

Table of Contents

[Dashboard Designer](#)

[Create a Dashboard](#)

[Provide Data](#)

[Supported Data Sources](#)

[Connecting to SQL Databases](#)

[Connecting to OLAP cubes](#)

[Binding to Microsoft Excel Workbooks](#)

[Binding to CSV Files](#)

[Binding to Extract Data Sources](#)

[Data Processing Modes](#)

[Connect to EF Data Sources](#)

[Binding to Federated Data Source](#)

[Binding to JSON Data Sources](#)

[Binding to Object Data Sources](#)

[Binding to XPO Data Sources](#)

[Binding to MongoDB](#)

[Work with Data](#)

[Edit Connection Parameters](#)

[Using the Query Builder](#)

[Using the Query Editor](#)

[Manage SQL Queries](#)

[Filter Queries](#)

[Pass Query Parameters](#)

[Stored Procedures](#)

[Preview Data](#)

[Creating Calculated Fields](#)

[Data Inspector](#)

[Add Dashboard Items](#)

[Bind Dashboard Items to Data](#)

[Bind Dashboard Items to Data](#)

[Hidden Data Items](#)

[Bind Dashboard Items to Data in OLAP mode](#)

[Dashboard Item Settings](#)

Chart

 Providing Data

 Series

 Series Overview

 Bar Series

 Point and Line Series

 Area Series

 Range Series

 Weighted Series

 Financial Series

 Panes

 Interactivity

 Master Filtering

 Drill-Down

 Coloring

 Legend

 Axes

 X-Axis

 Y-Axis

 Orientation

 Conditional Formatting

Scatter Chart

 Providing Data

 Interactivity

 Master Filtering

 Drill-Down

 Coloring

 Legend

 Axes

 Orientation

 Labels

 Conditional Formatting

Grid

 Providing Data

 Columns

 Column Type Overview

 Dimension Column

- [Hyperlink Column](#)
- [Measure Column](#)
- [Delta Column](#)
- [Sparkline Column](#)
- [Interactivity](#)
 - [Master Filtering](#)
 - [Drill-Down](#)
- [Conditional Formatting](#)
- [Totals](#)
- [Layout](#)
- [Style](#)

[Pies](#)

- [Providing Data](#)
- [Interactivity](#)
 - [Master Filtering](#)
 - [Drill-Down](#)
- [Coloring](#)
- [Layout](#)
- [Labels](#)
- [Style](#)

[Cards](#)

- [Providing Data](#)
- [Layout](#)
- [Delta](#)
- [Sparkline](#)
- [Formatting](#)
- [Conditional Formatting](#)
- [Interactivity](#)
 - [Master Filtering](#)
 - [Drill-Down](#)
- [Cards Arrangement](#)

[Gauges](#)

- [Providing Data](#)
- [Delta](#)
- [Gauge Scale](#)
- [Interactivity](#)
 - [Master Filtering](#)

- [Drill-Down](#)
- [Layout](#)
- [Style](#)
- [Pivot](#)
 - [Providing Data](#)
 - [Interactivity](#)
 - [Conditional Formatting](#)
 - [Layout](#)
 - [Expanded State](#)
- [Choropleth Map](#)
 - [Providing Maps](#)
 - [Providing Data](#)
 - [Map Coloring](#)
 - [Delta](#)
 - [Map Navigation](#)
 - [Interactivity](#)
 - [Labels](#)
 - [Legend](#)
- [Geo Point Maps](#)
 - [Map Types Overview](#)
 - [Providing Maps](#)
 - [Geo Point Map](#)
 - [Providing Data](#)
 - [Bubble Map](#)
 - [Providing Data](#)
 - [Coloring](#)
 - [Legends](#)
 - [Pie Map](#)
 - [Providing Data](#)
 - [Pie Options](#)
 - [Coloring](#)
 - [Legends](#)
 - [Clustering](#)
 - [Interactivity](#)
 - [Labels](#)
 - [Map Navigation](#)
- [Range Filter](#)

- Providing Data
 - Series
 - Interactivity
 - Predefined Ranges
 - Coloring
- Date Filter
- Images
 - Image Types Overview
 - Providing Images
 - Interactivity
 - Image Settings
- Text Box
 - Editing Text
 - Providing Data
 - Interactivity
- Treemap
 - Providing Data
 - Interactivity
 - Master Filtering
 - Drill-Down
 - Layout
 - Grouping
 - Coloring
 - Labels
- Filter Elements
 - Filter Elements Overview
 - Providing Data
 - Interactivity
- Dashboard Item Group
- Tab Container
- Data Shaping
 - Summarization
 - Grouping
 - Sorting
 - Filtering
 - Top N
 - Formatting Data

Interactivity

Master Filtering

Drill-Down

Neutral Filter Mode

Appearance Customization

Conditional Formatting

Value

Top-Bottom

Average

Icon Ranges

Color Ranges

Gradient Ranges

A Date Occurring

Expression

Bar

Bar Color Ranges

Bar Gradient Ranges

Coloring

Coloring Concepts

Customizing a Color Scheme

Data Display Formatting

Data Analysis

Aggregations

Summary Level Aggregations

Intermediate Level Aggregations

Expression Constants, Operators, and Functions

Window Calculations

Window Calculations Overview

Window Definition

Creating Window Calculations

Calculation Functions Reference

Window Calculation Limitations

Using Dashboard Parameters

Creating Parameters

Passing Parameter Values

Requesting Parameter Values

Convert Dashboard Items

Dashboard Layout

Dashboard Title

Dashboard Item Caption

Dashboard Items Layout

Undo and Redo Operations

Automatic and Manual Updates

Save a Dashboard

Printing and Exporting

UI Elements

Data Source Browser

Data Items Pane

Print Preview

Dashboard Viewer

Data Presentation

Data Presentation Basics

Master Filtering

Drill-Down

Dashboard Layout

Data Inspector

Dashboard Parameters

Requesting Parameter Values

Printing and Exporting

Dashboard Items

Chart

Data Presentation Basics

Interactivity

Printing and Exporting

Scatter Chart

Data Presentation Basics

Interactivity

Printing and Exporting

Grid

Data Presentation Basics

Interactivity

Printing and Exporting

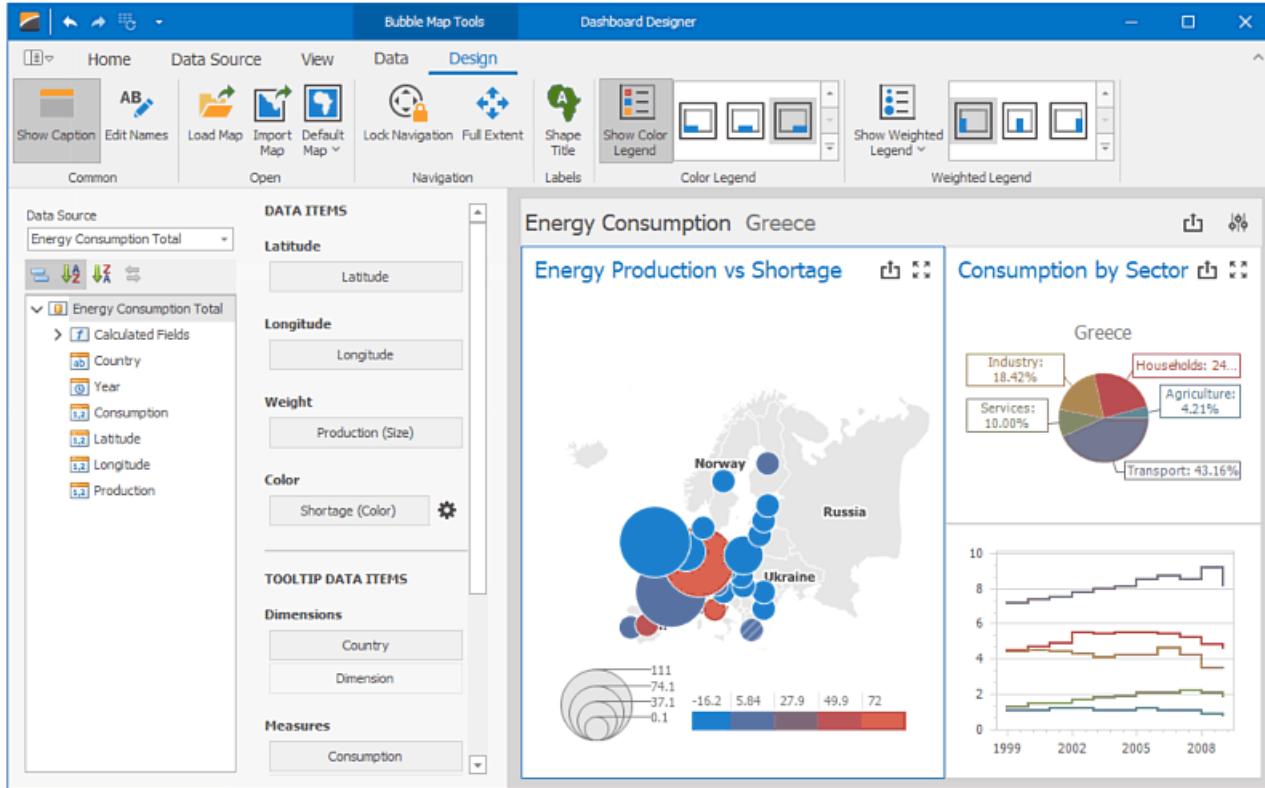
Pies

Data Presentation Basics

- Interactivity
- Printing and Exporting
- Cards
 - Data Presentation Basics
 - Interactivity
 - Printing and Exporting
- Gauges
 - Data Presentation Basics
 - Interactivity
 - Printing and Exporting
- Pivot
 - Printing and Exporting
- Choropleth Map
 - Data Presentation Basics
 - Interactivity
 - Printing and Exporting
- Geo Point Maps
 - Data Presentation Basics
 - Interactivity
 - Printing and Exporting
- Range Filter
 - Printing and Exporting
- Date Filter
- Image
 - Printing and Exporting
- Text Box
 - Printing and Exporting
- Treemap
 - Data Presentation Basics
 - Interactivity
 - Printing and Exporting
- Filter Elements
 - Filter Elements Overview
 - Neutral Filter Mode
- Tab Container

Dashboard Designer

The **Dashboard Designer** provides an intuitive UI that facilitates data binding and shaping, and layout design. Many of these normally complex tasks can be accomplished with a simple drag-and-drop operation, allowing you to start creating dashboards immediately.



Creating Dashboards

The following topics will guide you through the process of creating a dashboard.

- [Create a Dashboard](#)
- [Provide Data](#)
- [Work with Data](#)
- [Add Dashboard Items](#)
- [Bind Dashboard Items to Data](#)
- [Dashboard Item Settings](#)
- [Data Shaping](#)
- [Interactivity](#)
- [Appearance Customization](#)
- [Data Analysis](#)
- [Convert Dashboard Items](#)
- [Dashboard Layout](#)
- [Undo and Redo Operations](#)
- [Automatic and Manual Updates](#)
- [Save a Dashboard](#)

Printing and Exporting

The Dashboard Designer provides the capability to print or export the individual items of a dashboard, as well as the entire dashboard.

- [Printing and Exporting](#)

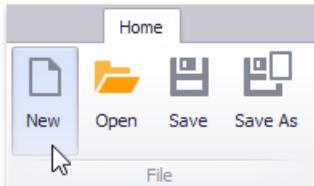
UI Elements

The topics in this section describe the main elements of a Dashboard Designer application.

- [UI Elements](#)

Create a Dashboard

When you run an application containing the Dashboard Designer, it already contains an empty dashboard. To create a new dashboard, click the **New** button in the ribbon **Home** tab.



Provide Data

The topics in this section describe how to provide data to be visualized in the dashboard.

This section contains the following topics.

- [Supported Data Sources](#)
- [Connecting to SQL Databases](#)
- [Connecting to OLAP cubes](#)
- [Binding to Microsoft Excel Workbooks](#)
- [Binding to CSV Files](#)
- [Binding to Extract Data Sources](#)
- [Data Processing Modes](#)
- [Binding to Object Data Sources](#)
- [Binding to JSON Data Sources](#)
- [Binding to XPO Data Sources](#)
- [Connect to EF Data Sources](#)
- [Binding to Federated Data Source](#)
- [Binding to MongoDB](#)

Supported Data Sources

The Dashboard Designer allows you to establish a connection to various data sources such as SQL databases, Microsoft Excel workbooks, XML/CSV data files or OLAP cubes.

The following data source types are supported:

- [SQL Data Source](#)
- [OLAP Data Source](#)
- [Microsoft Excel Workbooks/CSV Files](#)
- [JSON Data Source](#)
- [XPO Data Source](#)
- [Extract Data Source](#)
- [Object Data Source](#)
- [Entity Framework Data Source](#)
- [Federated Data Source](#)
- [MongoDB](#)

SQL Data Source

To connect to various SQL databases, the Dashboard Designer requires corresponding providers to be installed on your machine. The table below lists the supported data sources and the required data providers.

SQL DATA SOURCE	SUPPORTED VERSIONS	PROVIDER	DATABASE PROVIDER ASSEMBLY	DOWNLOAD LINK
Microsoft SQL Server	2005, 2008, 2008R2, 2012, 2014, 2016, 2005 Express Edition, 2008 R2 Express, 2012 Express, 2014 Express, 2016 Express, Azure SQL Database	.NET Framework Data Provider for SQL Server	System.Data.dll	Included in .NET Framework
Microsoft Access	2000 or higher	Microsoft Jet OLE DB Provider / Microsoft Access Database Engine (ACE)	System.Data.dll	Microsoft Access 2000-2003 - Microsoft Jet 4.0 Database Engine / Microsoft Access 2007 and later - Access Database Engine
Microsoft SQL Server CE	3.5, 4.0	.NET Framework Data Provider for SQL Server Compact	System.Data.SqlServerCe.dll	Included in .NET Framework
Oracle Database	9i or higher	Oracle Data Provider for .NET / .NET Framework Data Provider for Oracle	Oracle.DataAccess.dll, Oracle.ManagedDataAccess.dll, System.Data.OracleClient.dll	Download link (Included in .NET Framework)

SQL DATA SOURCE	SUPPORTED VERSIONS	PROVIDER	DATABASE PROVIDER ASSEMBLY	DOWNLOAD LINK
Amazon Redshift	n/a	.NET data provider for PostgreSQL	Npgsql.dll	Download link
Google BigQuery	n/a	DevExpress.DataAccess.BigQuery ADO.NET provider	DevExpress.DataAccess.BigQuery.dll	Download link
Teradata	13.0 or higher	.NET Data Provider for Teradata	Teradata.Client.Provider.dll	Download link
SAP Sybase Advantage	Advantage Database Server 9.1 or higher	Advantage .NET Data Provider	Advantage.Data.Provider.dll	Download link
SAP Sybase ASE	Sybase Adaptive Server 12.0 or higher	SAP Sybase ASE Database Client	Sybase.Data.AseClient.dll	Download link
SAP SQL Anywhere	11 or higher	SAP SQL Anywhere Database Client	iAnywhere.Data.SQLAnywhere.dll	Download link
IBM DB2	9.5 or higher	ADO.Net client from IBM	IBM.Data.DB2.dll	Download link
Firebird	1.5 or higher, Dialect 3	Firebird ADO.NET Data Provider	FirebirdSql.Data.Firebird.dll, FirebirdSql.Data.FirebirdClient.dll	Download link
MySQL	4.1 or higher	ADO.NET driver for MySQL	MySql.Data.dll	Download link
Pervasive PSQL	9.x or higher	PSQL ADO.NET Data Provider	Pervasive.Data.SqlClient.dll	Download link
PostgreSQL	7.x or higher	.NET data provider for PostgreSQL	Npgsql.dll	Download link
VistaDB	4, 5, 6	VistaDB ADO.NET Provider	VistaDB.5.NET40.dll	Download link
SQLite	3.x	ADO.NET provider for SQLite	System.Data.SQLite.dll	Download link
XML file	n/a	n/a	n/a	n/a

See the following topic for information on how to create a connection to a SQL data source: [Binding to SQL databases](#).

OLAP Data Source

To use the OLAP data source, the Dashboard Designer requires Microsoft Analysis Services OLE DB and Microsoft ADOMD.NET providers to be installed on your machine. Refer to the following topic for more information: [Data providers used for Analysis Services connections](#).

The following OLAP servers are supported:

- Microsoft SQL Server 2000 Analysis Services
- Microsoft SQL Server 2005 Analysis Services

- Microsoft SQL Server 2008 Analysis Services
- Microsoft SQL Server 2008 R2 Analysis Services
- Microsoft SQL Server 2012 Analysis Services (Multi-dimensional mode)
- Microsoft SQL Server 2014 Analysis Services (Multi-dimensional mode)
- Microsoft SQL Server 2016 Analysis Services (Multi-dimensional mode)

To create a connection to an OLAP cube data source, see [Binding to OLAP cubes](#).

Microsoft Excel Workbooks/CSV Files

The following Microsoft Excel/text formats are supported:

- XLS
- XLSX
- XLSM
- CSV

To create a connection to Microsoft Excel workbooks or CSV files, see [Binding to Microsoft Excel Workbooks](#).

JSON Data Source

The JSON data source retrieves data from:

- Web-service endpoint
- text file
- string

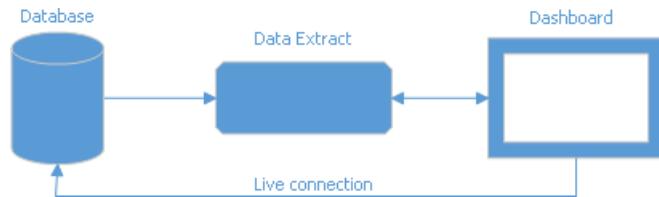
To create a JSON data source and specify connection parameters in the **Data Source Wizard**, see [Binding to JSON Data Sources](#).

XPO Data Source

The XPO data source gets data from **eXpress Persistent Objects**. To create an XPO data source and specify connection parameters, see [Binding to XPO Data Sources](#).

Extract Data Source

Extract Data Source is a compressed snapshot of data from a regular data source. This data is saved to a local file and can be updated from the original data source at any time.



The extract data file is optimized for data grouping. It reduces the initial dashboard load time. A special in-memory cache allows you to improve performance when accessing extract data.

To create an Extract data source and specify connection parameters, see [Binding to Extract Data Sources](#).

Object Data Source

The Dashboard Designer allows you to connect to an object data source defined in a separate class within the current project.

To create a connection to an Object data source, see [Binding to Object Data Sources](#).

Entity Framework Data Source

Use the available data context to connect to EF data source.

To create a connection to an EF data source, see [Connect to EF Data Sources](#).

Federated Data Source

A federated data source integrates different data sources and provides uniform data access with a federated query.

Federated data source supports the following data source types:

- [SQL Data Source](#)
- [Excel Data Source](#)
- [Object Data Source](#)
- [MongoDB](#)

See the following topic for information on how to create a federated data source with the **Data Source Wizard: Binding to Federated Data Source**.

MongoDB

The Dashboard Designer allows you to connect to a MongoDB instance and stores data in JSON-like documents.

The [MongoDB.Driver](#) package should be installed in your project to supply MongoDB data at runtime.

You can use MongoDB as the original data source to create an Extract database. MongoDB can be used to create a federated data source.

You can filter the MongoDB data source and add calculated fields.

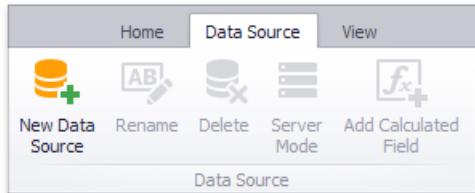
Refer to the following article for more information on how to connect to MongoDB: [Binding to MongoDB](#).

Connecting to SQL Databases

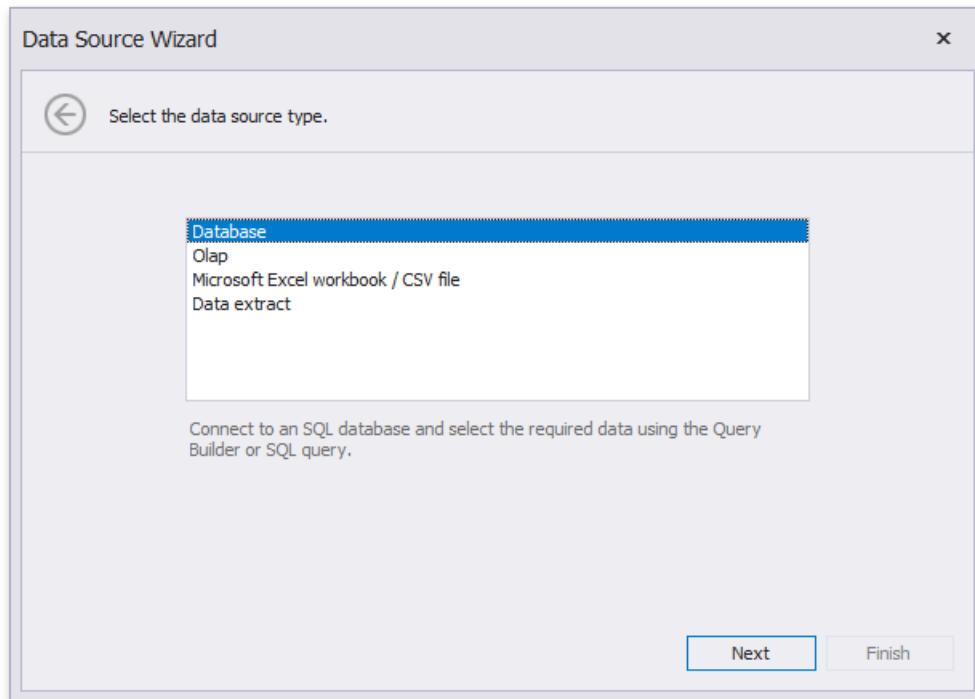
The Dashboard Designer provides the capability to connect to multiple types of SQL databases using the **Data Source** wizard. This tutorial describes how to establish a connection to any supported database and select the required data.

To connect to an SQL database in the Dashboard Designer, follow the steps below.

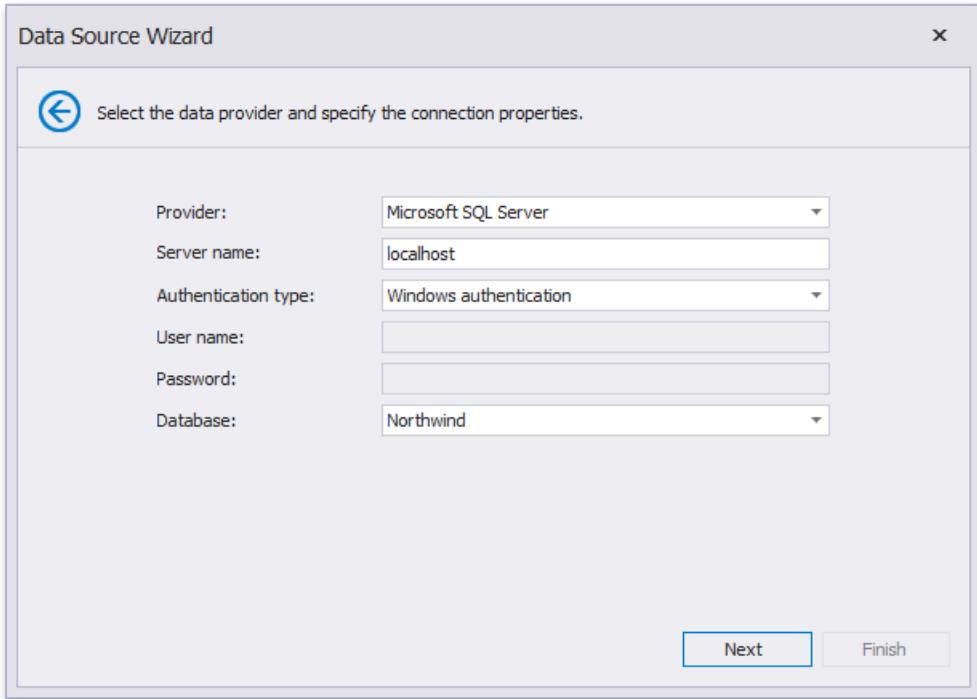
1. Click the **New Data Source** button in the **Data Source** ribbon tab.



2. On the first page of the invoked **Data Source Wizard** dialog, select **Database** and click **Next**.



3. On the next page, select the required data provider and specify the required connection parameters.



For instance, if you selected the **Microsoft SQL Server** data provider, the following options should be specified.

- **Server name**

Specify the name of the MS SQL server to which the connection should be established.

- **Authentication type**

Specify the authentication mode of the MS SQL Server. You can choose whether to use *Windows authentication* or *Server authentication*.

- **User name**

Specify the user name used to authenticate to the MS SQL server.

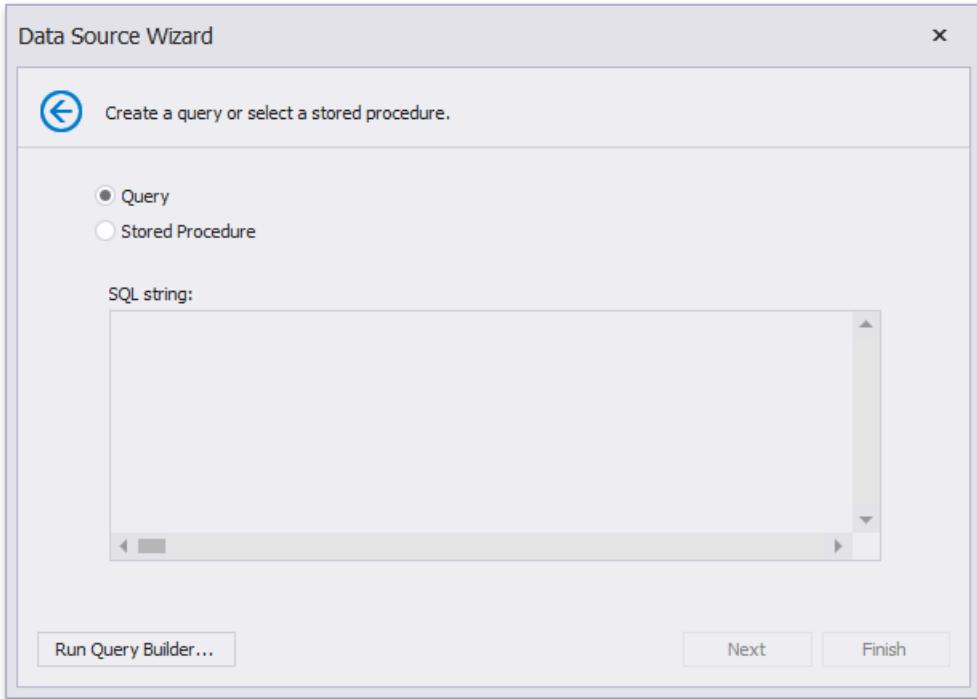
- **Password**

Specify the password used to authenticate to the MS SQL server.

- **Database**

Select the database that contains required data.

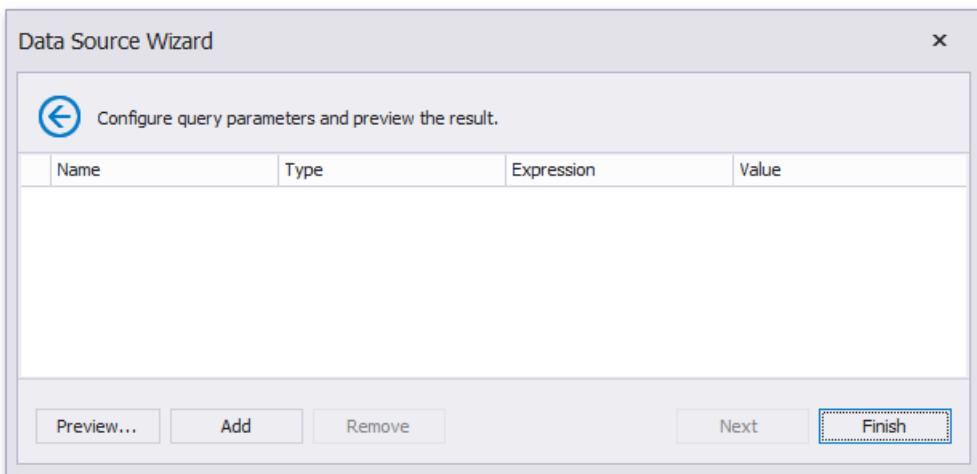
4. After you have specified the required connection parameters, click **Next** and specify how to select data from the database.



- Select the **Query** option and run the [Query Builder](#) by clicking the **Run Query Builder...** button. The Query Builder allows you to choose the required tables/columns visually and passes the resulting SQL query to the **SQL String** editor. Click **Finish** to create the data source.
- Select the **Stored Procedure** option to select one of the [stored procedures](#) from the database.

Click **Next**.

5. On the final page, you can optionally add [query parameters](#) and [preview](#) data.



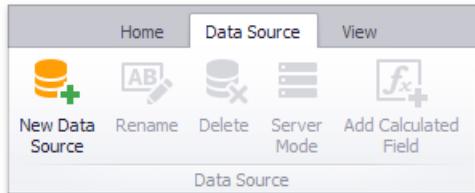
Click **Finish** to create the data source.

Connecting to OLAP cubes

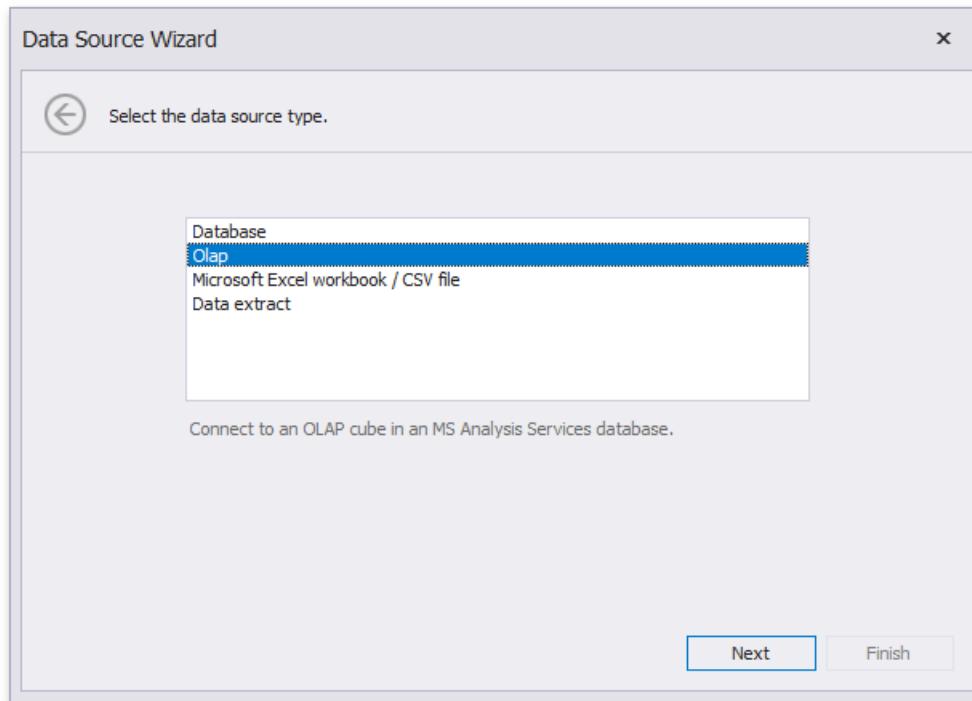
The Dashboard Designer provides the capability to connect to an OLAP cube in the Microsoft Analysis Services database using the **Data Source** wizard.

To connect to an OLAP cube in the Dashboard Designer, do the following steps.

1. Click the **New Data Source** button in the **Data Source** ribbon tab.



2. On the first page of the invoked **Data Source Wizard** dialog, select **Olap** and click **Next**.

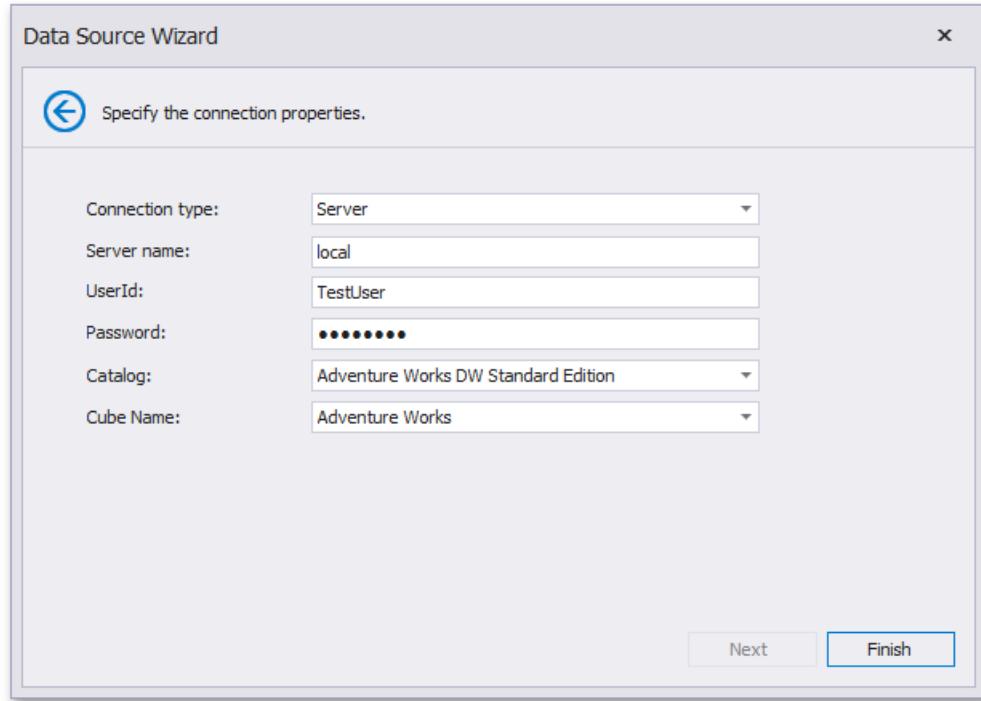


3. On the next page, choose the required **Connection type**. The following types are available.

- o [Server](#)
- o [Local cube file](#)
- o [Custom connection string](#)

Server

If you selected **Server**, the following options are available.



- **Server name**

Specify the name of the OLAP server to which the connection should be established.

- **UserId**

Specify the user name used to authenticate to the OLAP server.

- **Password**

Specify the password used to authenticate to the OLAP server.

- **Catalog**

Select a data catalog that contains cubes.

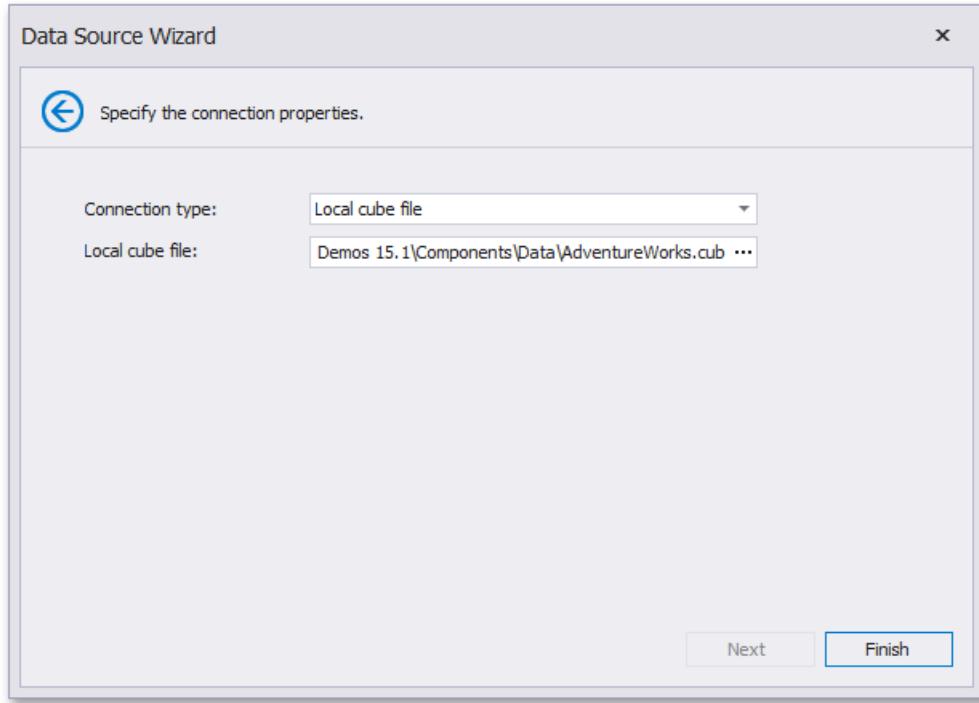
- **Cube Name**

Select a cube that provides OLAP data.

Click **Finish** to create a data source.

Local Cube File

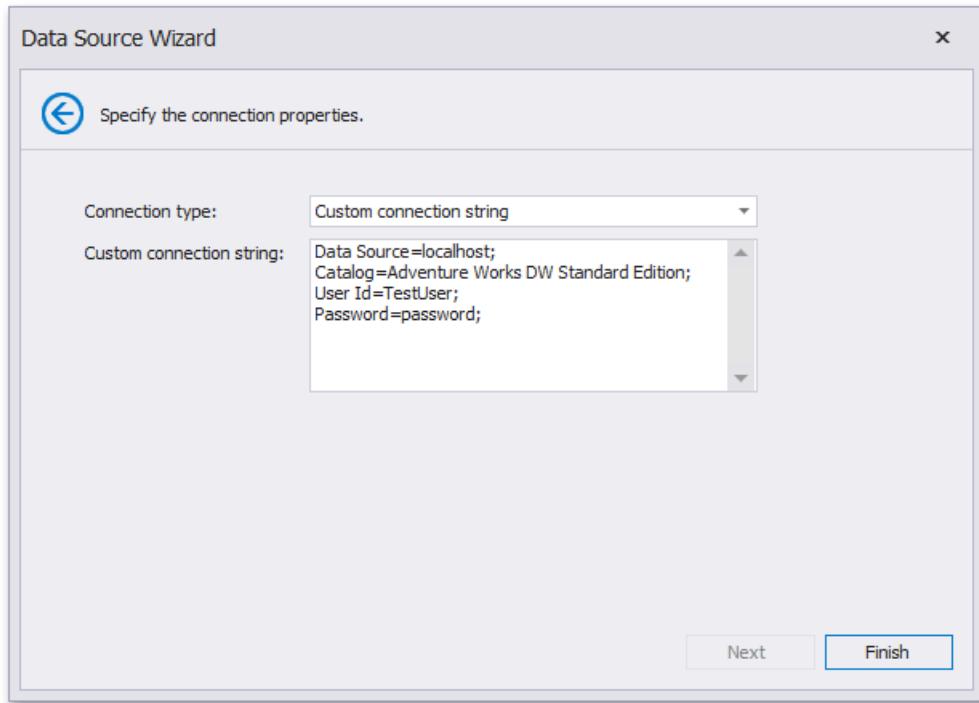
If you selected **Local cube file**, specify the path to the requiredOLAP cube. To locate the cube, click the ellipsis button next to the Database field.



Click **Finish** to create a data source.

Custom Connection String

If you selected **Custom connection string**, specify a connection string in the **Custom connection string** editor.



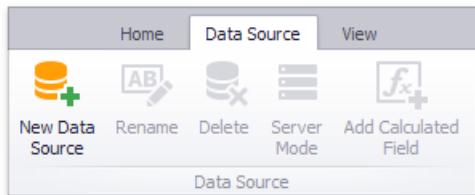
Click **Finish** to create a data source.

Binding to Microsoft Excel Workbooks

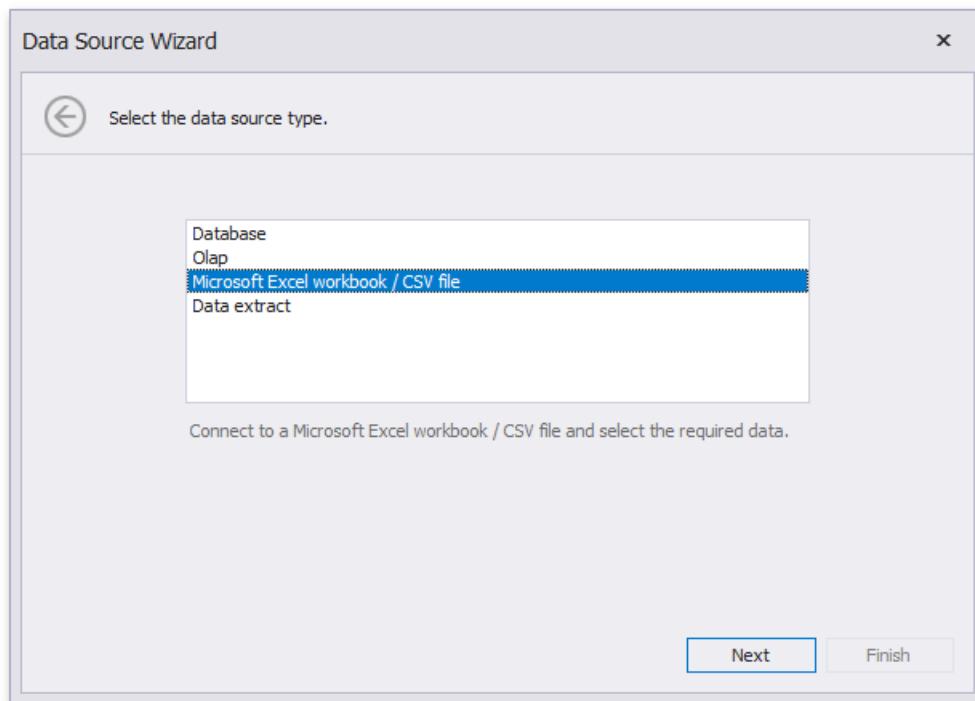
The Dashboard Designer allows you to select required data from Microsoft Excel workbooks (XLS, XLSX or XLSM). You can select all data from the specified worksheet or you can select the cell range referenced by the specified defined/table name.

To bind a dashboard to a Microsoft Excel workbook, do the following.

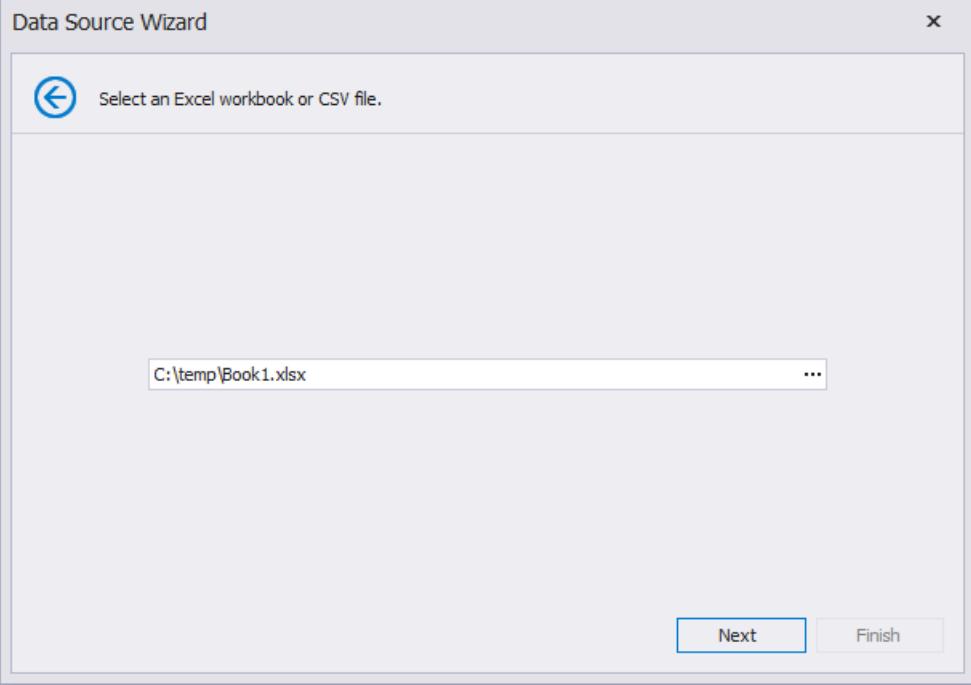
1. Click the **New Data Source** button in the **Data Source** ribbon tab.



2. On the first page of the invoked **Data Source Wizard** dialog, select **Microsoft Excel workbook / CSV file** and click **Next**.



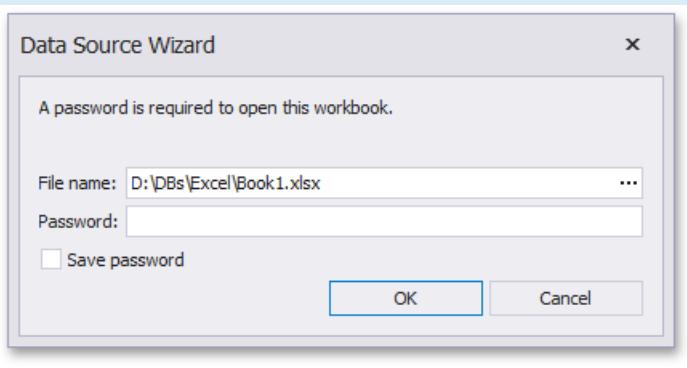
3. On the next page, locate the required workbook by clicking an ellipsis button and selecting the file.



Click **Next**.

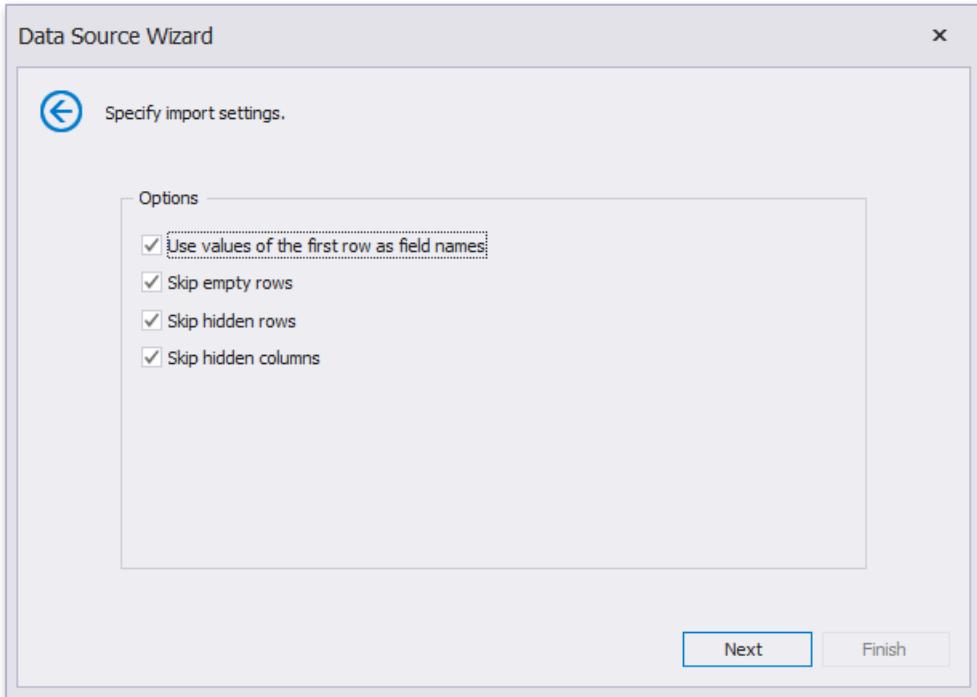
NOTE

If the workbook is protected by a password, the following window will be invoked.



Specify a password in the **Password** field and click **OK**. Note that if you enable the **Save password** flag, the password will be saved to a dashboard definition as plain text.

4. Then, specify import settings used to extract data from the workbook.

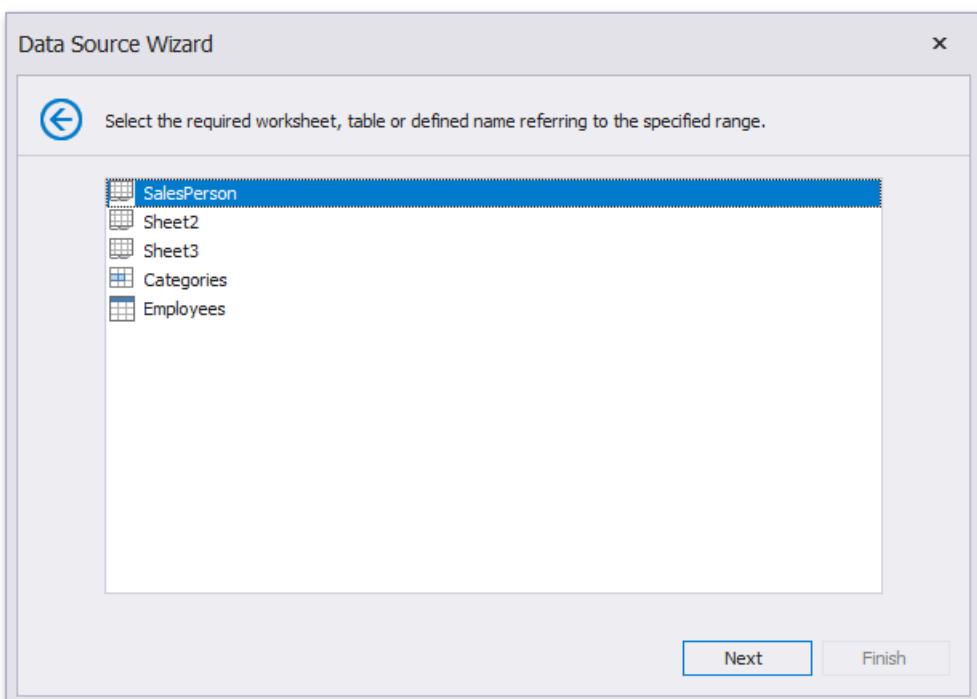


The following options can be specified.

- **Use values of the first row as field names** - Specifies whether to use the values of the first row as field names. If you disable this option, field names will be generated automatically.
- **Skip empty rows** - Specifies whether or not to include the empty rows into the resulting data source.
- **Skip hidden rows** - Specifies whether to ignore hidden rows when importing data to a data source.
- **Skip hidden columns** - Specifies whether to ignore hidden columns when importing data to a data source.

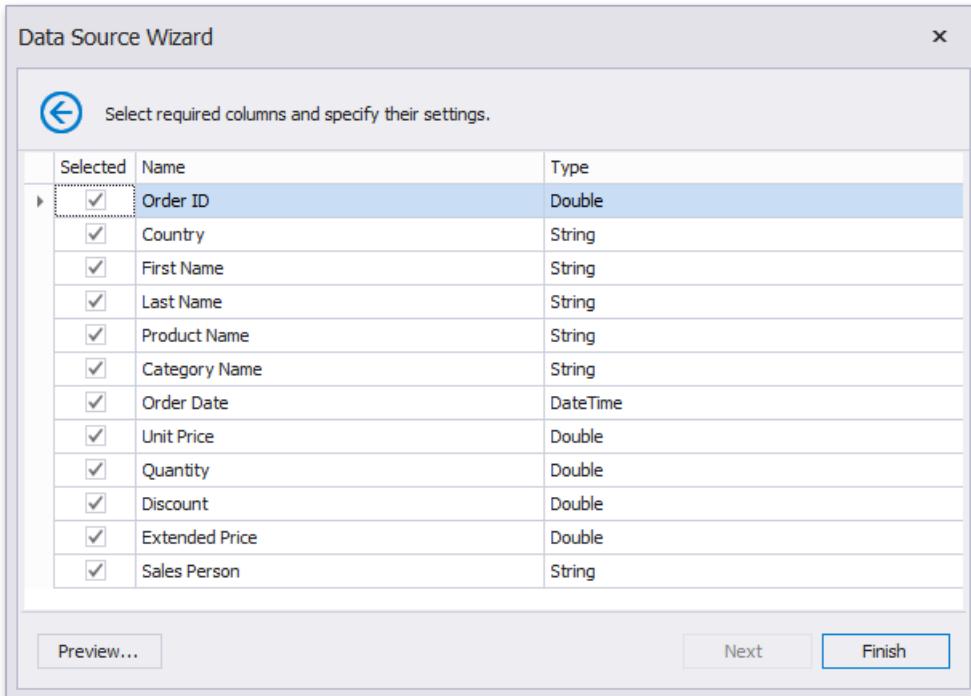
Click **Next**.

5. On the next page, you can select the worksheet containing the required data, the table or the defined name referring to the specified cell range.



Click **Next**.

6. On the final page, you can select columns to be included to a data source and specify their settings. The **Name** column allows you to specify the column name while **Type** allows you to specify its type.



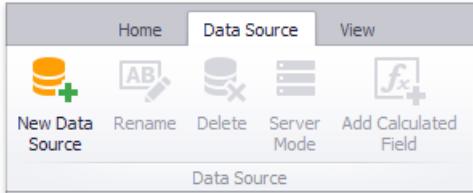
Click **Finish** to create a data source. This creates the data source and displays its fields in the [Data Source Browser](#).

Binding to CSV Files

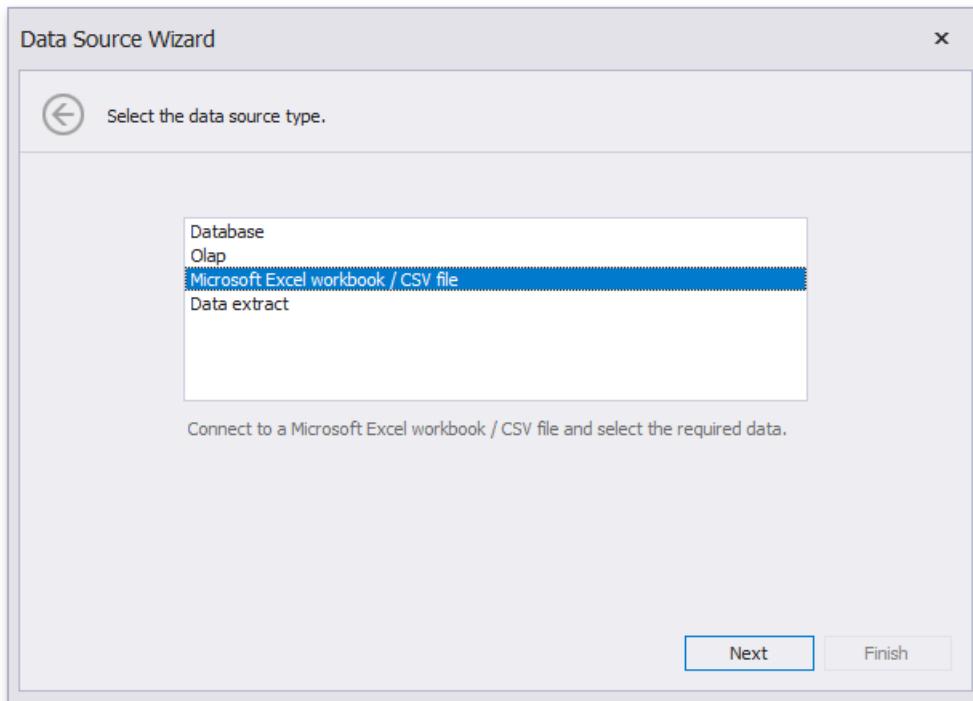
The Dashboard Designer allows you to select data from CSV files.

To bind a dashboard to a CSV file, do the following.

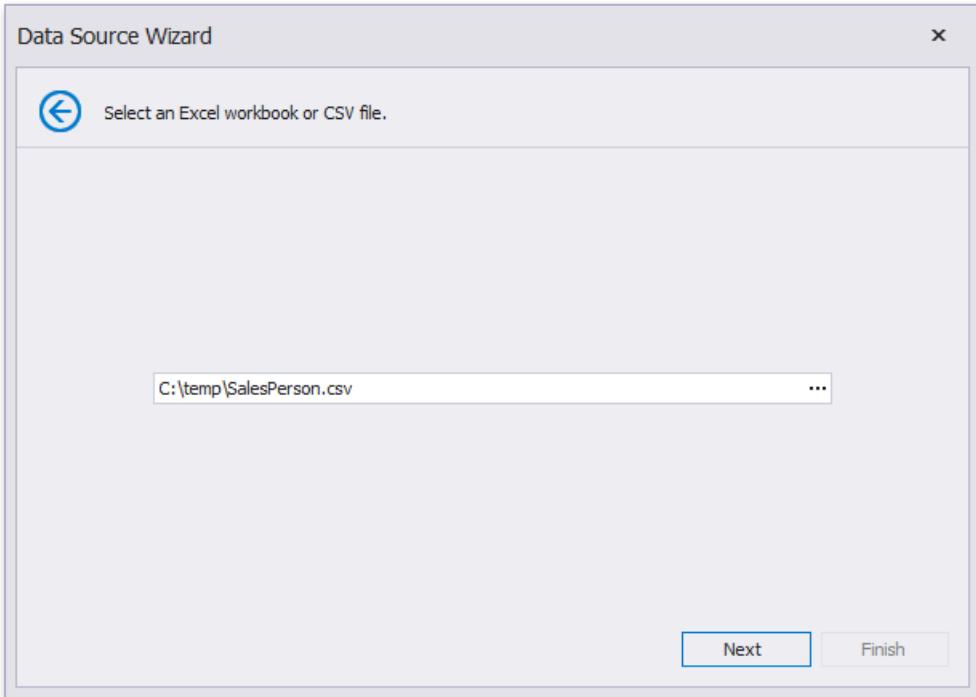
1. Click the **New Data Source** button in the **Data Source** ribbon tab.



2. On the first page of the invoked **Data Source Wizard** dialog, select the **Microsoft Excel workbook / CSV file** and click **Next**.

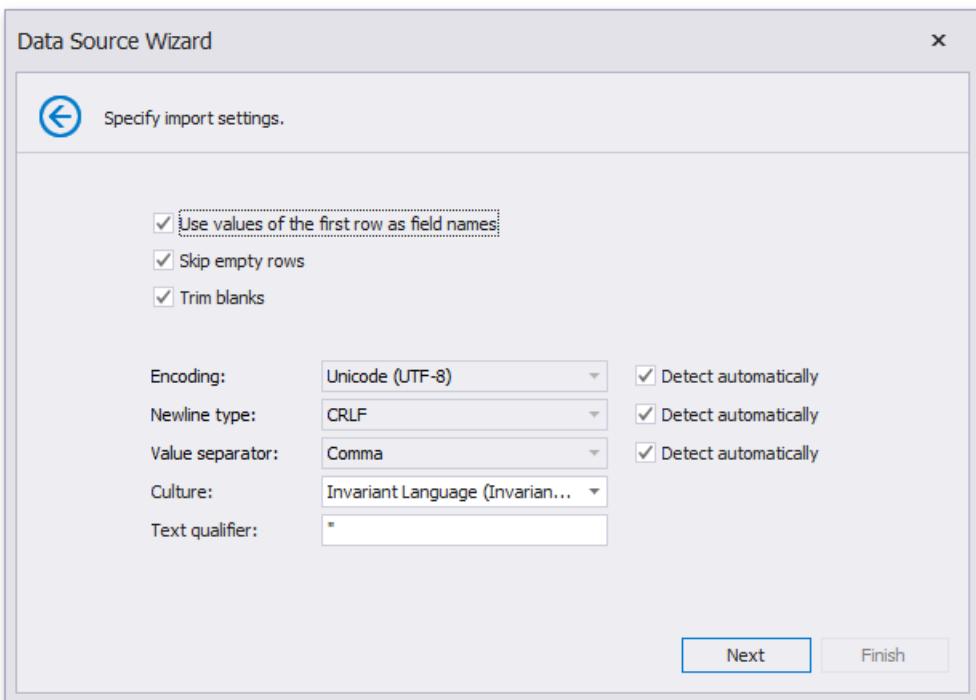


3. On the next page, locate the required CSV file by clicking the ellipsis button and selecting the file.



Click **Next**.

4. Then, specify import settings used to extract data from the CSV file.



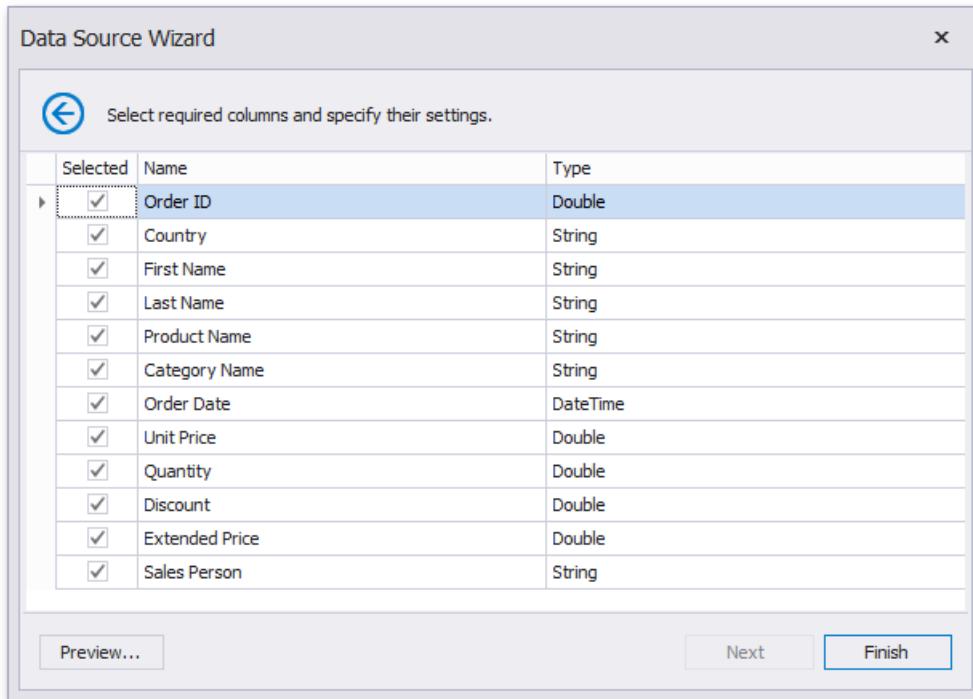
The following options can be specified.

- **Use values of the first row as field names** - Specifies whether to use the values of the first row as field names. If you disable this option, field names will be generated automatically.
- **Skip empty rows** - Specifies whether or not to include the empty rows into the resulting data source.
- **Trim Blanks** - Specifies whether to remove all leading and trailing white-space characters from each value in the CSV document.
- **Encoding** - Specifies the character encoding of the CSV document. You can use the **Detect automatically** option to specify whether character encoding is automatically determined.
- **Newline type** - Specifies the character used to identify a new line in a CSV document. You can use the **Detect automatically** option to specify whether the character used to identify a new line is automatically determined.

- **Value separator** - Specifies a character used to separate values in a CSV document. You can use the **Detect automatically** option to specify whether the character used to separate values in a CSV document is determined automatically.
- **Culture** - Specifies the culture information used to parse the data being imported.
- **Text Qualifier** - Specifies the character that encloses values in the CSV document.

Click **Next**.

5. On the final page, you can select columns to be included to a data source and specify their settings. The **Name** column allows you to specify the column name while **Type** allows you to specify its type.



Click **Finish** to create a data source. This creates the data source and displays its fields in the [Data Source Browser](#).

Binding to Extract Data Sources

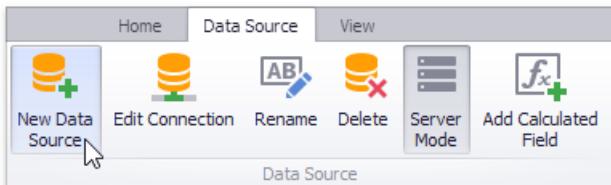
The Dashboard Designer allows you to create a *data extract* that is a compressed snapshot of data obtained from the existing data source. This data is saved to a local file and can be updated from the original data source at any time.

NOTE

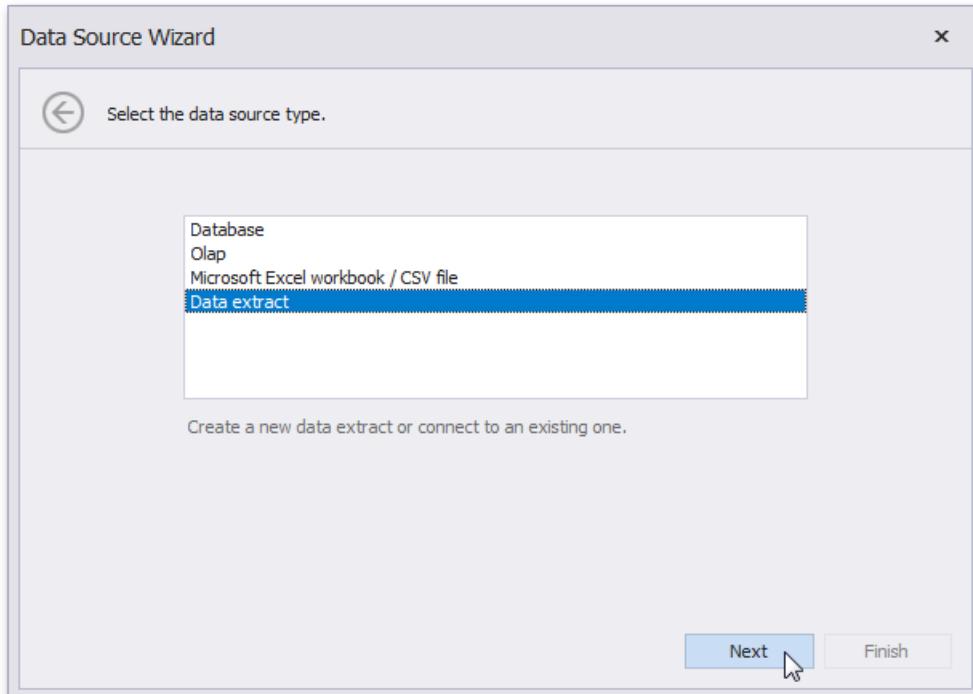
Note that data extracts cannot be created for the OLAP data sources.

To create a new data extract from the existing data source, perform the following steps.

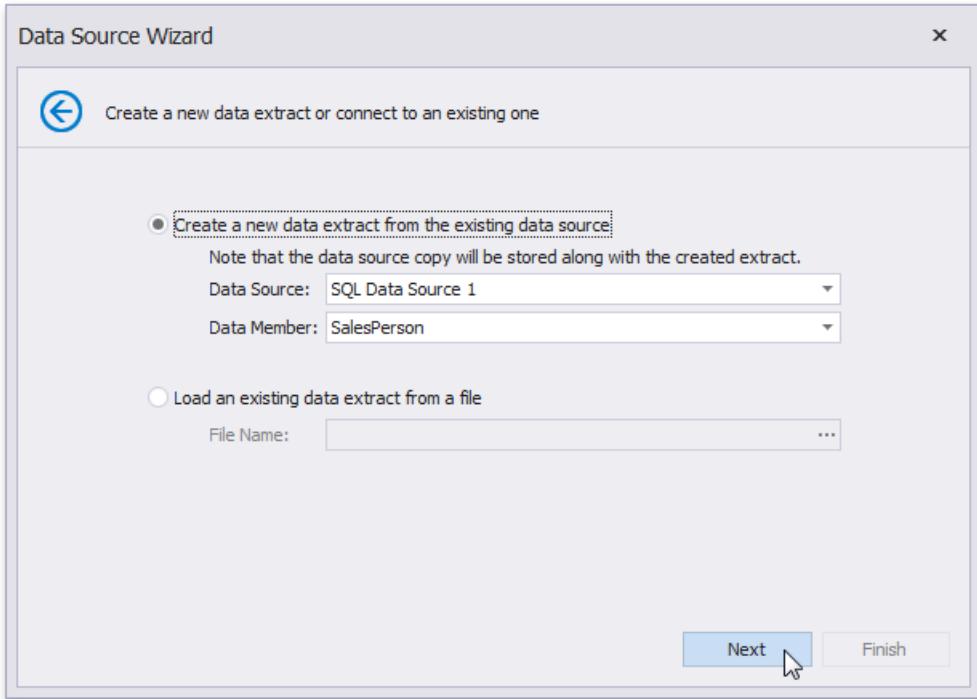
1. Click the **New Data Source** button in the **Data Source** ribbon tab.



2. On the first page of the invoked **Data Source Wizard** dialog, select **Data extract** and click **Next**.

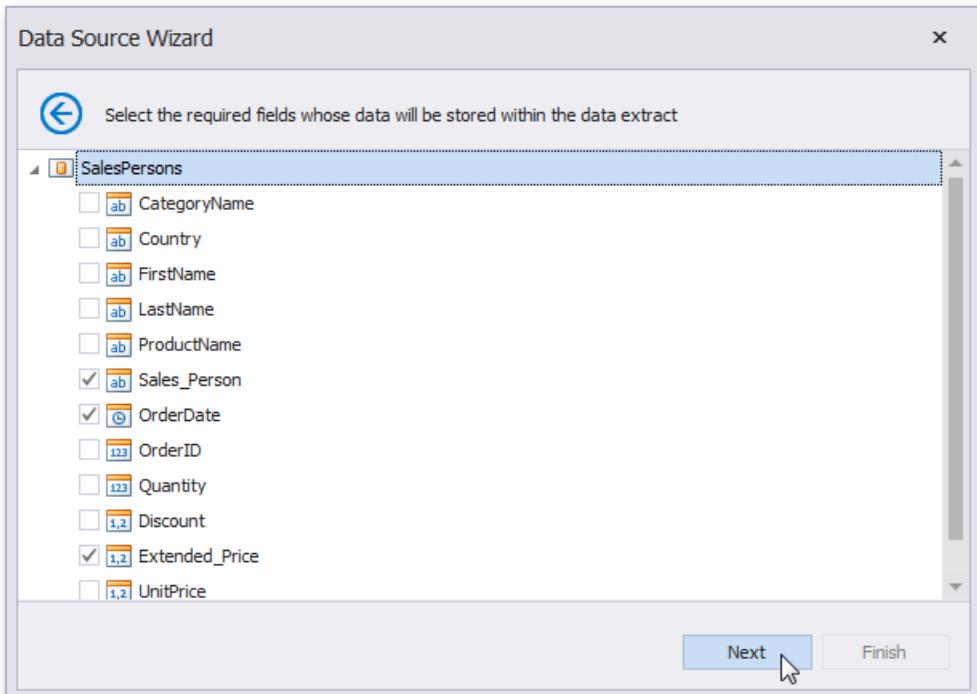


3. On the next page, select whether to create a new data extract or establish a connection to an existing one.

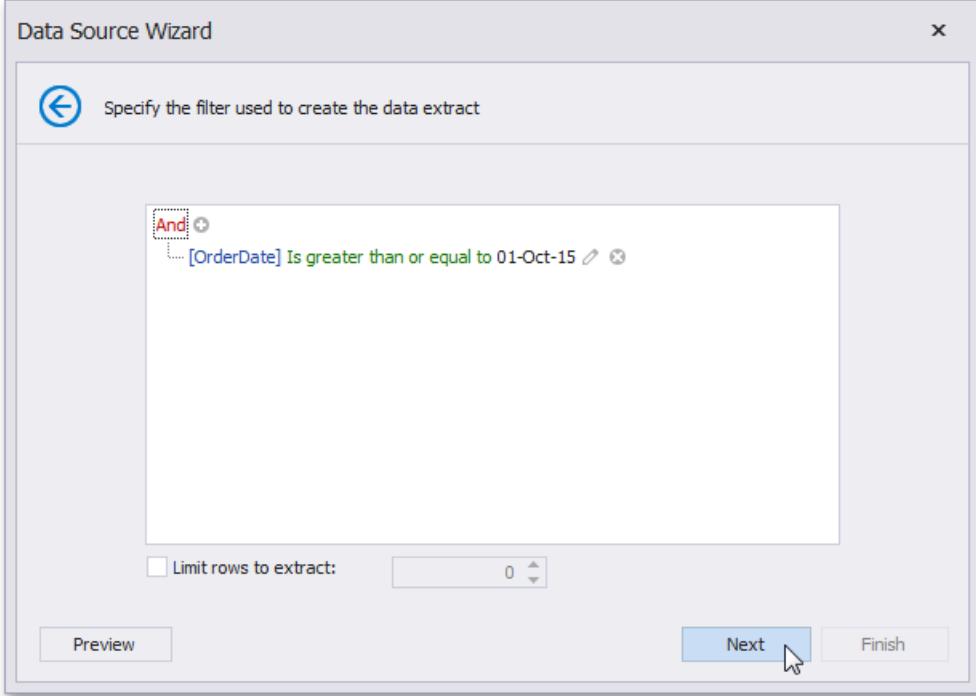


- To create a new data extract, select **Create a new data extract from the existing data source** and specify the required **Data Source** and **Data Member**. Click **Next**.
- To establish a connection to an existing data extract, select **Load an existing data extract from a file** and locate the required *.dat file. Click **Finish**.

4. **(Conditional)** The next page only appears if you are creating the data extract based on the Entity Framework or Object data sources, and allows you to select the required fields.



5. On the next page, you can specify the filter used to extract data. To learn how to specify the filter criteria, see [Filter Data via the Filter Editor](#).



Data Source Wizard



And [OrderDate] Is greater than or equal to 01-Oct-15

Limit rows to extract:

Preview

Next

Finish

You can also limit the number of extracted rows by enabling the **Limit rows to extract** option and specifying the required number of rows. Click **Next**.

i NOTE

Use the **Preview** button to see the data that will be placed into the resulting data extract.

6. **(Conditional)** The next page only appears if the original data source contains [parameters](#) (for instance, the [SQL query is filtered](#) using a dashboard parameter).

Data Source Wizard

Specify the parameter value(s) used to create a data extract

Parameter Name	Value
Select a category:	Beverages

Preview

Next

Finish

7. On the final page, specify a path to the file that will contain the resulting data extract.

Data Source Wizard

x



Specify a path to the file that will contain the resulting data extract

C:\temp\SalesPersonExtract.dat

...

Next

Finish



Click **Finish**. This creates the data extract and displays its fields in the [Data Source Browser](#). You can use this data extract as a regular data source.

Data Processing Modes

DevExpress Dashboard supports two data processing modes that are used to perform data-related operations (such as grouping, filtering, etc.).

- In **server mode**, data-related operations are performed on the database server side. For instance, when you apply [filtering](#) to a dashboard item, the Dashboard Designer requests the required data automatically by sending a query containing a corresponding SELECT statement with the specified WHERE clause.
- In **client mode**, data-related operations are performed on the workstation side. In this mode, a compressed snapshot of aggregated data is loaded into a workstation memory. This reduces memory consumption and improves the speed of client-side data shaping operations using several techniques: data compression, various data grouping and multi-threading algorithms, etc.

i TIP

Note that performance in **server/client** modes depends on multiple factors such as database structure, server workload, etc. To decide which mode to use, test both.

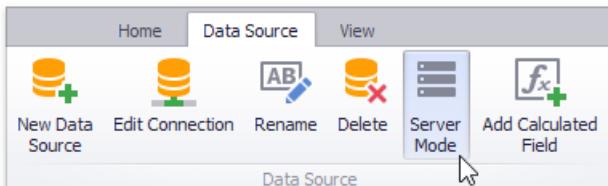
i NOTE

In OLAP mode, data processing is performed using the *server mode* specified for the Analysis Services instance. To learn more, see [Determine the Server Mode of an Analysis Services Instance](#).

Change Data Processing Mode

Different data source types allow you to manage the current data processing mode in different ways.

- For [SQL data sources](#), you can switch between data processing modes manually. To enable or disable **server mode** for the [selected](#) data source, use the **Server Mode** button located on the **Data Source** ribbon tab.



Server mode is supported for the SQL data sources created using the Data Source wizard and supplied with data using the [Query Builder](#).

- [Excel Data Source](#) supports **client mode** only.
- [Extract Data Source](#) works in **client mode**.

Server Mode Limitations

In **server mode**, the Dashboard does not have simultaneous access to bound data in its entirety. This imposes some limitations.

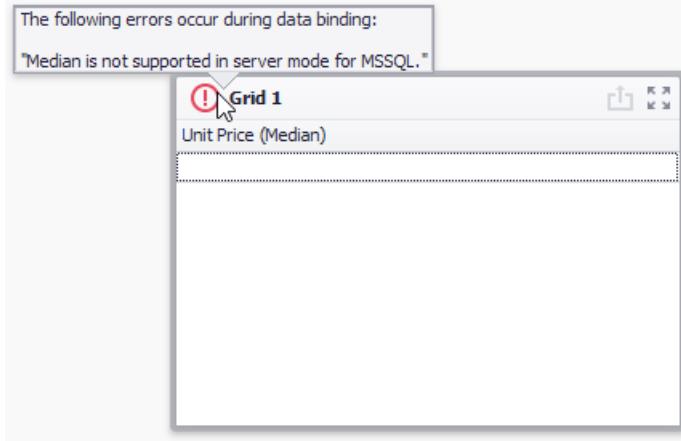
- [Stored procedures](#) are not supported in server mode.
- Stored procedures executed using custom SQL are not supported in server mode.
- Some [calculated fields](#) cannot be evaluated in server mode.
- The [Count Distinct](#) summary function is not supported for the following database engines:
 - Microsoft Access
 - Microsoft SQL Server CE
- The [Median](#) summary function is supported for the Oracle data provider only.

- The [Bound Image](#) and [Grid](#) dashboard items cannot display images from the following types of databases:

- Microsoft SQL Server
- MySQL
- PostgreSQL

Data Processing Errors

The Dashboard Designer provides the capability to display errors that occurred during data processing operations (such as changing measure [summary types](#), [calculation](#) errors, etc.). For instance, the [Grid](#) below shows an error when the summary type of the *Extended Price* measure is set to [Median](#) in server mode.

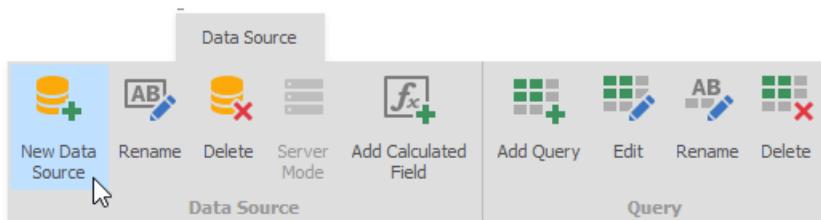


To see the error message, hover the mouse pointer over the icon.

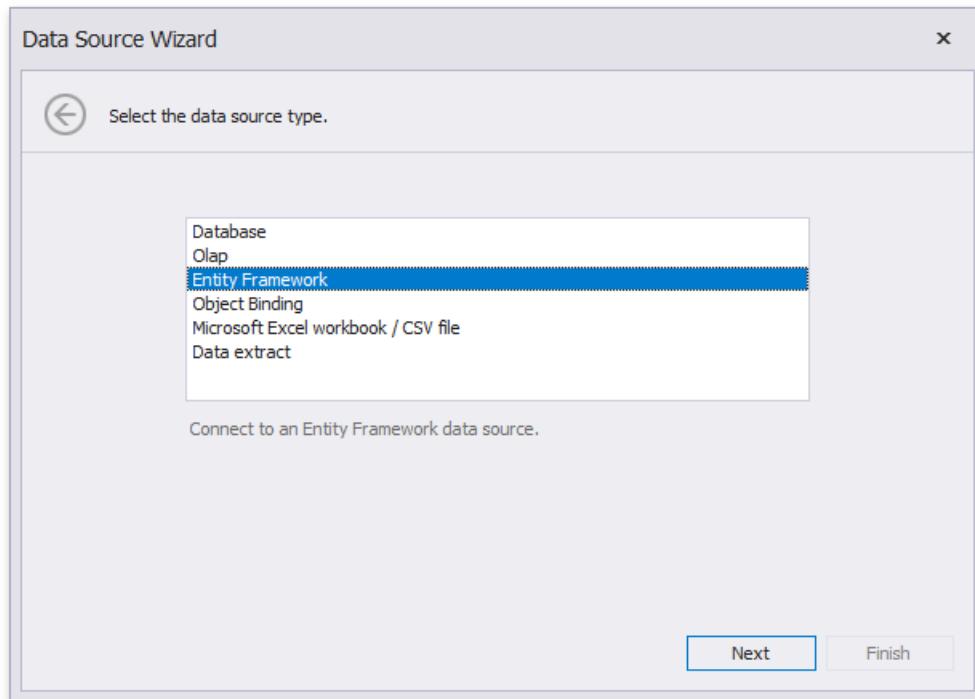
Connect to EF Data Sources

To bind a dashboard to an Entity Framework data source from the current project, do the following.

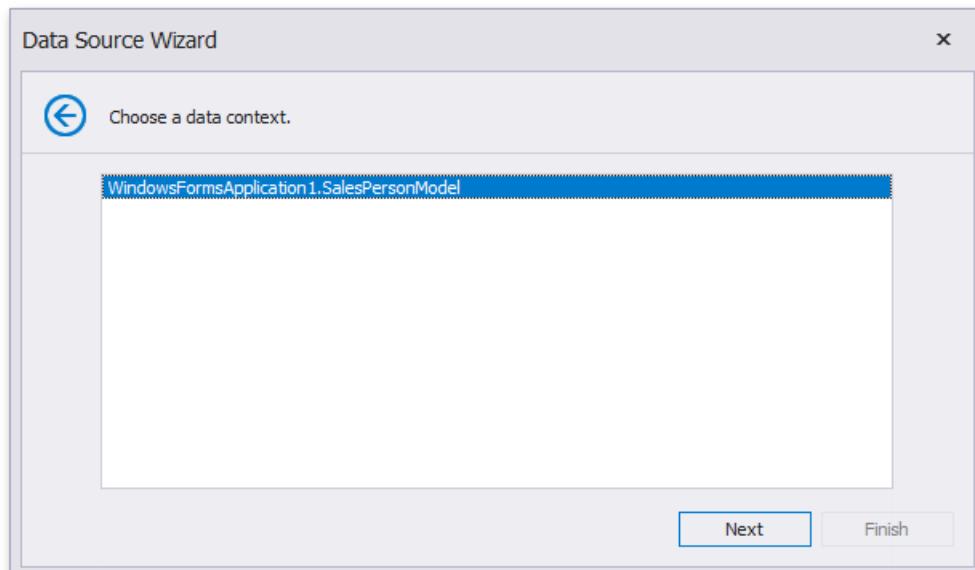
1. Click the **New Data Source** button in the **Data Source** ribbon tab.



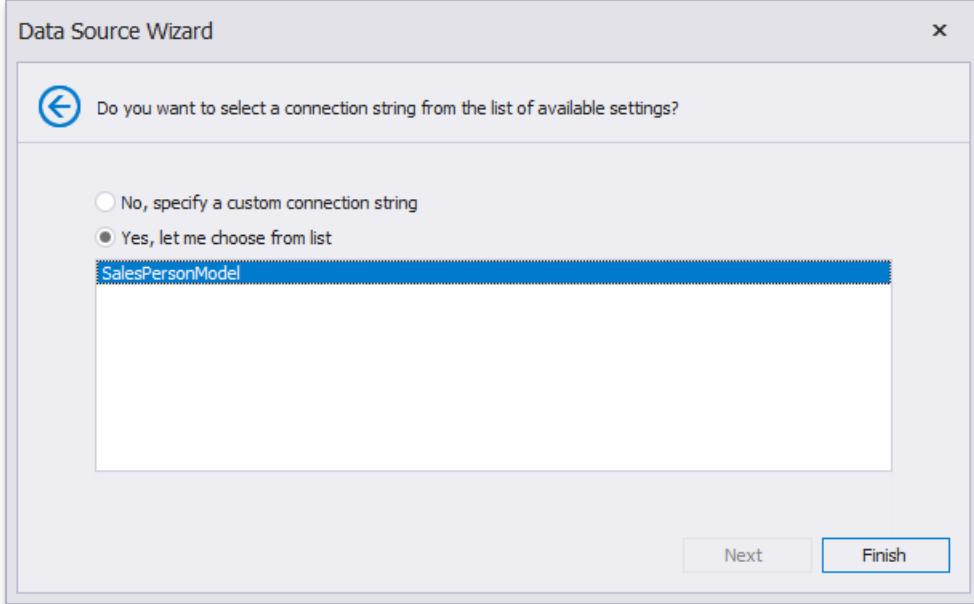
2. On the first page of the invoked **Data Source Wizard** dialog, select **Entity Framework** and click **Next**.



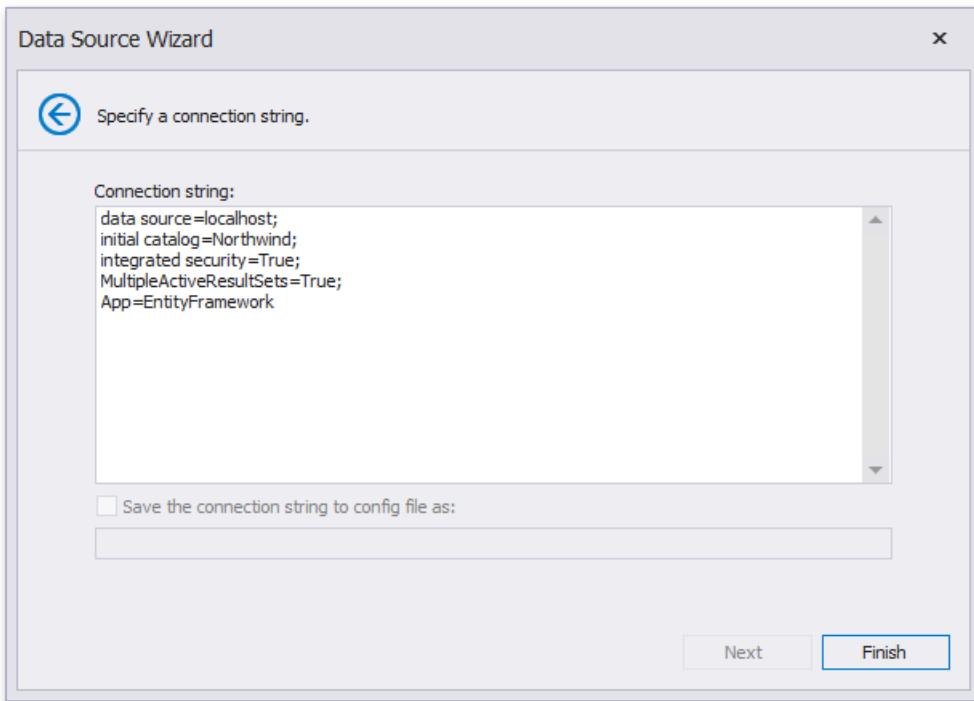
3. On the next page, select the available data context and click **Next**.



4. On the final page, choose the connection string corresponding to the selected data context and click **Finish**.



If the application configuration file does not contain the required connection string, or you need to specify the connection string manually, select **No, specify a custom connection string** and click **Next**.



On this page, specify a custom connection string and click **Finish**. This creates the data source and displays its fields in the [Data Source Browser](#).

Binding to Federated Data Source

You can create a federated data source if a dashboard contains at least one data source. Create a federated query where you specify how to federate existing data sources.

You can create federated queries of the following types:

- **Join**

Combines rows from two or more tables based on a clause.

- **Union and Union All**

The **Union** query combines rows from two or more tables into one data set and removes duplicate rows in merged tables.

The **UnionAll** query does the same, except it doesn't remove duplicated rows. You can create a union query for data sources if data types of their columns are [implicitly converted](#).

- **Transformation**

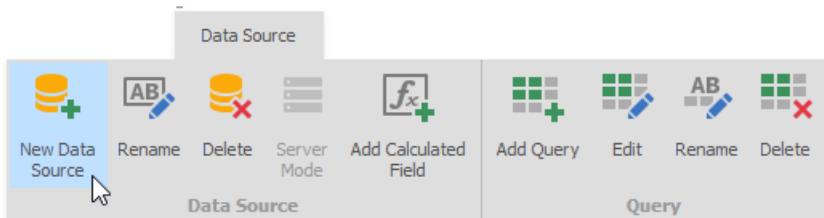
If a data source contains a complex column (an object), you can transform its properties to display columns separately in a flattened view.

Create a Federated Data Source with the Data Source Wizard

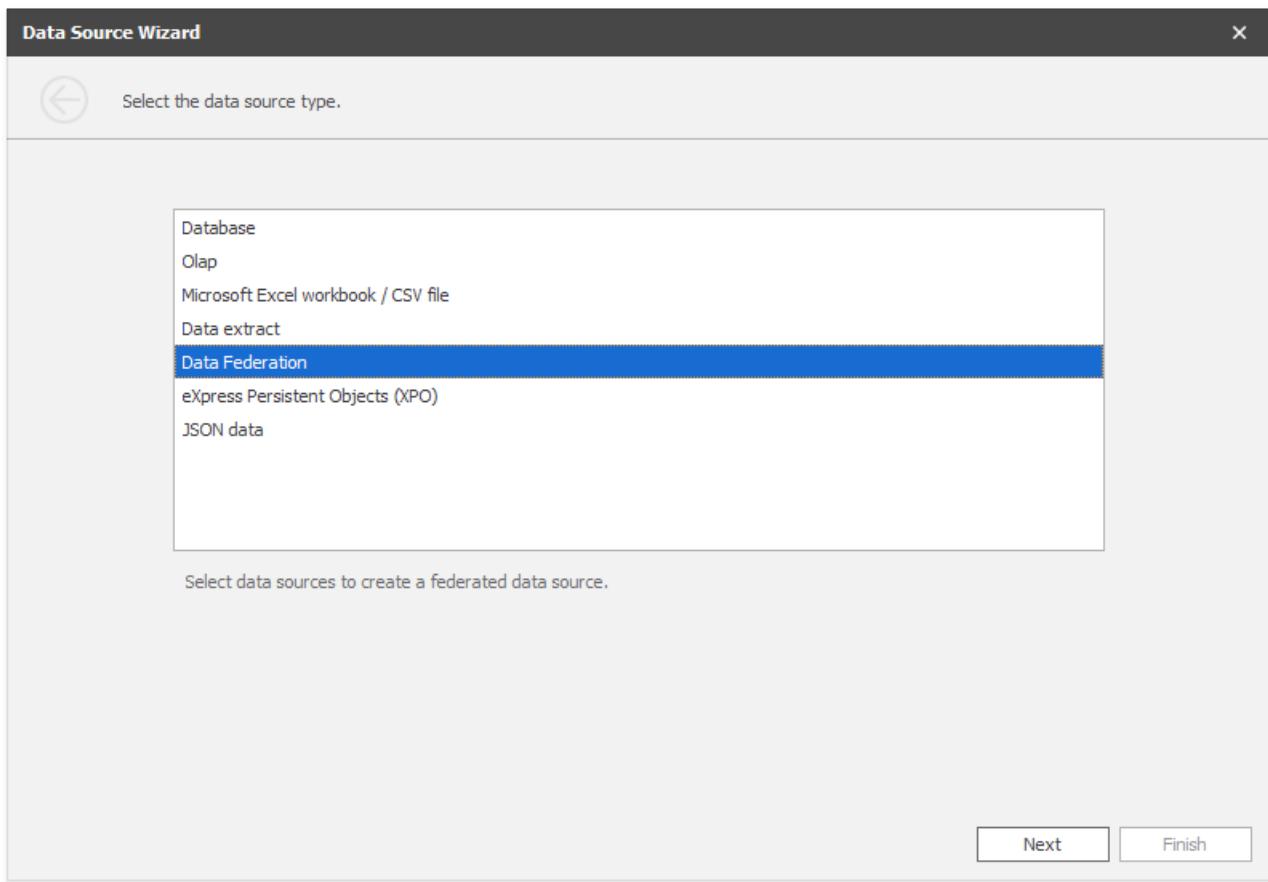
Follow the steps below to create a federated data source with the Data Source Wizard:

Create a New Federated Data Source

Click the **New Data Source** button in the **Data Source** ribbon tab.



On the first page of the invoked **Data Source Wizard** dialog, select **Data Federation** and click **Next**.



Select the Query Type

The [Query Builder](#) displays the available data sources you can use to create queries.

The screenshot shows the 'Query Builder' window. At the top, it says 'Query Type: Join Union Union All'. On the left, there is a tree view of data sources under 'SQLite Data Source': 'SQLite Orders' (selected and highlighted in blue), 'ExcelDS', and 'ObjectDS'. Below this, there is a section titled 'Columns of SQLite Orders' containing columns: OrderID, CustomerID, EmployeeID, OrderDate, RequiredDate, ShippedDate, and ShipVia. To the right of these lists is a large empty area where the query results would be displayed. At the bottom right of the window are 'OK' and 'Cancel' buttons.

Join

Drag the data sources you want to join to the diagram pane, specify the related column to create the relationship between tables, and select the columns you want to include in the query. Use * (All Columns) to get a complete list of columns from a table. Columns included in the query are displayed in the bottom pane where you can configure their settings.

The screenshot shows the Query Builder window with the following components:

- Query Type:** Join (selected)
- Data Sources:** SQLite Data Source (expanded), showing SQLite Orders, ExcelDS, and ObjectDS.
- Tables:** Three tables are selected:
 - sqlite** (SQLite Orders): Includes OrderID, CustomerID, EmployeeID, OrderDate (checked), RequiredDate, ShippedDate, ShipVia, Freight, ShipName, ShipAddress, ShipCity (checked), ShipRegion, and ShipPostalCode.
 - excel** (ExcelDS): Includes * (All Columns), CategoryName (checked), Country (checked), ProductName, SalesPerson (checked), OrderDate, OrderID, Quantity, Discount, Extended Price (checked), and UnitPrice.
 - SalesPersonDS** (ObjectDS): Includes * (All Columns), ID, SalesPerson (checked), Weight (checked), and Checked.
- Relationships:** Lines connect OrderDate from sqlite to CategoryName and SalesPerson from excel.
- Columns of SQLite Orders:** A list of columns from the selected table, including OrderID, CustomerID, EmployeeID, OrderDate, RequiredDate, ShippedDate, and ShipVia.
- Aliases:** A table mapping columns to tables and aliases:

Column	Table	Alias
OrderDate	sqlite	
ShipCity	sqlite	
ShipCountry	sqlite	
CategoryName	excel	
ProductName	excel	
Extended Price	excel	
- Buttons:** OK and Cancel.

Union

Double-click the data sources you want to combine. Unlike Join queries, you cannot select individual columns. Columns included in the query are displayed in the bottom pane where you can specify their aliases.

Query Builder

Query Type: Join Union Union All Transformation

Source	
→ Excel Data Source 1	X
Excel Data Source 2	X

Columns of Excel Data Source 2

Category
Product
RevenueQTD (Sum)
RevenueQTDTarget (Sum)
RevenueYTD (Sum)
RevenueYTDTTarget (Sum)
State

Column Name	Alias
→ Category	
Product	
RevenueQTD (Sum)	
RevenueQTDTarget (Sum)	
RevenueYTD (Sum)	
RevenueYTDTTarget (Sum)	

OK Cancel

The screenshot shows the 'Query Builder' application interface. At the top, there's a toolbar with standard window controls (Minimize, Maximize, Close) and a title bar. Below the toolbar, the 'Query Type' section has four radio buttons: 'Join', 'Union' (which is selected), 'Union All', and 'Transformation'. On the left, a tree view lists 'Excel Data Source 1' and 'Excel Data Source 2'. The main area contains two tables. The first table, titled 'Source', lists the data sources being joined ('Excel Data Source 1' and 'Excel Data Source 2') with a red 'X' button next to each entry. The second table, titled 'Columns of Excel Data Source 2', lists the columns from 'Excel Data Source 2' with their corresponding aliases in the 'Alias' column. A bottom pane shows a list of columns from 'Excel Data Source 2' with their aliases. At the bottom right are 'OK' and 'Cancel' buttons.

Union All

Double-click the data sources you want to combine. A **UnionAll** query duplicates rows from different tables even if they contain the same data. Columns included in the query are displayed in the bottom pane where you can specify their aliases.

Query Builder

Query Type: Join Union Union All Transformation

Source
Excel Data Source 1
Excel Data Source 2

Columns of Excel Data Source 2

Column Name	Alias
Category	
Product	
RevenueQTD (Sum)	
RevenueQTDTarget (Sum)	
RevenueYTD (Sum)	
RevenueYTDTTarget (Sum)	
State	

OK Cancel

The screenshot shows the 'Query Builder' application interface. At the top, there's a toolbar with standard window controls (minimize, maximize, close) and a title bar. Below the toolbar, the 'Query Type' section has four radio buttons: 'Join', 'Union', 'Union All' (which is selected), and 'Transformation'. To the right of this is a large table titled 'Source' with two rows: 'Excel Data Source 1' and 'Excel Data Source 2'. Below this table is another table titled 'Columns of Excel Data Source 2' containing eight columns: Category, Product, RevenueQTD (Sum), RevenueQTDTTarget (Sum), RevenueYTD (Sum), RevenueYTDTTarget (Sum), and State. A separate column labeled 'Alias' is present but empty. At the bottom right of the main area are 'OK' and 'Cancel' buttons.

Transformation

Select a data source/query that contains columns you want to transform. Select the **Transform** checkbox next to the column you want to unfold and flatten. The bottom pane allows you to specify the aliases for the generated columns.

QueryBuilder

Query Type: Join Union Union All Transformation

Excel Data Source 1

- Sales
- JSON Data Source 1**

Transformation node root: JSON Data Source 1

Column Name	Alias	Transform
CategoryId		<input type="checkbox"/>
CategoryName		<input type="checkbox"/>
Description		<input type="checkbox"/>
Products		<input checked="" type="checkbox"/>

Transformation result

- CategoryId
- CategoryName
- Description
- Products_CatagoryId
- Products_Discontinued
- Products_OrderDetails
- Products_ProductId
- Products_ProductName
- Products_QuantityPerUnit

OK Cancel

Click **OK** to create a query.

Copy Calculated Fields

The Data Source Wizard invokes the following page if one of the selected data sources contains calculated fields. Drag or double-click the calculated field you want to copy to the resulting federated data source. You can specify the name of the copied calculated field in the left Grid.

Data Source Wizard

Select calculated fields you want to include in a federated data source.

Calculated fields in original data sources		Calculated fields in a federated data source	
Name	Expression	Name	Expression
Source: Excel Data Source 1			
<input checked="" type="checkbox"/> Price with Discount	[UnitPrice]*(1-[Discount])	Price with Discount	[UnitPrice]*(1-[Discount])

Next **Finish**

See the Result

The [Data Source Browser](#) displays the newly created Federated Data Source.

The image below displays a new *Federation Data Source 1* with a joined *SQLite Orders* query.

Data Source
Federation Data Source 1

Query
SQLite Orders

SQLite Orders

- ProductName
- SalesPerson
- ShipCity
- ShipCountry
- OrderDate
- Weight
- Extended Price

The query name is the same as the root table's name in the query builder. Click the **Rename** button in the **Query** group on the **Data Source** ribbon tab to change the query name.

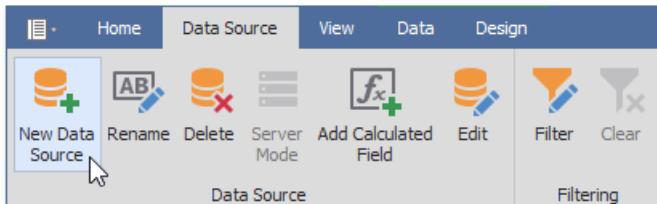
Binding to JSON Data Sources

The Dashboard Designer allows you to connect to the JSON data source that retrieves data from a Web-service endpoint, text file or a string in JSON format.

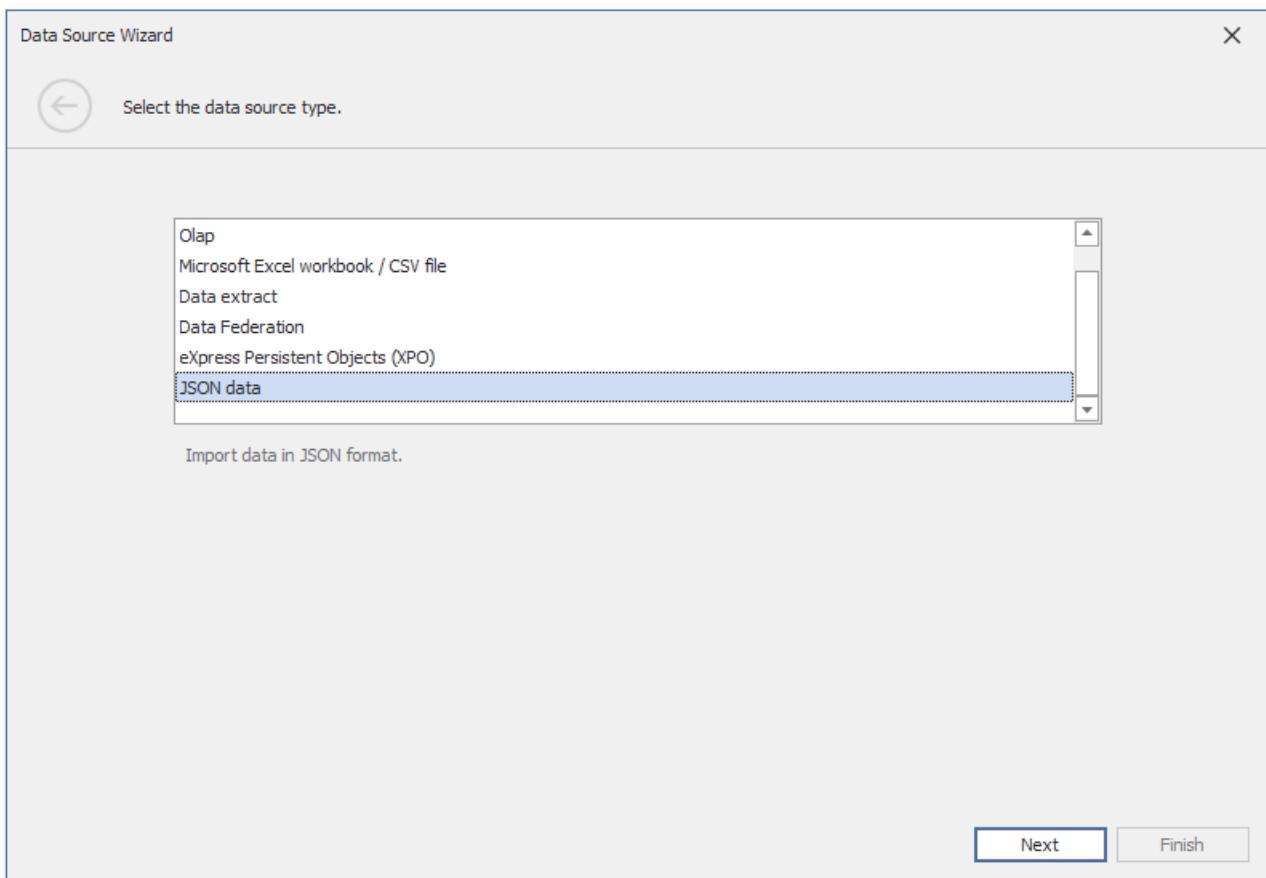
Create a New Data Connection

Follow the steps below to connect to the JSON data source:

1. Click the **New Data Source** button in the **Data Source** ribbon tab.



2. On the first page of the invoked **Data Source Wizard** dialog, select **JSON data** and click **Next**.



Configure a New Data Connection

1. On the next page, configure a new data connection.

Data Source Wizard

Specify JSON data location.

JSON Source:

Web Service Endpoint (URI):

Web Service Endpoint (URI):

Web Service Endpoint (URI):

URI Path Parameters

Name	Expression	Value

Query Parameters

Name	Expression	Value

Resulting URI:

[Next](#) [Finish](#)

JSON String

Specify a string that contains JSON data.

Data Source Wizard

Specify JSON data location.

JSON Source:

JSON String:

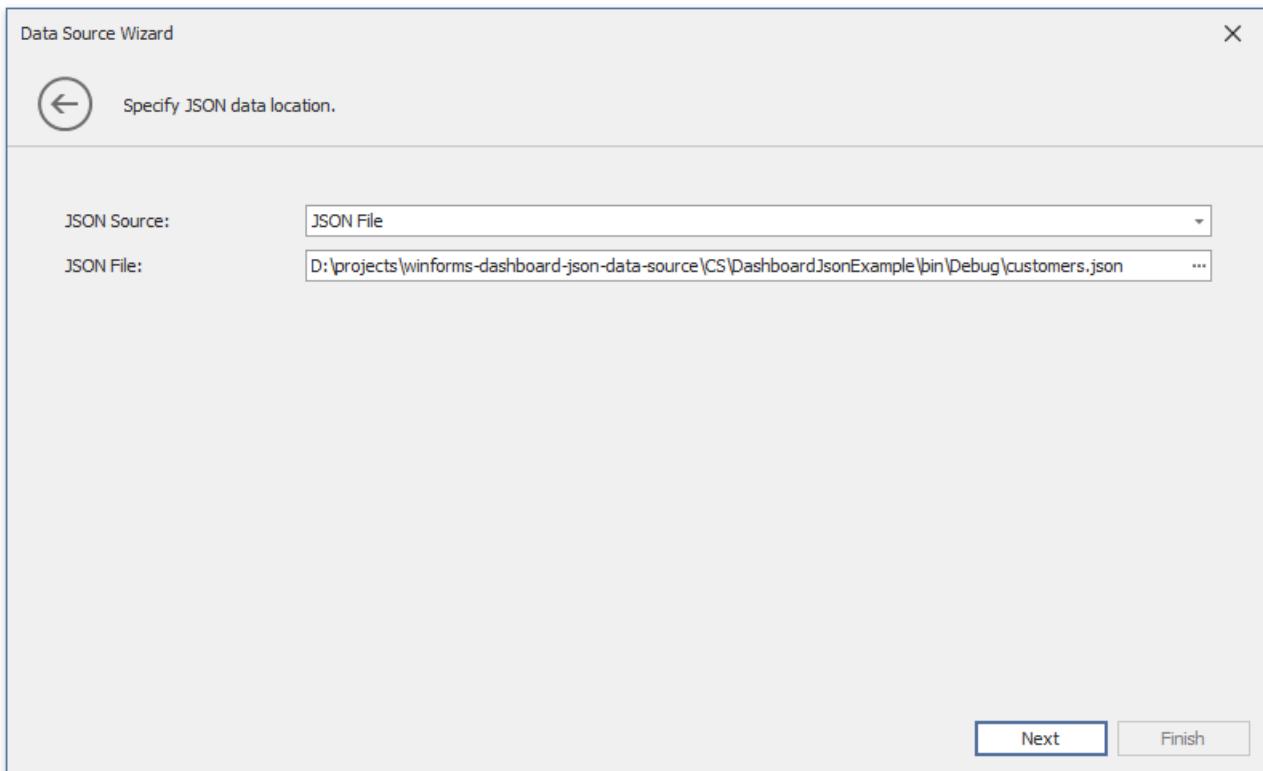
```
"Customers": [ { "Id": "ALFKI", "CompanyName": "Alfreds Futterkiste", "ContactName": "Maria Anders", "ContactTitle": "Sales Representative", "Address": "Obere Str. 57", "City": "Berlin", "PostalCode": "12209", "Country": "Germany", "Phone": "030-0074321", "Fax": "030-0076545" }, { "Id": "ANATR", "CompanyName": "Ana Trujillo Emparedados y helados", "ContactName": "Ana Trujillo", "ContactTitle": "Owner", "Address": "Avda. de la Constitución 2222", "City": "México D.F.", "PostalCode": "05021", "Country": "Mexico", "Phone": "(5) 555-4729", "Fax": "(5) 555-3745" }, { "Id": "ANTON", "CompanyName": "Antonio Moreno Taquería", "ContactName": "Antonio Moreno", "ContactTitle": "Owner", "Address": "Mataderos 2312", "City": "México D.F.", "PostalCode": "05023", "Country": "Mexico", "Phone": "(5) 555-3932" }, { "Id": "AROUT", "CompanyName": "Around the Horn", "ContactName": "Thomas Hardy", "ContactTitle": "Sales Representative", "Address": "120 Hanover Sq.", "City": "London", "PostalCode": "WA1 1DP", "Country": "UK", "Phone": "(171) 555-7788", "Fax": "(171) 555-6750" } ] }
```

[Next](#) [Finish](#)

Click **Next** to proceed to the [Select Data Fields](#) page.

JSON File

Specify the JSON data location to load content from the selected JSON file.



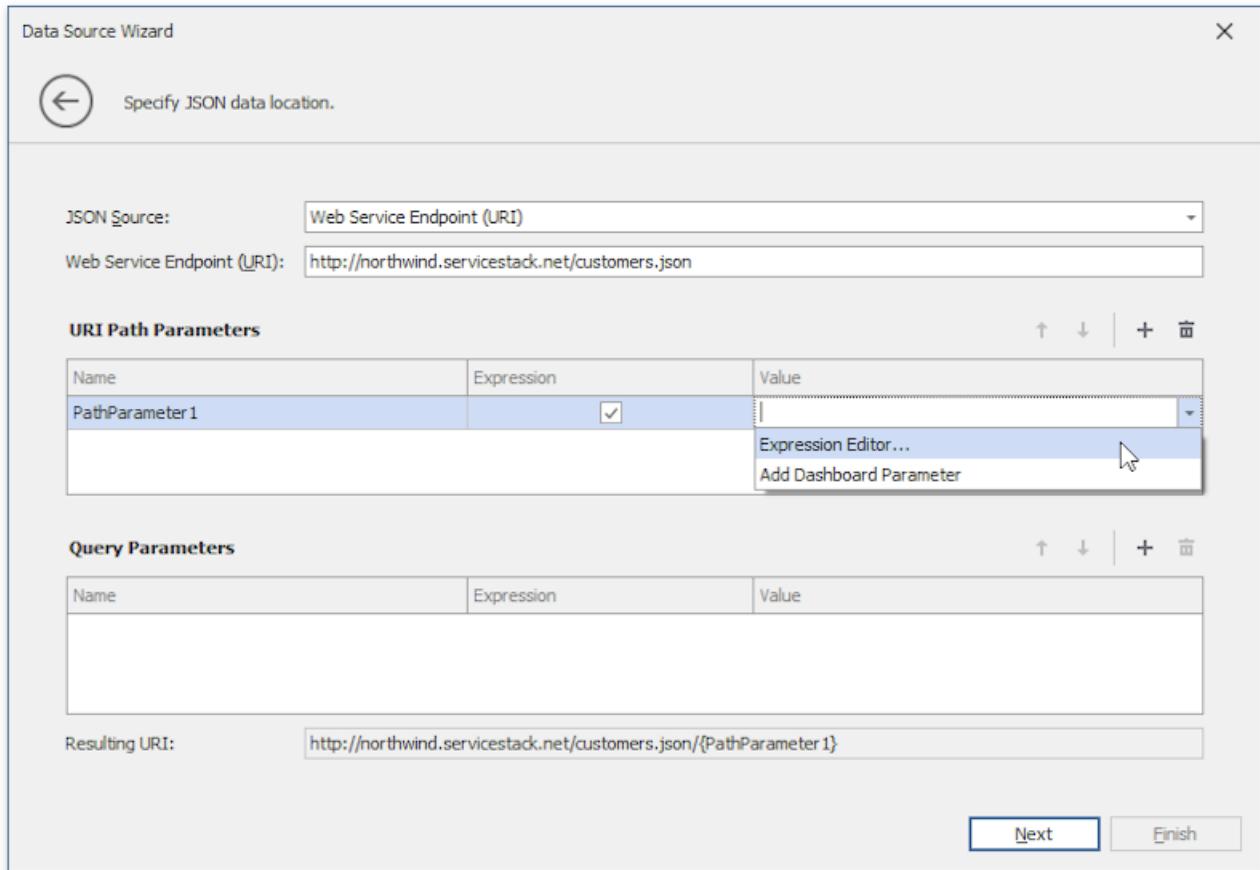
Click **Next** to proceed to the [Select Data Fields](#) page.

Web Service Endpoint (URI)

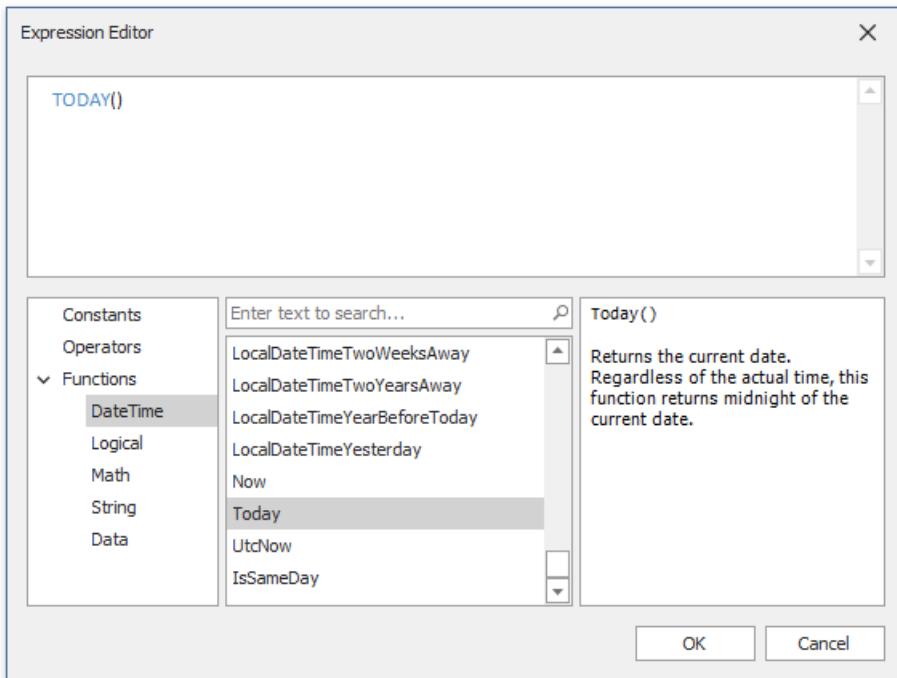
Specify a URL to a file in JSON format and the Web Service Endpoint's request parameters (username and password, HTTP headers, query parameters or URI path parameters).

- A **path parameter** appends a path element to a JSON endpoint's Uri.
- A **query parameter** specifies an HTTP request parameter that is passed to a JSON endpoint.
- A **header** is a custom HTTP header in JSON endpoint requests.

You can use expressions and dashboard parameters to set path parameters, query parameter values and headers. Click the "+" icon to create a new parameter, enable the new parameter's **Expression** property and select **Expression Editor** from the **Value** property's drop-down list.



Specify the expression in the invoked **Expression Editor** and click **OK**.

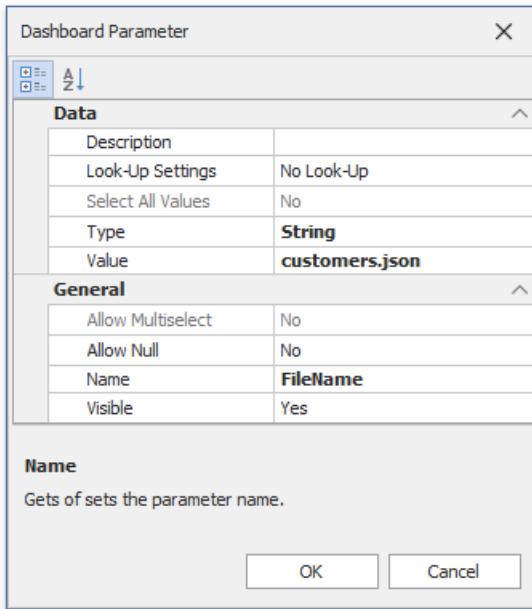


An expression can include [dashboard parameters](#).

TIP

Refer to the following help topic for details on how to create a dashboard parameter: [Create Parameters](#).

Select **Add Dashboard Parameter** from the **Value** property's drop-down list, configure the dashboard parameter in the invoked **Dashboard Parameter** dialog, and click **OK**.



Path parameters and query parameters are included in endpoint requests in the order in which they are listed. Move a parameter up or down the list to change its position within an endpoint request.

The read-only **Resulting URI** field displays the result: a JSON URI.

Data Source Wizard

Specify JSON data location.

JSON Source: Web Service Endpoint (URI)

Web Service Endpoint (URI): <http://northwind.servicestack.net/customers.json>

URI Path Parameters

Name	Expression	Value

Query Parameters

Name	Expression	Value
QueryParamer1	<input checked="" type="checkbox"/>	TODAY()
QueryParamer2	<input checked="" type="checkbox"/>	?FileName

Resulting URI: <http://northwind.servicestack.net/customers.json?QueryParamer1={}&QueryParamer2={}>

Next **Finish**

Click **Next** to configure basic HTTP authentication credentials and specify HTTP Header parameters.

Data Source Wizard

Configure web service endpoint request.

Basic HTTP Authentication

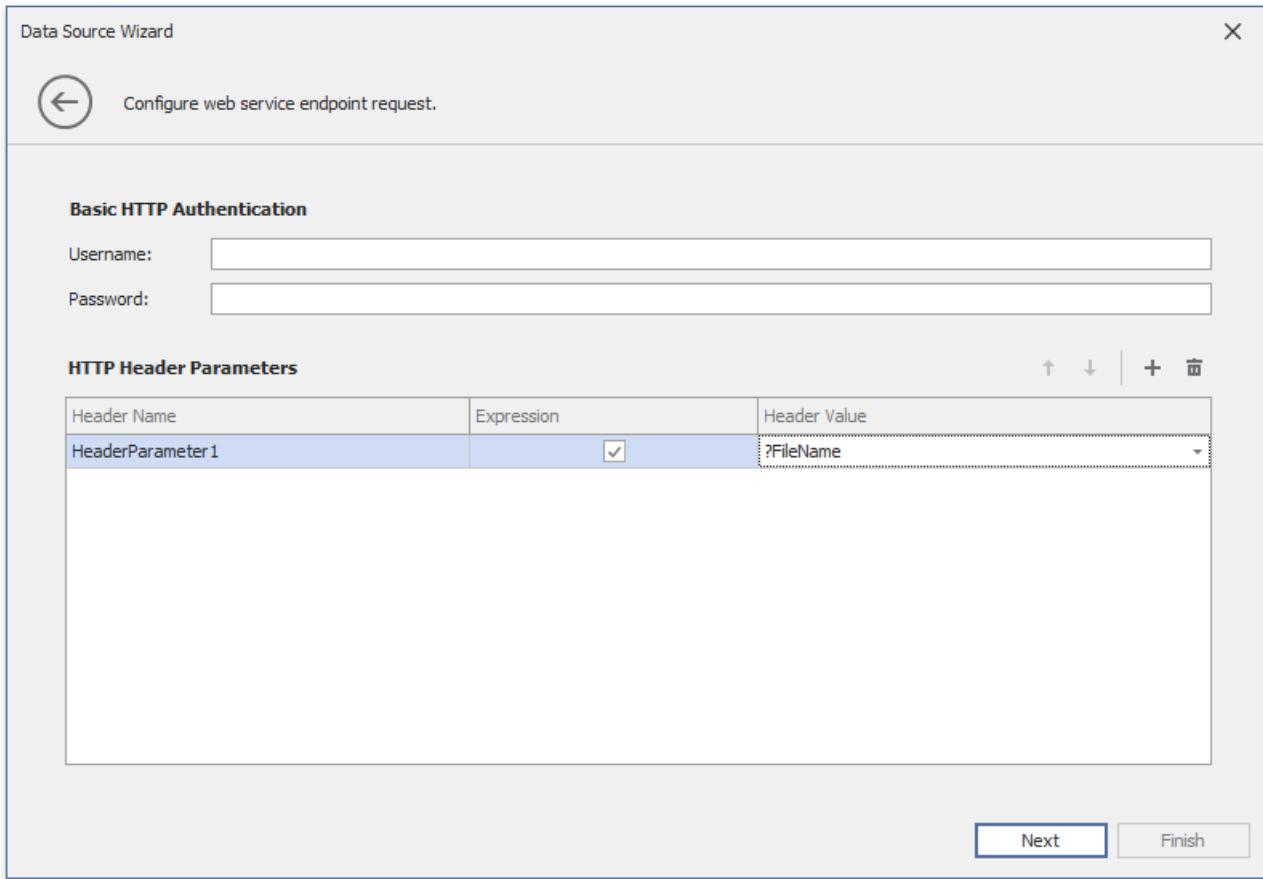
Username:

Password:

HTTP Header Parameters

Header Name	Expression	Header Value
HeaderParameter1	<input checked="" type="checkbox"/>	?FileName

Next **Finish**



Click **Next** to proceed to the [Select Data Fields](#) page.

Select Data Fields

1. The "Select data fields" page allows you to include or exclude data fields used in a JSON data source.

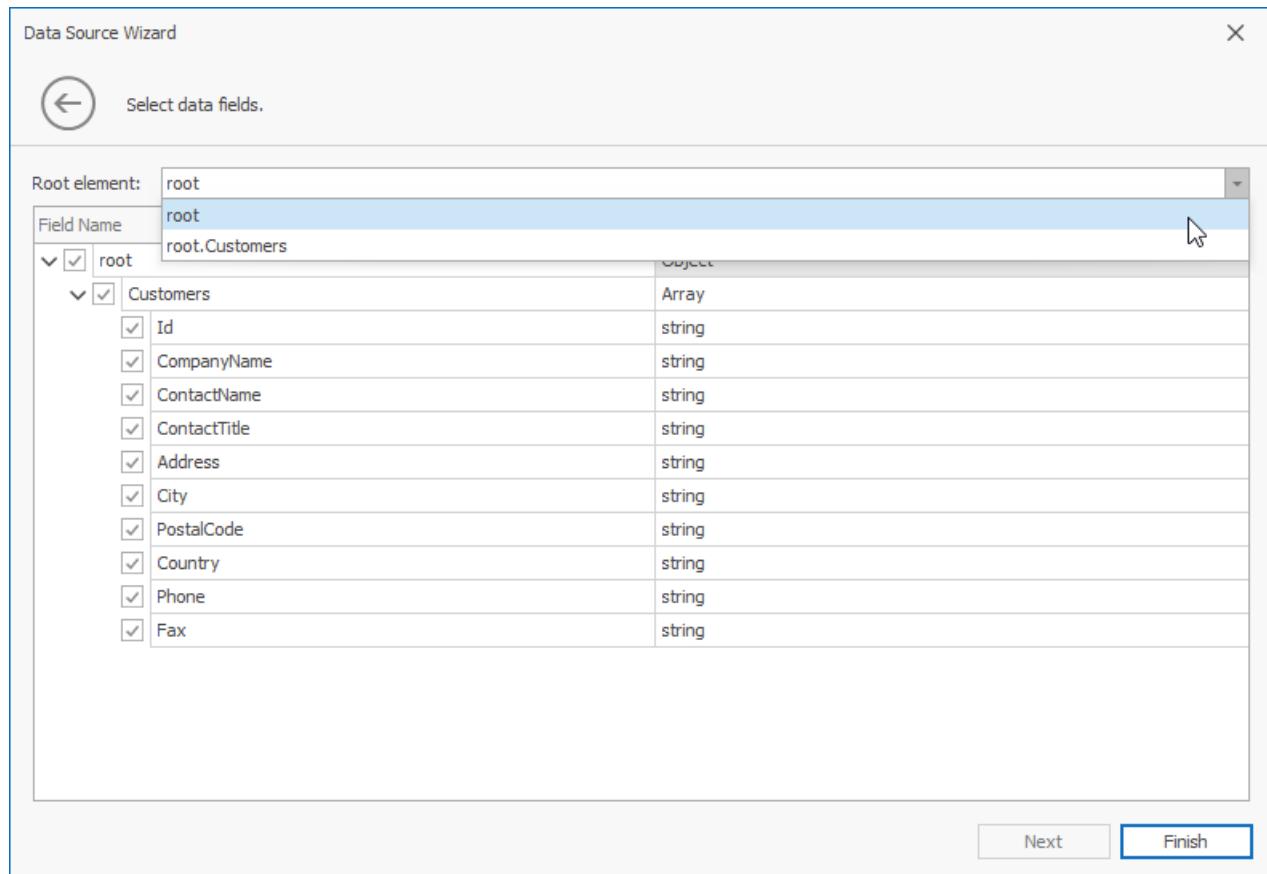
Data Source Wizard

Select data fields.

Root element:

Field Name	Type
root	Object
root.Customers	Array
Customers	Object
Id	string
CompanyName	string
ContactName	string
ContactTitle	string
Address	string
City	string
PostalCode	string
Country	string
Phone	string
Fax	string

Next **Finish**

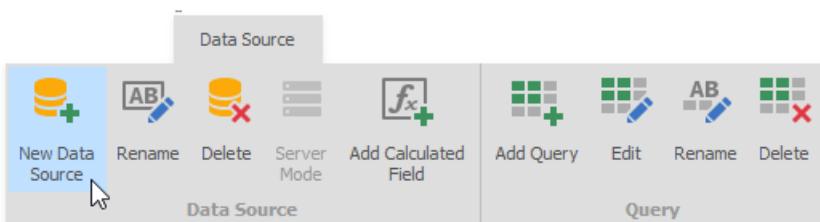


Click **Finish** to create a JSON data source.

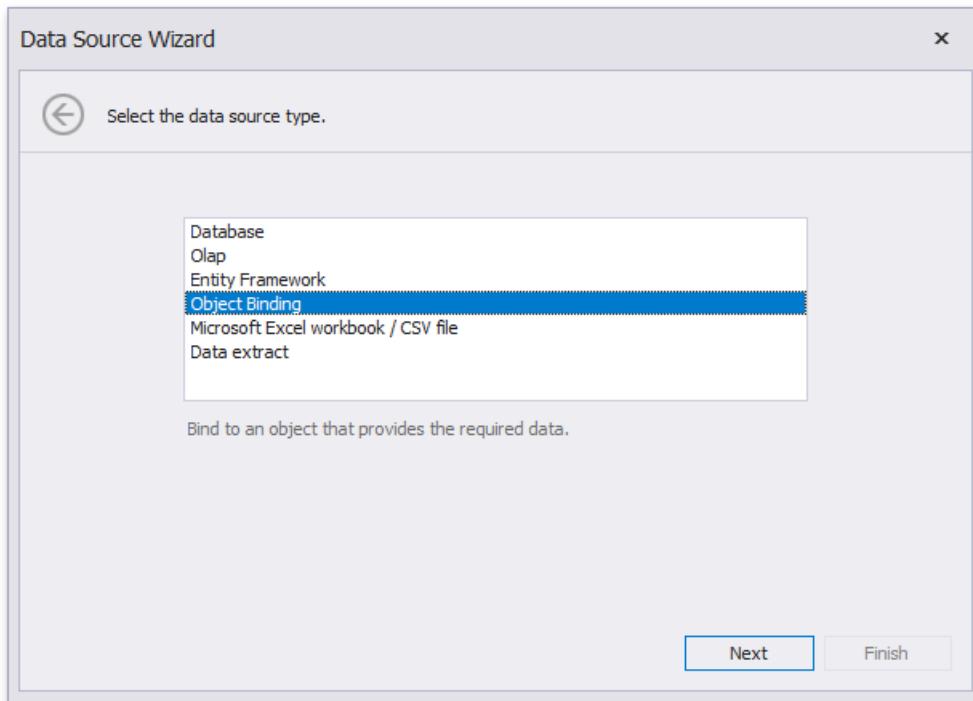
Binding to Object Data Sources

To bind a dashboard to an object data source, do the following.

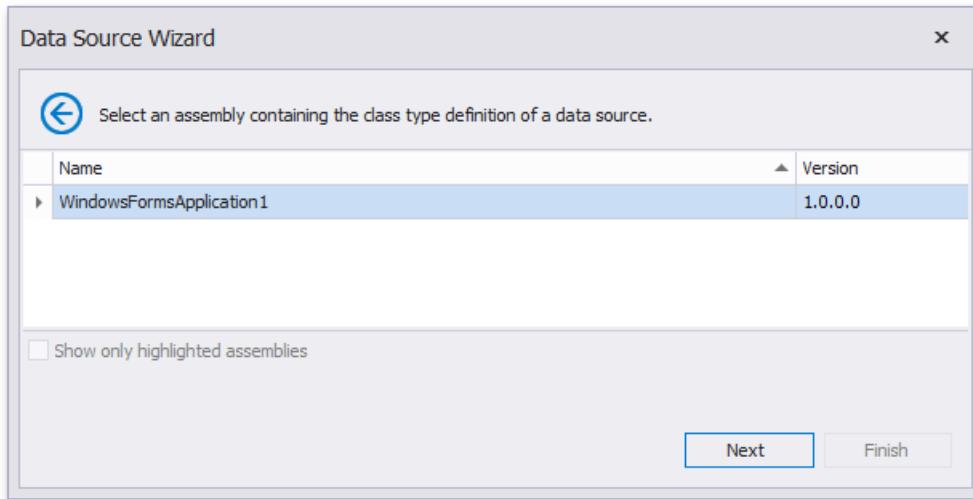
1. Click the New Data Source button in the Data Source ribbon tab.



2. If you are allowed by your application vendor to connect an object data source, select **Object Binding**, click **Next**.

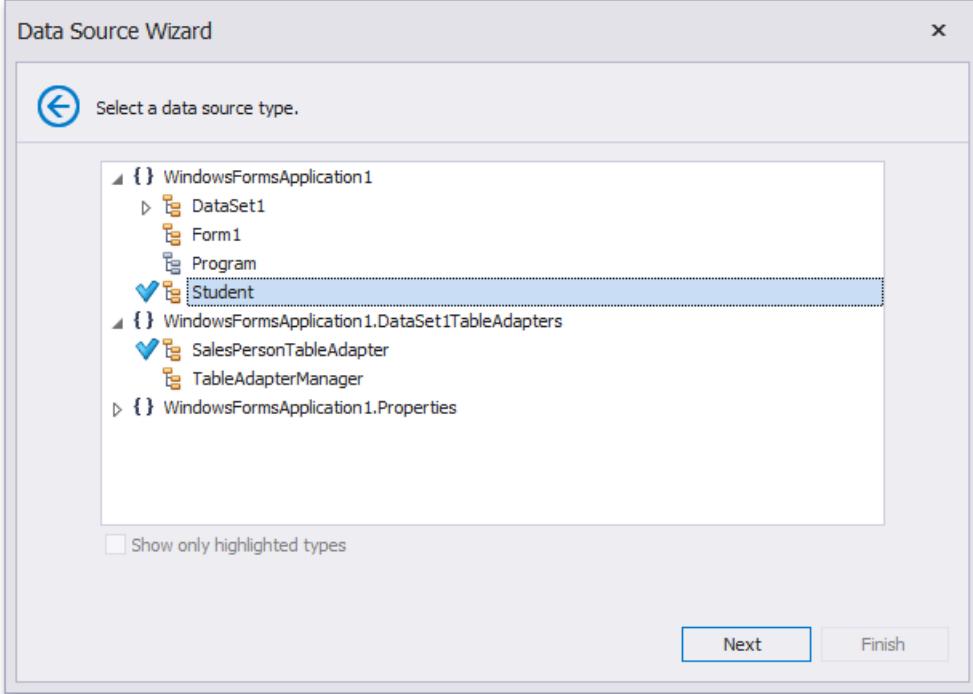


3. On the next page, select the assembly containing the definition of the required class.



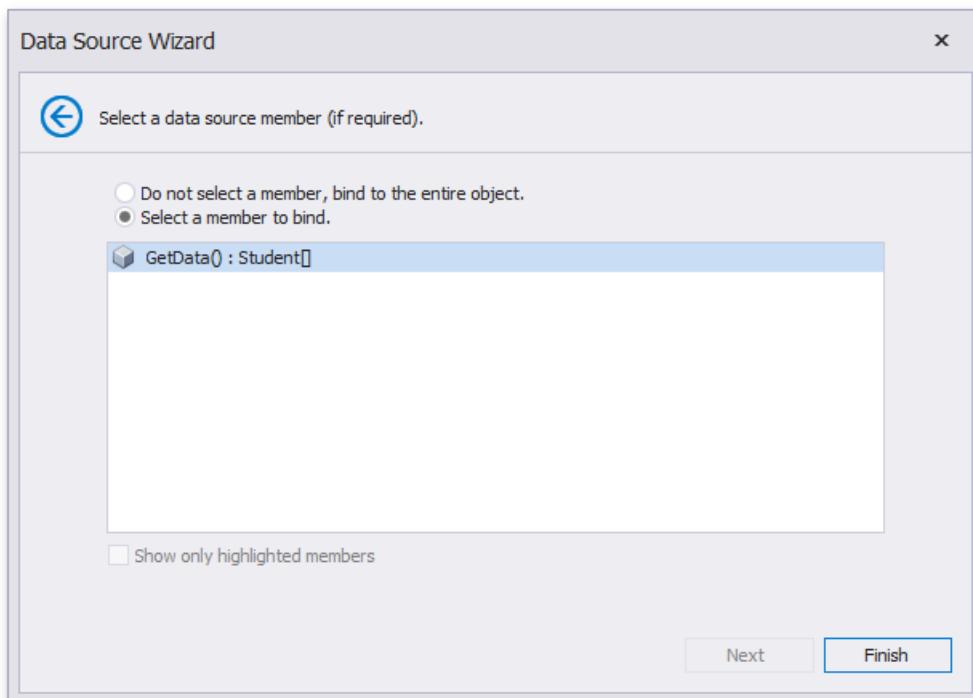
Click **Next**.

4. Select the class providing the required data and click **Next**.



For instance, this can be a custom class providing the required data or any TableAdapter used to query a database.

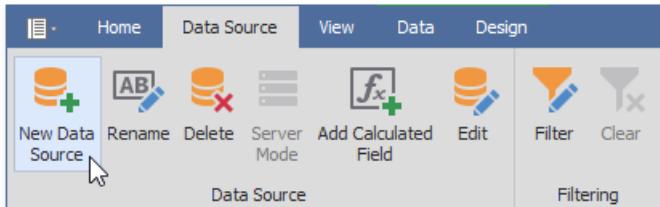
5. On the final page, select the required data member used to obtain data and click **Finish**.



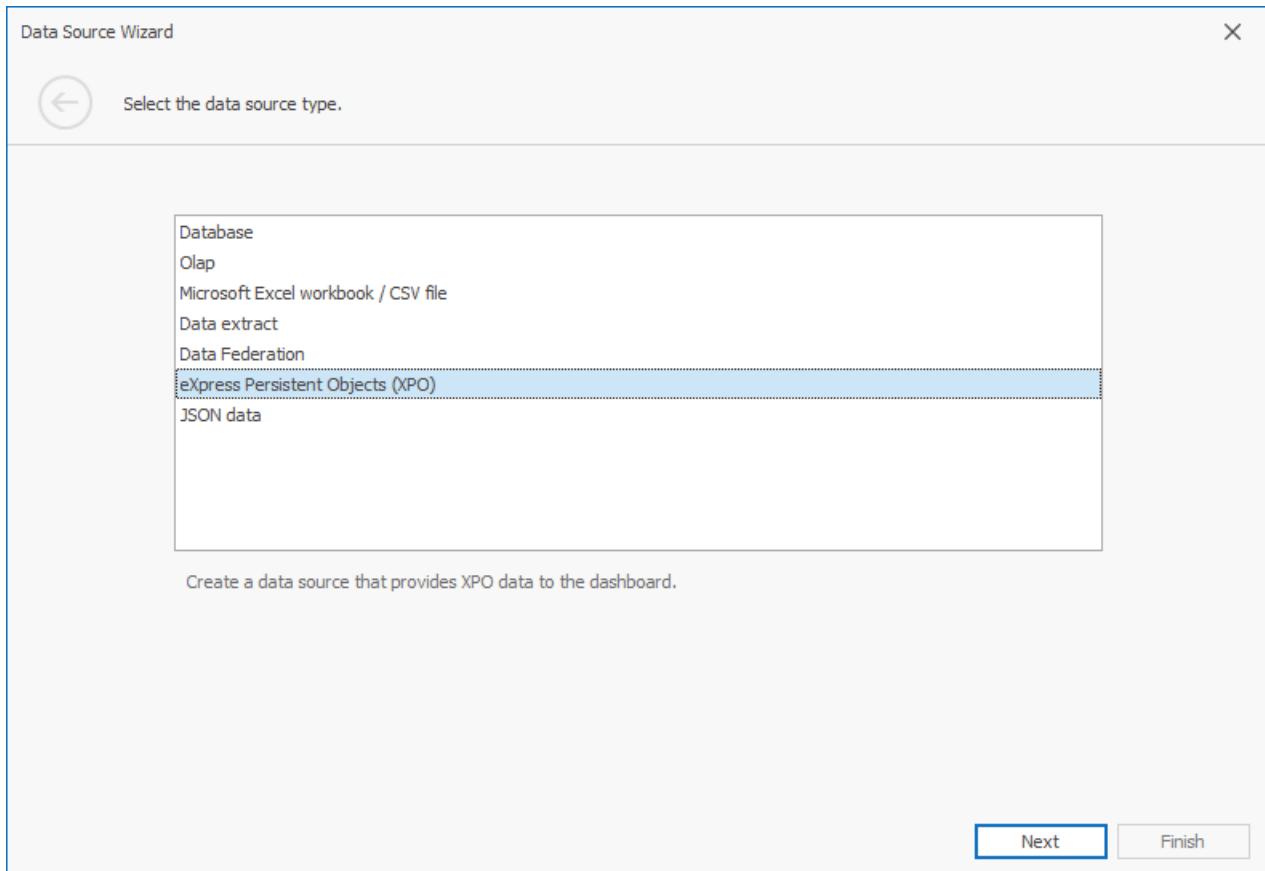
Binding to XPO Data Sources

To connect to the XPO data source, perform the following steps.

1. Click the **New Data Source** button in the **Data Source** ribbon tab.



2. On the first page of the invoked **Data Source Wizard** dialog, select **eXpress Persistent Objects (XPO)** and click Next.



3. Choose the available entity type.

Data Source Wizard

X



Choose an entity type.

DashboardXpoExample.nwind.Customers

Next

Finish

Binding to MongoDB

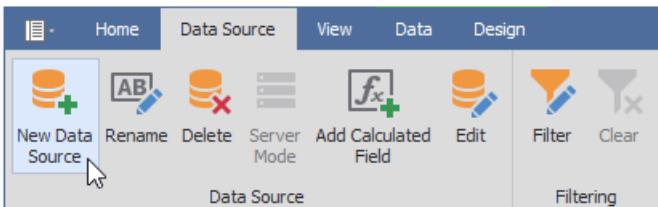
The WinForms Designer allows you to connect to MongoDB in the Data Source Wizard.

NOTE

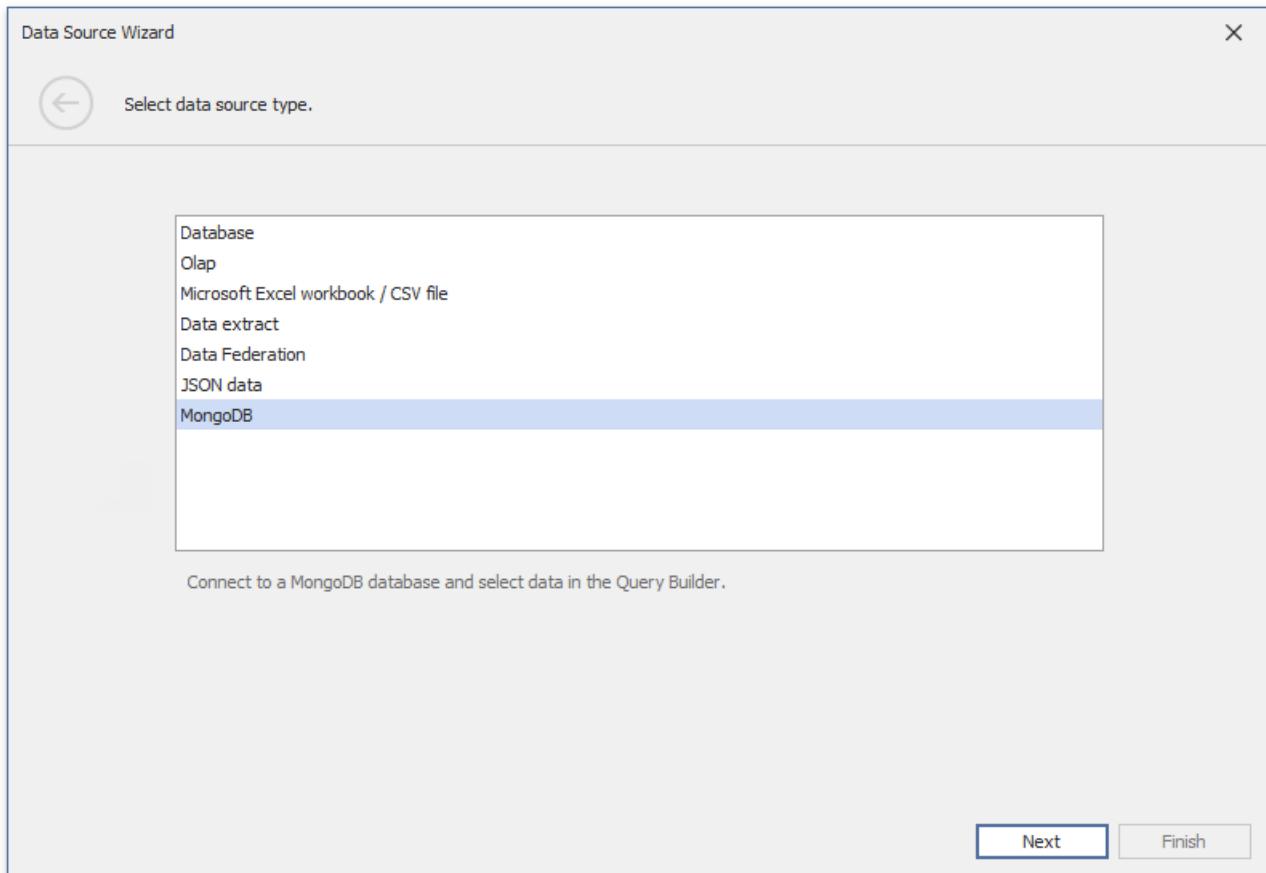
The **MongoDB.Driver** package should be installed in your project to supply MongoDB data at runtime.

Follow the steps below to establish a database connection:

1. Click the **New Data Source** button in the **Data Source** ribbon tab.

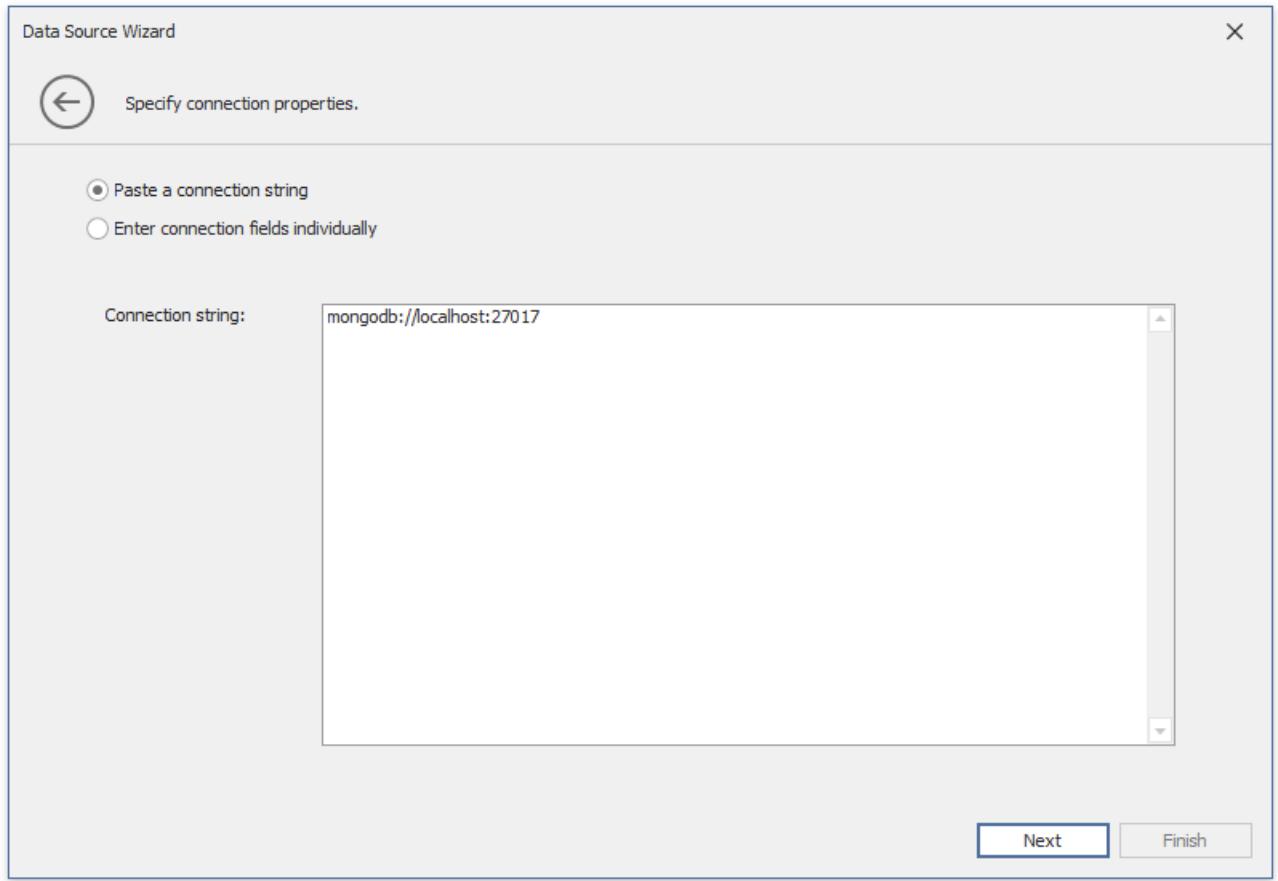


2. On the first page of the invoked **Data Source Wizard** dialog, select **MongoDB** and click **Next**.



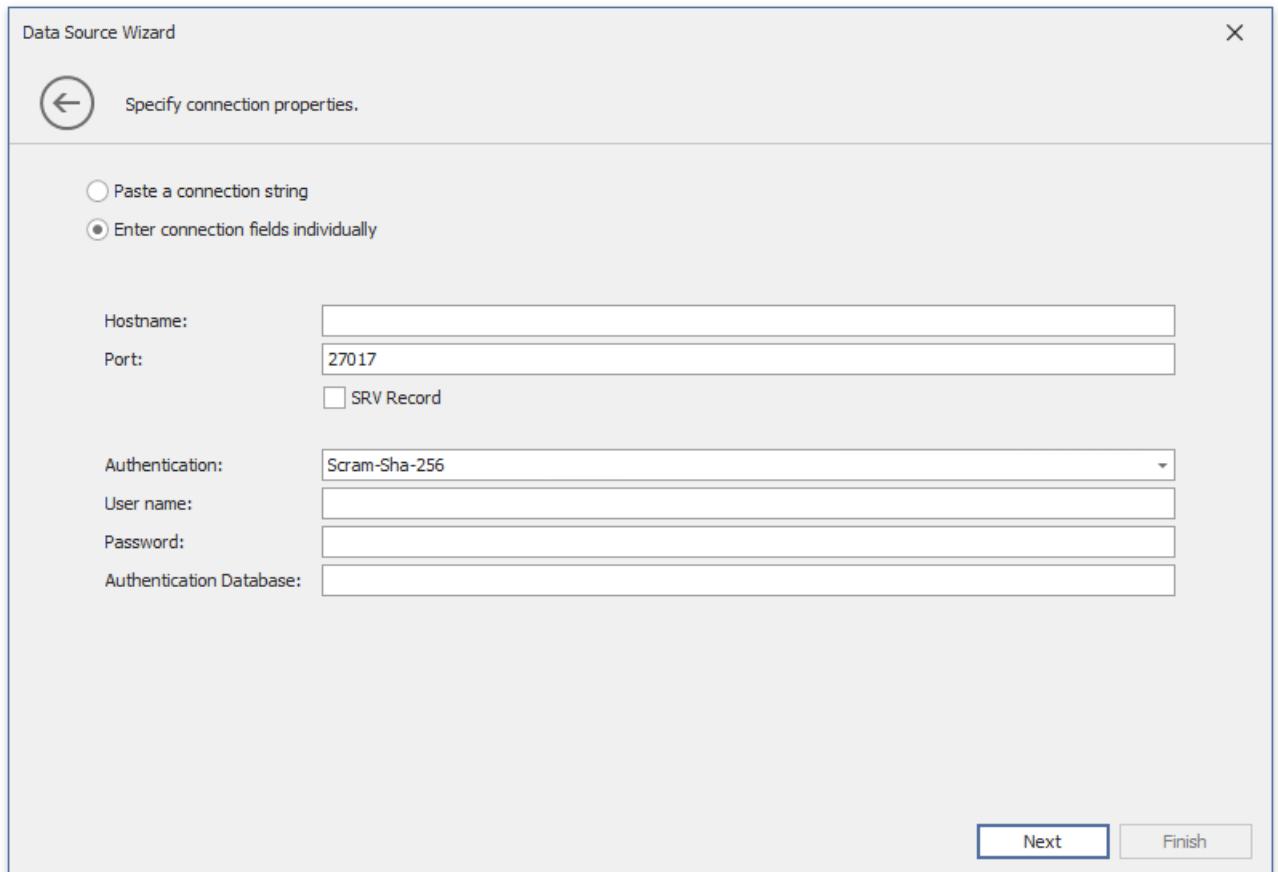
3. Specify connection parameters on the next page in the following ways:

- o Pass an entire string.



Refer to the following topic for information about connection string format and options: [Connection String URI Format](#).

- Enter connection fields individually.



4. The following page allows you to configure queries. Select databases and collections that you want to load from the

MongoDB instance. A string stored in a query's **Collection** column is the default name for the query. The names of MongoDB queries should be unique. You can use the **Alias** column to set unique names for queries in the same collection. To filter queries, add a filter string to the **Filter** column.

Data Source Wizard X

Configure queries.

Database	Collection	Alias	Filter
Northwind	Categories		
Northwind	Products	cheapProducts	[UnitPrice] <= 10.0
Choose Database	Choose Collection		

Next Finish

Work with Data

The topics in this section describe how to work with data in a [connected](#) data source.

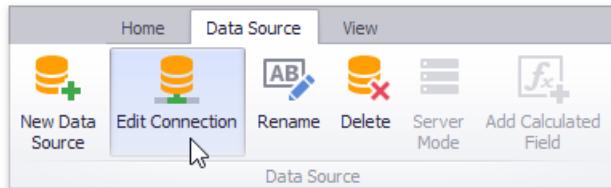
This section contains the following topics.

- [Edit Connection Parameters](#)
- [Using the Query Builder](#)
- [Using the Query Editor](#)
- [Manage SQL Queries](#)
- [Filter Queries](#)
- [Pass Query Parameters](#)
- [Stored Procedures](#)
- [Preview Data](#)
- [Creating Calculated Fields](#)
- [Data Inspector](#)

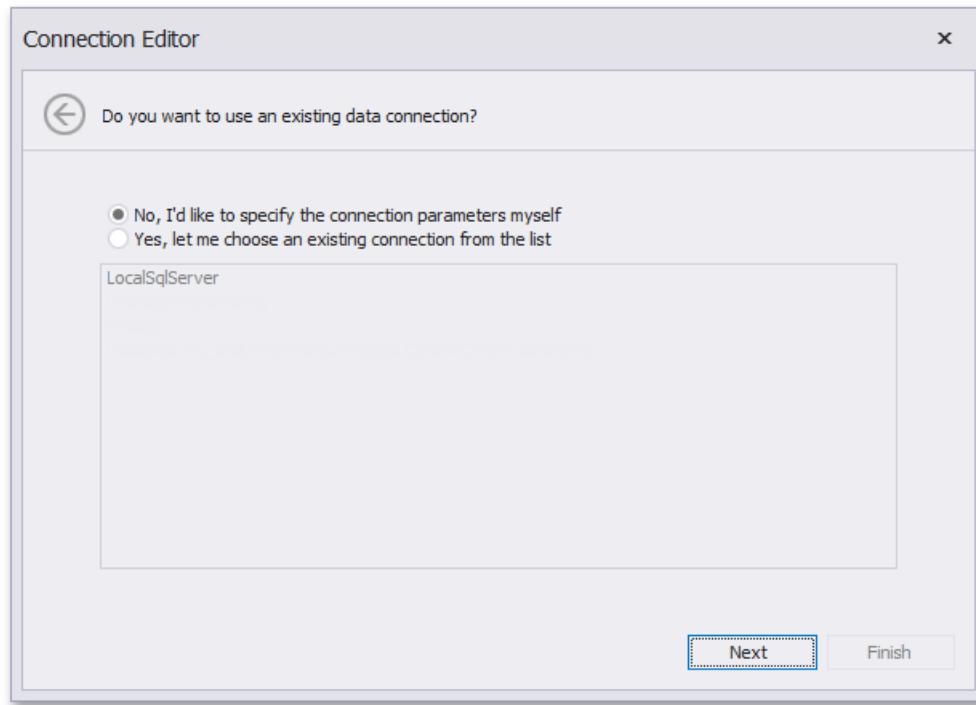
Edit Connection Parameters

After you [connected](#) to the data store and selected the required data, you can edit the connection parameters used to establish a connection.

To edit connection parameters for the selected data source, click the **Edit Connection** button in the **Data Source** ribbon tab.



In the invoked **Connection Editor** dialog, click **Next**.



On the next page, you can specify new connection parameters.

Connection Editor

x



Select the data provider and specify the connection properties.

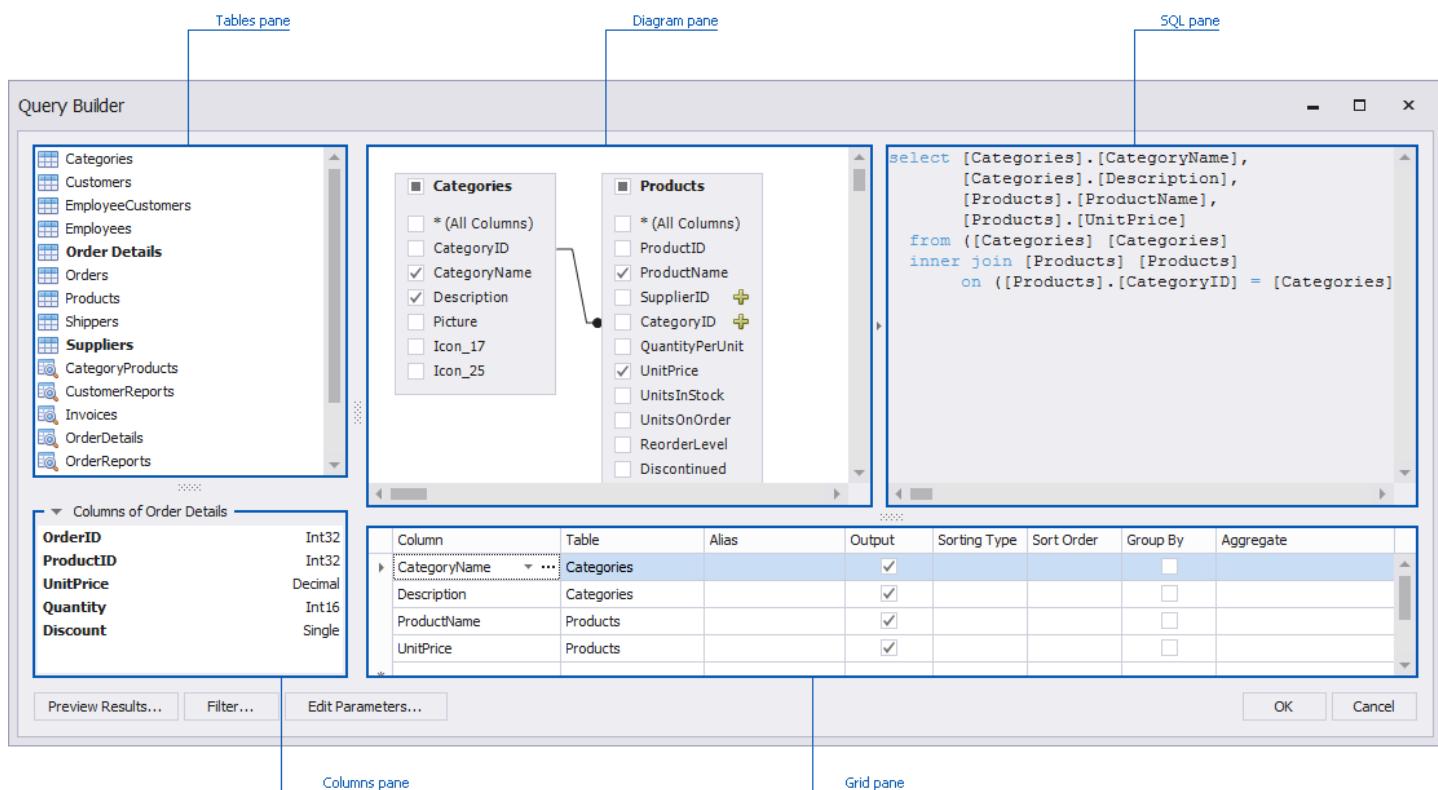
Provider:	Microsoft SQL Server
Server name:	localhost
Authentication type:	Windows authentication
User name:	
Password:	
Database:	Northwind

Next

Finish

Using the Query Builder

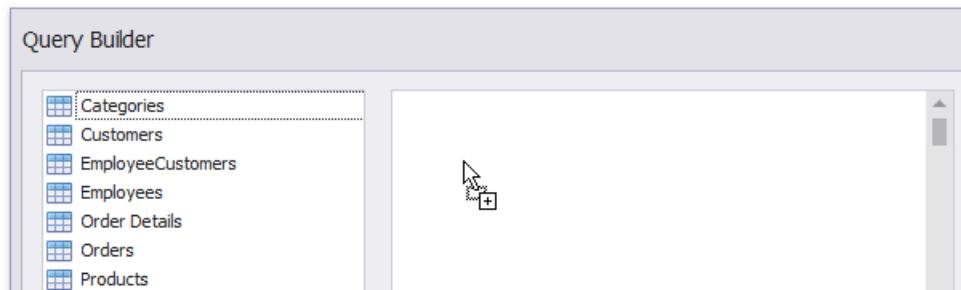
In the **Query Builder** dialog, you can add data tables and views to the data source, and select which columns to include. The Query Builder automatically joins the related tables, so all you need to do is drag-and-drop.



- Add Tables
- Join Tables
- Edit Column Settings
- Filter Data
- Customize SQL Query
- Preview Data

Add Tables

To add the required tables/views to a data source, double-click the table (or view) or drag-and-drop it from the **Tables** pane onto the **Diagram** pane.



Then, select the required columns.

Query Builder

The screenshot shows the Query Builder interface with the 'Tables' pane open. On the left, a list of tables is shown: Categories, Customers, EmployeeCustomers, Employees, Order Details, Orders, Products, Shippers, Suppliers, CategoryProducts, CustomerReports, and Invoices. The 'Products' table is selected. On the right, a detailed view of the 'Products' table is displayed, showing columns: * (All Columns), ProductID, ProductName, SupplierID, CategoryID, QuantityPerUnit, and UnitPrice. The 'CategoryID' column has a checked checkbox next to it.

Join Tables

Note that if at least one table has been added to the **Diagram** pane, the **Tables** pane highlights tables that have a relationship with any of the recently added tables.

The screenshot shows the Query Builder interface with the 'Tables' pane open. Several tables are highlighted in blue: Categories, Order Details, and Suppliers. On the right, a detailed view of the 'Products' table is shown, listing columns: * (All Columns), ProductID, ProductName, SupplierID, CategoryID, QuantityPerUnit, and UnitPrice. The 'SupplierID' and 'CategoryID' columns each have a green '+' button next to them, indicating they are foreign key columns.

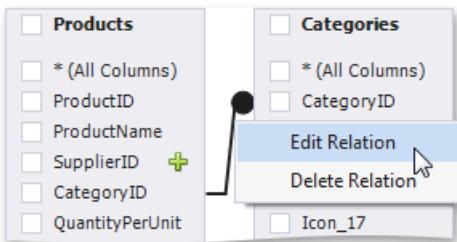
To join the already added table with another table, do one of the following.

- Click the **+** button next to the foreign key column (*SupplierID* and *CategoryID* in the image above).
- Drag and drop the highlighted table from the **Tables** pane to **Diagram** pane.

The Query Builder will display a relationship between tables.

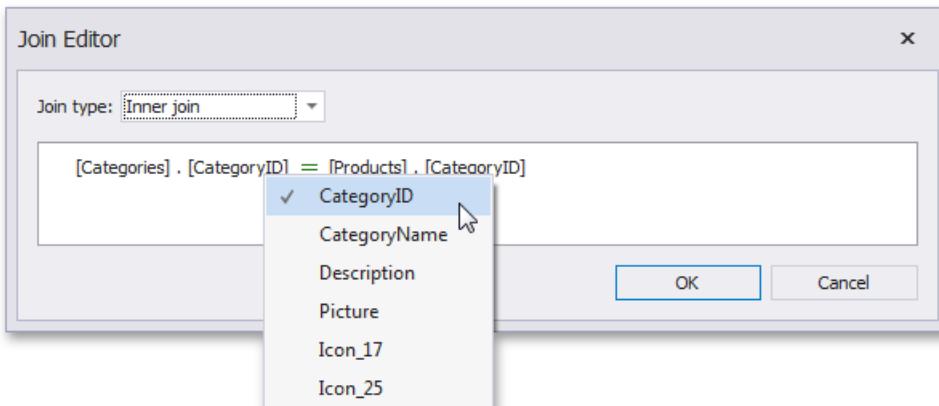
The screenshot shows the Query Builder interface with the 'Tables' pane open. The 'Order Details' and 'Categories' tables are highlighted in blue. A black line with arrows at both ends connects the 'SupplierID' column in the 'Order Details' table to the 'CategoryID' column in the 'Categories' table, indicating a relationship between these two tables.

To edit this relation, select it and use its context menu.



The following commands are available.

- **Edit Relation** - Allows you to edit the selected relation. Clicking this menu item invokes the **Join Editor** dialog.



First, check the join type. You can specify it in the **Join type** combo box (*Inner join* or *Left outer join*). To edit column and table names in the existing condition, click the name you wish to replace and choose a different name from the popup menu.

i NOTE

Note that the **Join Editor** dialog will be invoked automatically if you join tables that do not have a relationship at the database level.

- **Delete Relation** - Removes the selected relation. Note that this action removes the joined table(s).

Edit Column Settings

After you have added the tables and selected the required columns, you can change settings for each column in the **Grid** pane.

Column	Table	Alias	Output	Sorting Type	Sort Order	Group By	Aggregate
Sales Person	SalesPerson		<input checked="" type="checkbox"/>	Descending	1	<input checked="" type="checkbox"/>	
Extended Price	SalesPerson	Price	<input checked="" type="checkbox"/>			<input type="checkbox"/>	Sum
Discount	SalesPerson	Avg_Discount	<input checked="" type="checkbox"/>			<input type="checkbox"/>	Avg
OrderDate	SalesPerson		<input type="checkbox"/>			<input type="checkbox"/>	

The following settings are available for each column.

- Use **Column** to select the required column from the combo box or add a new column. If necessary, you can customize a column expression. To do this, click the ellipsis button for the required column and specify the [expression](#) in the invoked **Expression Editor** dialog.
- The **Table** column displays corresponding table names.
- The **Alias** column allows you to specify the column alias.

i NOTE

Note that aggregated columns should always have an alias.

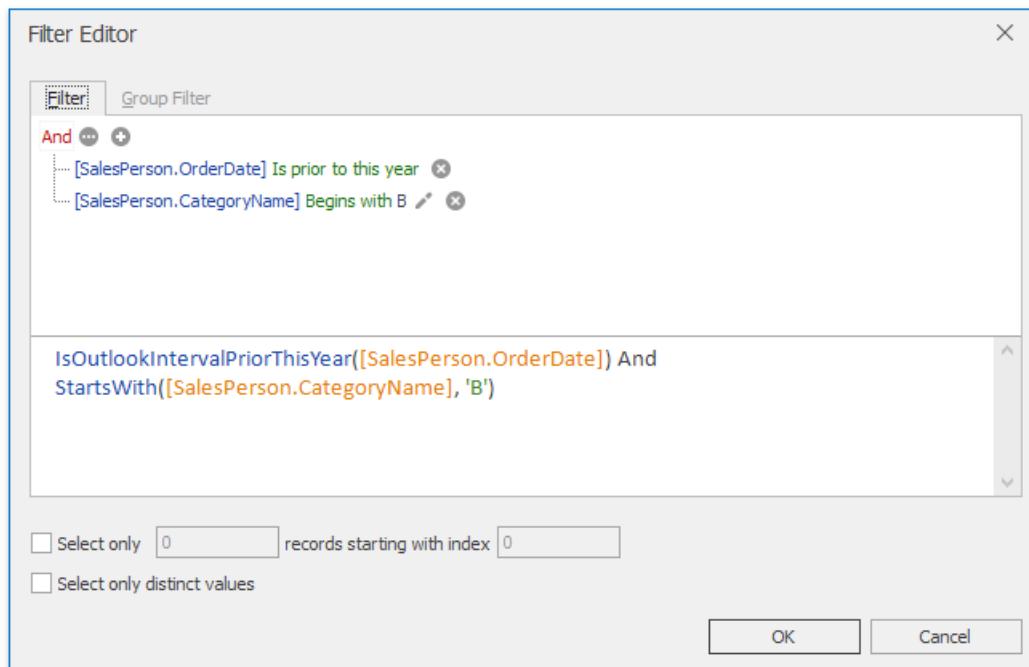
- The **Output** column allows you to choose whether to include specific columns to the query.
- Use the **Sorting type** combo box to specify the sort order of column values. The **Sort order** column allows you to specify the order in which several columns are sorted.
- The **Group By** statement is used in conjunction with the aggregate functions to group the result-set by one or more columns.
- The **Aggregate** option allows you to specify the aggregate function used to aggregate column values.

NOTE

Note that you should apply aggregation/grouping either to all columns or to none of them.

Filter Data

To filter data in the Query Builder, click the **Filter...** button. This will invoke the **Filter Editor** dialog, which allows you to build filter criteria.



To learn more, see [Filter Queries](#).

Customize SQL Query

IMPORTANT

Note that the Query Builder does not allow you to use custom SQL queries by default.

After you add the required tables, you can customize the automatically generated SQL query. To do this, enable the **Allow Edit SQL** check box and edit the SQL query displayed in the **SQL** pane.

Query Builder

Allow Edit SQL

 Categories
 Customers
 EmployeeCustomers
 Employees
 Order Details
 Orders
 Products
 Shippers
 Suppliers
 CategoryProducts
 CustomerReports

```
select [Categories].[CategoryName],  
       [Categories].[Description],  
       [Categories].[CategoryID],  
       [Categories].[Picture],  
       [Products].[UnitPrice]  
  from ([Categories] [Categories]  
        inner join [Products] [Products]  
          on ([Products].[CategoryID] = [Categories].[CategoryID]))  
 where [Categories].[CategoryName] = 'Seafood'  
       and [Products].[UnitPrice] between 10 and 20
```

For instance, you can add a WHERE clause to the SQL expression.

NOTE

Note that if you edit the automatically generated query and uncheck the **Allow Edit SQL** check box, your changes will be discarded, and the generated query will be restored.

Preview Data

The Query Builder allows you to preview data for the created SQL query. To do this, click the **Preview Results...** button.

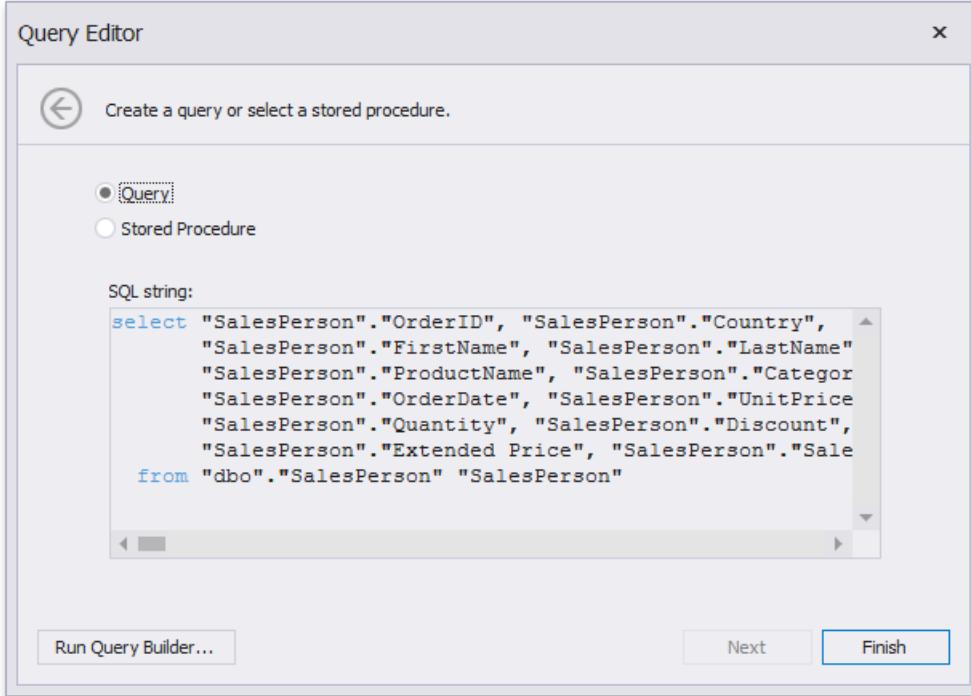
This invokes the [Data Preview](#) window containing data returned after executing the query.

Using the Query Editor

The **Query Editor** dialog allows you to create new SQL queries or edit the existing queries created using the [Data Source](#) wizard. Optionally, you can add [query parameters](#).

The Query Editor can contain two pages depending on the current query.

1. The first page allows you to specify the query or select the [stored procedure](#).



You can choose the following options to create/modify a query.

- Select the **Query** option and run the [Query Builder](#) by clicking the **Run Query Builder...** button. The Query Builder allows you to choose the required tables/columns visually and displays the resulting SQL query within the **SQL String** editor.
- If available, select the **Stored Procedure** option to select one of the [stored procedures](#) from the database.

2. The second page of the Query Editor allows you to add or modify [query parameters](#).

Query Editor

x



Configure query parameters and preview the result.

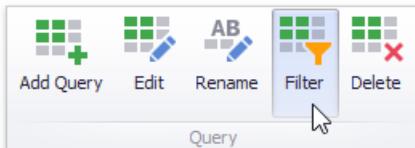
Name	Type	Expression	Value
Parameter1	String	<input type="text"/>	Beverages

[Preview...](#)[Add](#)[Remove](#)[Next](#)[Finish](#)

Manage SQL Queries

After you [connect](#) to the data store and select the required data, you can edit the resulting query/[stored procedure](#) or add another query/stored procedure to the data source.

To manage queries for the current data source, use buttons from the **Query** group in the **Data Source** ribbon tab.



You can perform the following actions.

- **Add Query** - Adds a new query to the data source. Clicking this button invokes the [Query Editor](#) dialog that allows you to create a new query by invoking the [Query Builder](#) or to select the existing [stored procedure](#).
- **Edit** - Modifies the selected query/stored procedure using the [Query Editor](#).
- **Rename** - Renames the selected query.
- **Filter** - Filters the selected query. To learn more, see the [Filter Queries](#) topic.
- **Delete** - Removes the selected query.

Filter Queries

SQL queries constructed in the [Query Builder](#) can be filtered by including WHERE clauses to the query. Filtering can be applied to either underlying or aggregated data. You can also limit the number of returned records when filtering data.

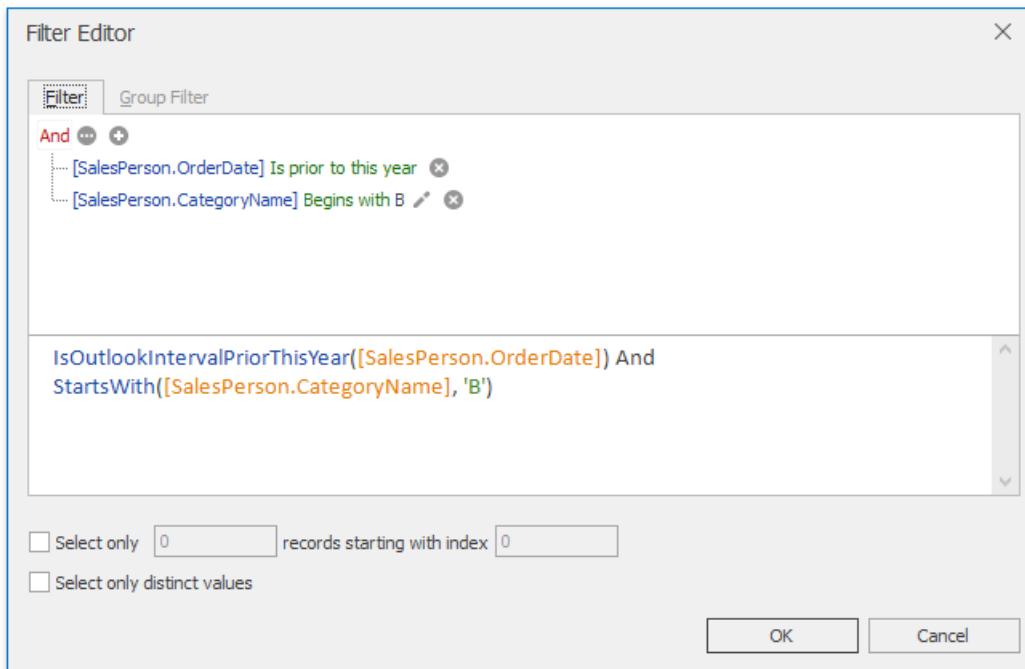
- [Invoke the Filter Editor](#)
- [Filter Data](#)
- [Add Limits](#)

Invoke the Filter Editor

To filter data in the Query Builder, click the **Filter...** button... in the **Data Source** ribbon tab...



... or use a corresponding button within the [Query Builder](#). This will invoke the [Filter Editor](#) dialog, which allows you to build filter criteria.



The **Filter** tab allows you to filter underlying data while the **Group Filter** tab provides the capability to filter data aggregated on the server side.

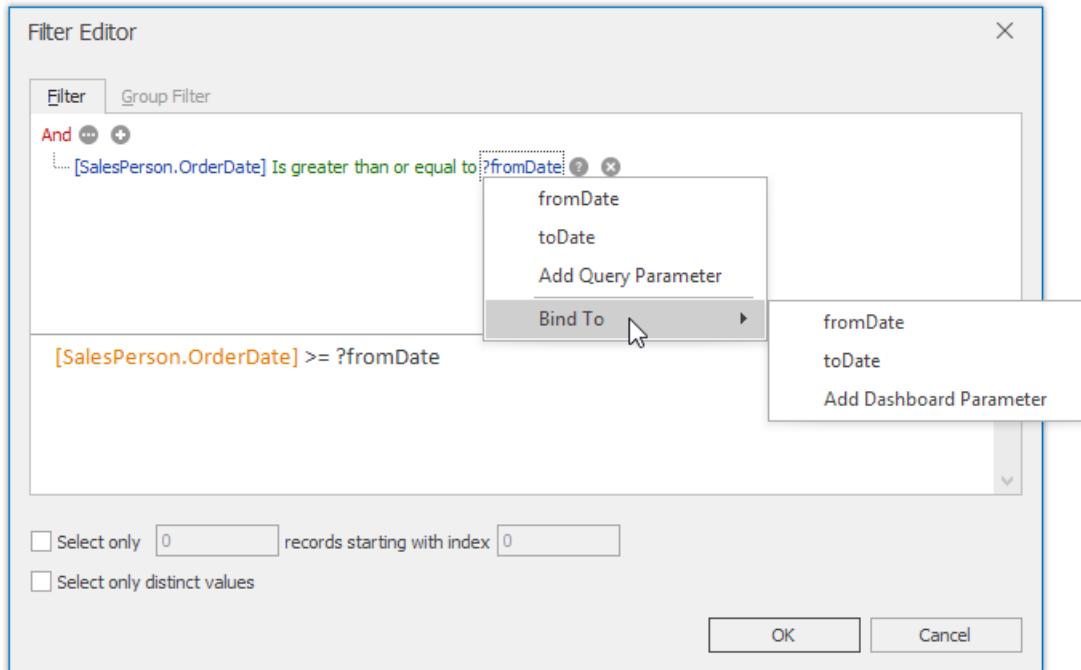
Filter Data

In the Filter Editor, you can compare a field value with the following objects.

- A *static value* (represented by the icon). Click this button to switch to the next item mode ("another field value") to compare the field value with another field value.
- *Another field value* (represented by the icon). Click this button to switch to the next item mode ("parameter value") to compare the field value with a parameter value.
- *A parameter value* (represented by the icon). Click this button to switch back to the initial mode ("static value") to compare the field value with a static value.

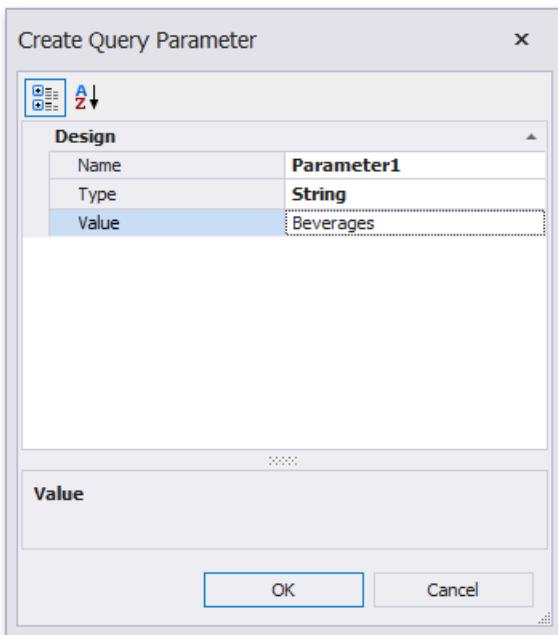
Thus, you can pass the [query parameter](#) to the filter string. To do this, click the button, then click the button and finally click

<select a parameter>.



In the invoked popup menu, you can choose from the following options.

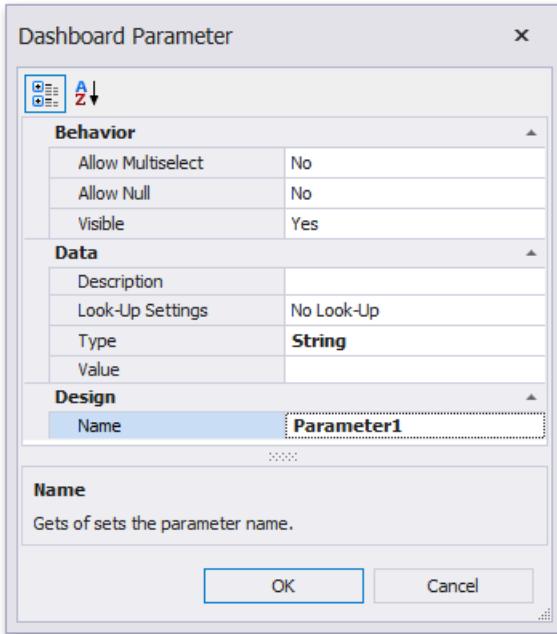
- **Add Query Parameter** - allows you to create a new [query parameter](#). The following dialog will be invoked.



In this dialog, you can specify a parameter's name (**Name**), type (**Type**) and value (**Value**).

If the current query already contains query parameters, they will be displayed within the popup menu.

- **Bind to** - allows you to pass a [dashboard parameter](#) to a filter string. You can choose from the list of predefined dashboard parameters or create a new dashboard parameter by selecting **Add Dashboard Parameter**. If you selected **Add Dashboard Parameter**, the following dialog will be invoked.



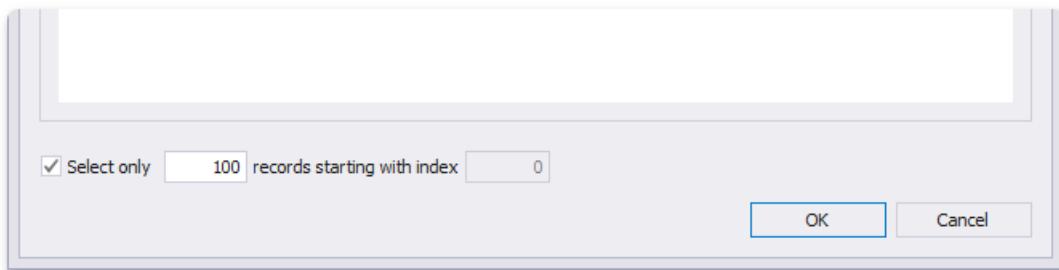
In this dialog, you can specify settings of the dashboard parameter to be created. To learn more, see [Creating Parameters](#).

After you specified the required settings, click **OK**. A new dashboard parameter along with a new query parameter will be created. Note that created dashboard and query parameters will be bound automatically.

The **Group Filter** tab of the Filter Editor allows you to apply filtering to grouped/aggregated data fields by including HAVING clauses to the query. Grouping and aggregation are managed by the **Group By** and **Aggregate** options in the Query Builder. To learn more, see the **Edit Column Settings** paragraph in the [Query Builder](#) topic.

Add Limits

The Filter Editor also allows you to limit the number of returned records. To do this, enable the **Select only** checkbox and specify the number of records to be returned.



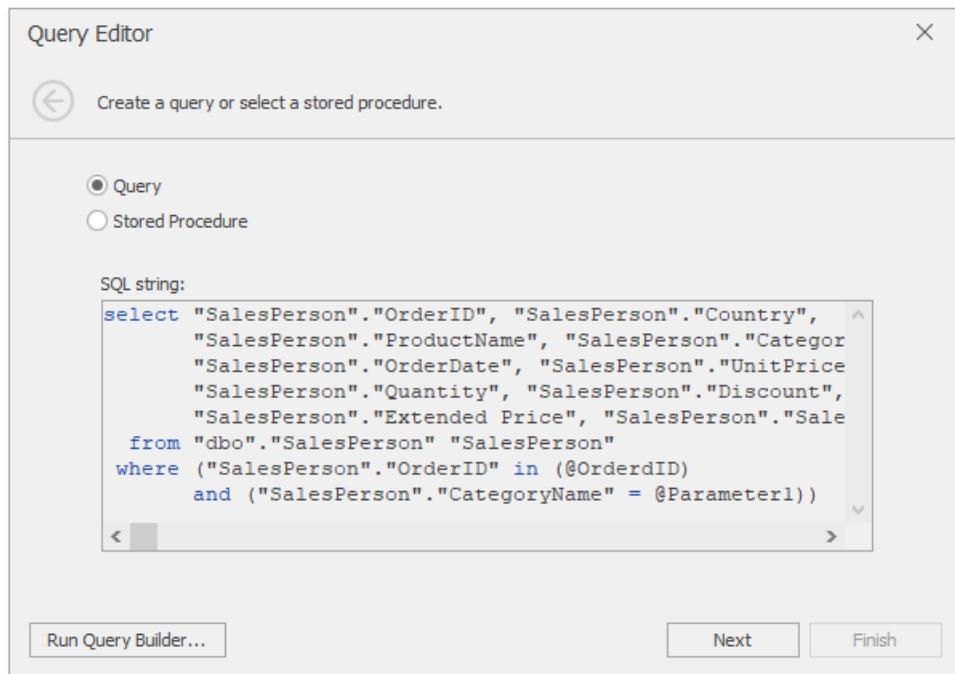
You can also skip the required number of records in the returned dataset by specifying the **records starting with index** value.

NOTE

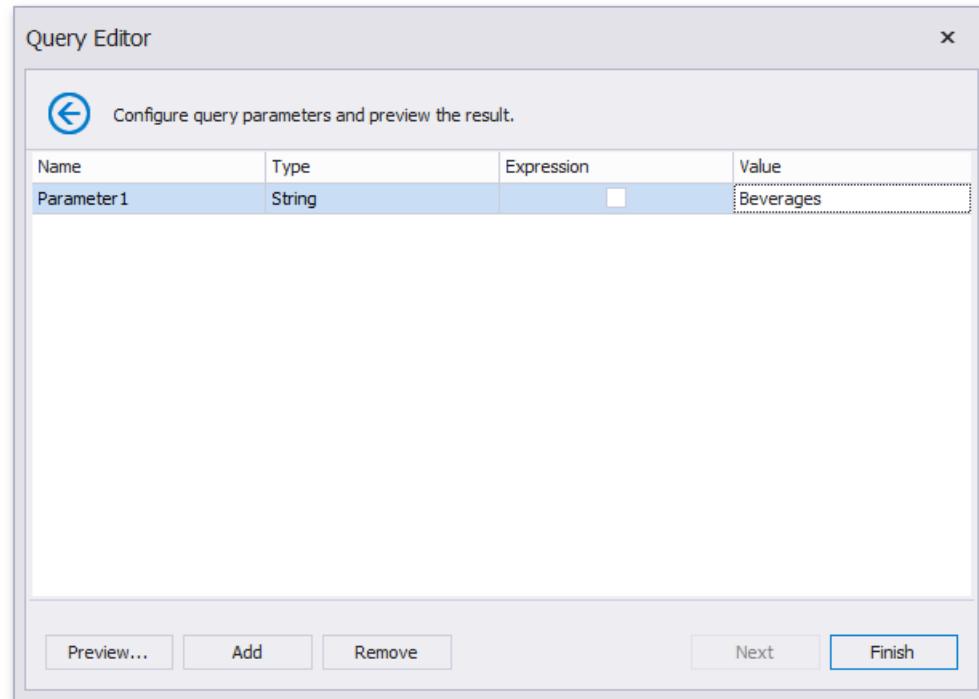
Note that the **Sorting type** should be specified in the Query Builder to enable the capability to skip the specified number of records. To learn how to apply sorting, see the **Edit Column Settings** paragraph in the [Query Builder](#) topic.

Pass Query Parameters

The [Query Builder](#) allows you to add query parameters when creating a filter criteria. To specify settings of an added query parameter, click **Next** in the [Query Editor](#) dialog.



On the next page, add a new parameter (using the **Add** button) and specify its settings.



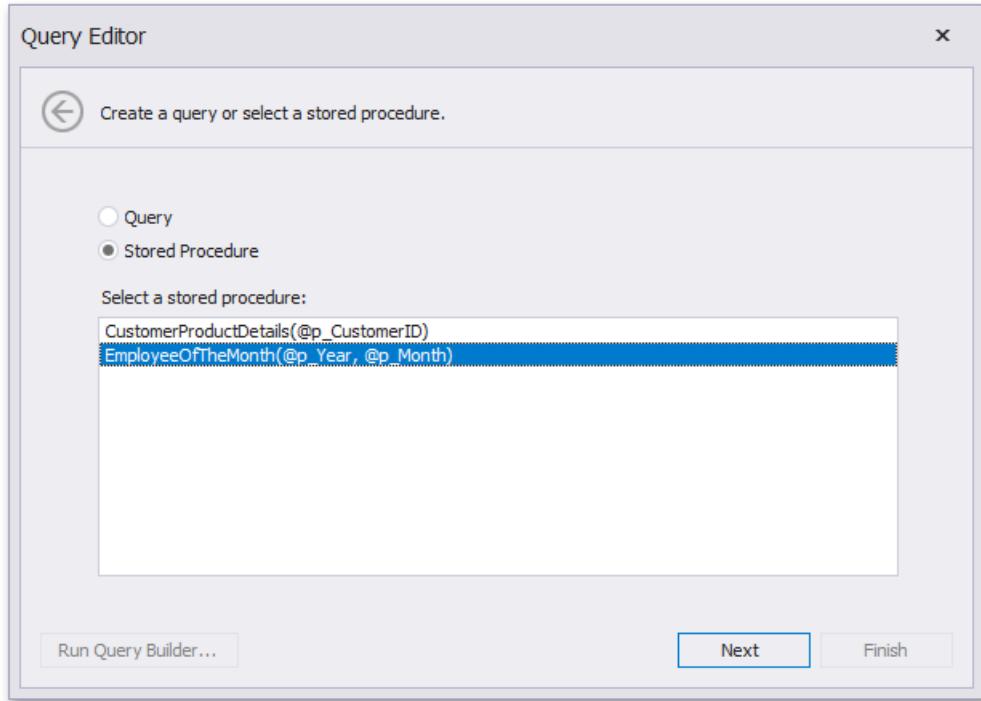
- **Name** - Specifies a parameter's name.
- **Type** - Specifies the parameter's type.
- **Expression** - Specifies whether an expression is used to specify a parameter's value.
- **Value** - Specifies the parameter's value. If the **Expression** check box is checked, you can invoke the **Expression Editor** dialog to specify the required [expression](#) or select an existing [dashboard parameter](#) to pass to the SQL query.

Use the **Remove** button to remove query parameters.

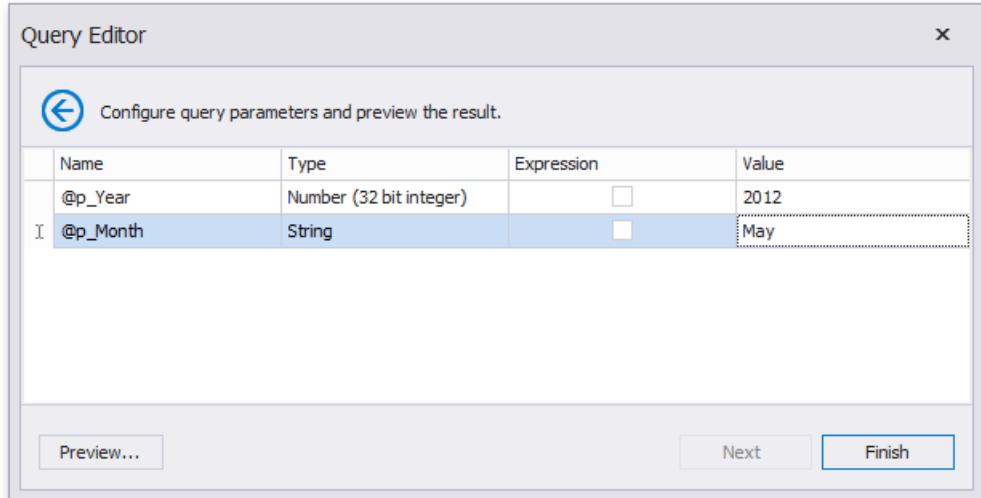
Click the [Preview...](#) button to preview the query result. Then, click **Finish** to complete query modification.

Stored Procedures

If you use a stored procedure to supply the dashboard with data, you should specify the stored procedure parameters. In the [Query Editor](#) dialog, select the required stored procedure and click **Next**.



On the next page, you can specify the parameter settings.



- **Name** - Displays the parameter name.
- **Type** - Displays the parameter type.
- **Expression** - Specifies whether the expression is used to specify a parameter value.
- **Value** - Specifies a parameter value. If the **Expression** check box is checked, you can invoke the **Expression Editor** dialog to specify the required [expression](#) or select an existing [dashboard parameter](#) to use it as a stored procedure parameter.

Click the [Preview...](#) button to preview the query result. Then, click **Finish** to complete query modifying.

Preview Data

The [Query Editor](#) and [Query Builder](#) allow you to preview data returned after a query/[stored procedure](#) execution. To do this, click the **Preview...** button.

Data Preview (First 1000 Rows Displayed)

Order ID	Country	First Name	Last Name	Product Name	Category Name
10253	USA	Janet	Leverling	Chartreuse verte	Beverages
10254	UK	Steven	Buchanan	Guaraná Fantástica	Beverages
10255	UK	Anne	Dodsworth	Chang	Beverages
10257	USA	Margaret	Peacock	Chartreuse verte	Beverages
10258	USA	Nancy	Davolio	Chang	Beverages
10260	USA	Margaret	Peacock	Outback Lager	Beverages
10261	USA	Margaret	Peacock	Steeleye Stout	Beverages
10263	UK	Anne	Dodsworth	Guaraná Fantástica	Beverages
10264	UK	Michael	Suyama	Chang	Beverages
10265	USA	Andrew	Fuller	Outback Lager	Beverages
10267	USA	Margaret	Peacock	Lakkalikööri	Beverages
10270	USA	Nancy	Davolio	Ipoh Coffee	Beverages
10273	USA	Janet	Leverling	Lakkalikööri	Beverages

Close

This invokes the **Data Preview** window containing data returned after executing the current query/stored procedure.

Creating Calculated Fields

The Dashboard Designer provides the capability to create calculated fields that allow you to apply complex expressions to data fields that are obtained from the dashboard's data source. You can use these fields in data visualizations as regular data source fields.

- [Creating a Calculated Field](#)
- [Editing a Calculated Field](#)

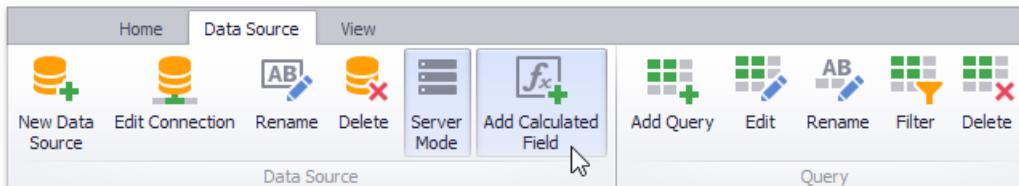
NOTE

Note that calculated fields are not supported for [OLAP](#) data sources.

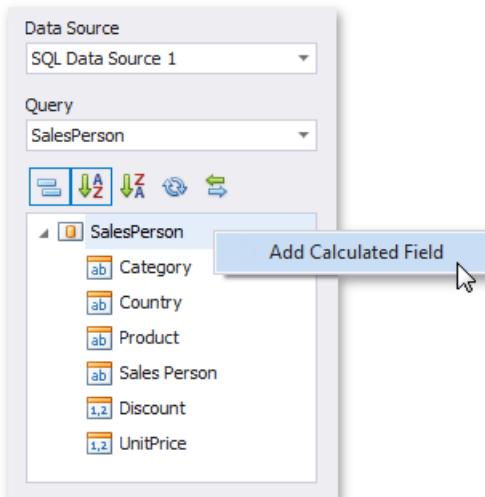
Creating a Calculated Field

After you have created a data source, you can add a new calculated field based on the existing data source fields.

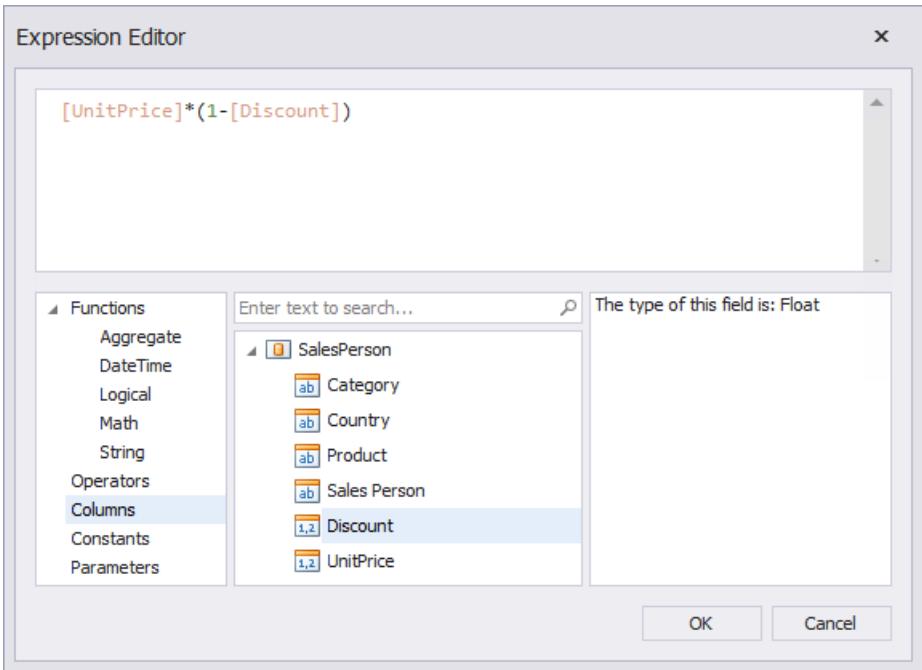
To create a calculated field, select the required data source (and the required [query](#)/data member, if applicable) in the [Data Source Browser](#) and click the **Add Calculated Field** button in the Ribbon's Data Source tab...



...or right-click the Field List and select **Add Calculated Field** in the context menu.



This invokes the **Expression Editor** dialog, which allows you to specify an [expression](#) that will be used to obtain calculated field values. Here, you can construct the required expression.



You can use the following elements in expressions.

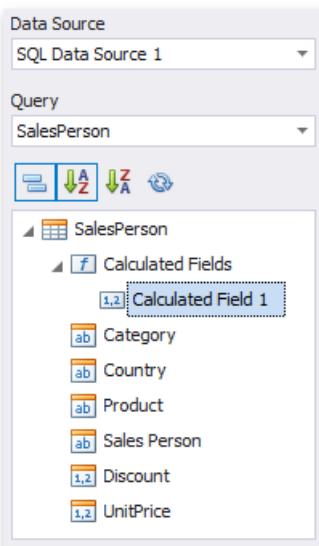
- Functions

NOTE

To learn how to use **Aggregate** functions, see [Aggregations](#). The [Expression Operators, Functions and Constants](#) topic lists the functions (**DateTime**, **Math**, **String**, etc.) supported by expressions.

- Operators
- Columns
- Constants
- [Parameters](#)

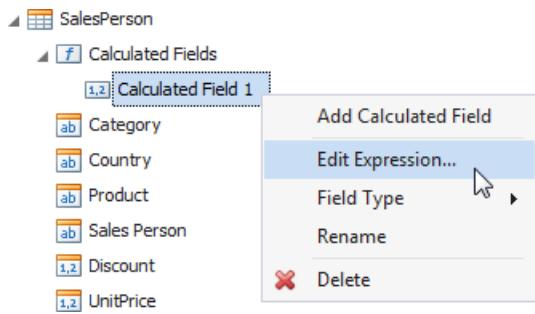
After the expression has been specified, click **OK**. This displays a new calculated field in the data source structure.



Now you can specify the required calculated field type, change its default name, etc.

Editing a Calculated Field

To edit a calculated field, use its context menu.



This menu contains the following items.

ITEM	DESCRIPTION
Edit Expression...	Invokes the Expression Editor dialog, which allows you to change an expression for an existing calculated field.
Field Type	Specifies the type of the calculated field.
Rename	Changes the calculated field name.
Delete	Removes the existing calculated field from the data source.

Data Inspector

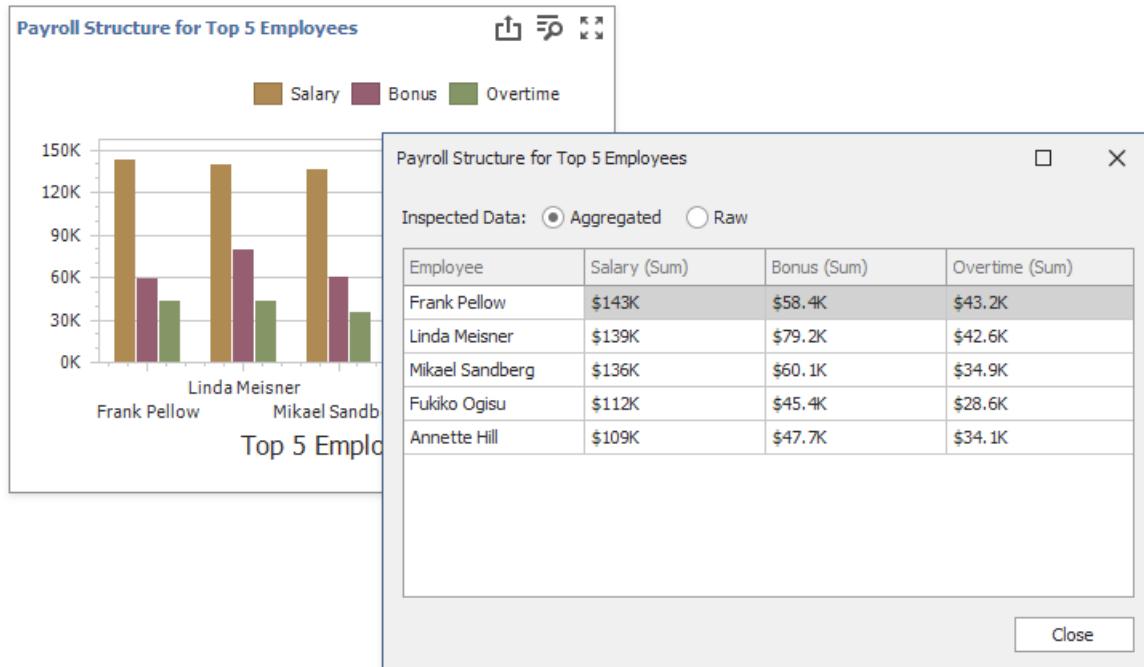
Data Inspector is a dialog window that displays raw and aggregated data.

Overview

To invoke the Data Inspector window, click the "Inspect Data" button  in the [dashboard item caption](#) or select the "Inspect Data" context menu item.

Aggregated (Displayed) Data

The data shown as *Aggregated* is retrieved from the dashboard item's data storage.



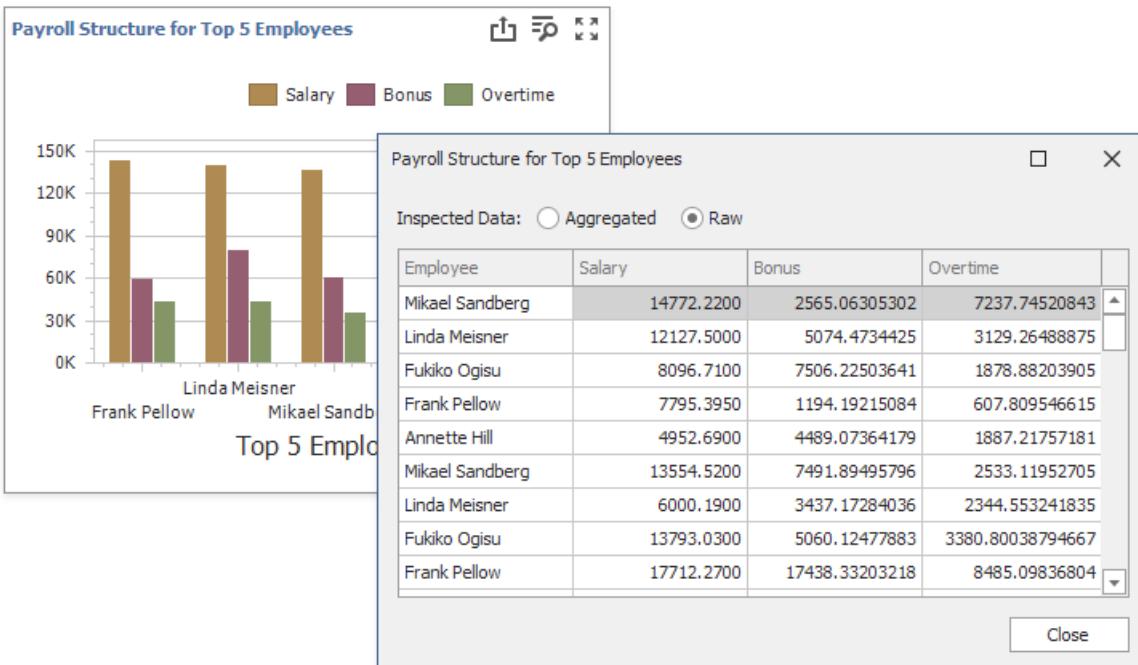
The columns are:

- [Dimensions](#), except the **Sparkline**.
- [Measures](#). A list of dimensions does not include unbound measures (the measures without a DataMember, such as [Totals](#) and the number of points in a [Cluster](#)).
 - The [Sparkline](#) is displayed as a column.

Raw Data

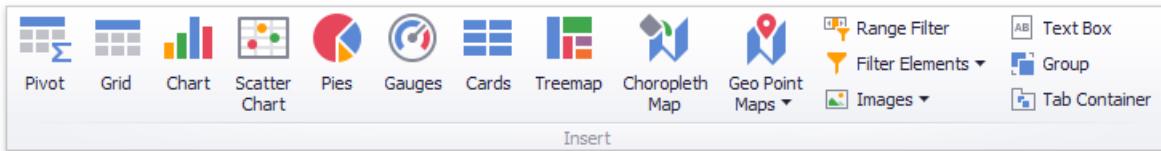
Raw data is the dashboard item's underlying data.

Raw Data:



Add Dashboard Items

To create a dashboard item in the Dashboard Designer, click the corresponding button in the **Home** ribbon tab.

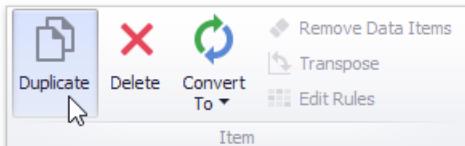


This creates an empty dashboard item, and displays the required data sections for binding this item to data (for instance, the image below displays the **Pivot** dashboard item and corresponding data sections).

Perform the following steps to design a dashboard item.

- [Bind](#) the dashboard item to data.
- Perform the required [data shaping](#) operations (such as grouping, sorting and filtering).
- Use the [interactivity](#) features to enable interaction between various dashboard items.
- Adjust the dashboard item's [position and size](#) and specify the [dashboard item caption](#) settings.
- Specify specific dashboard item settings based on its type. To learn more, see [Dashboard Item Settings](#).

After you have created and designed the dashboard item, you can create an exact copy. To do this, click the **Duplicate** button in the **Home** ribbon tab...



... or use the dashboard item's context menu. To remove the dashboard item from the dashboard, use the **Delete** button or the corresponding item in the context menu.

Bind Dashboard Items to Data

This section consists of the following topics.

- [Bind Dashboard Items to Data](#)
- [Hidden Data Items](#)
- [Bind Dashboard Items to Data in OLAP mode](#)

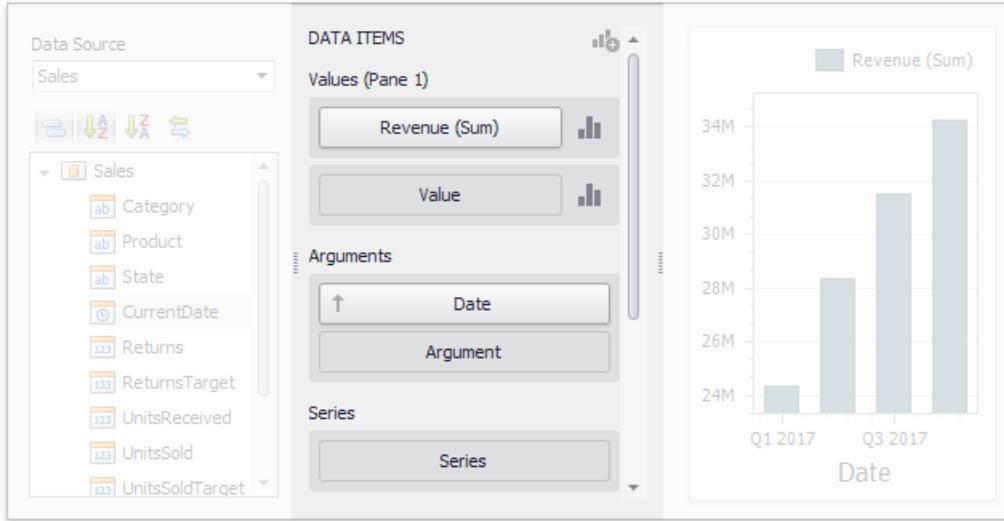
Bind Dashboard Items to Data

This topic explains how to bind the newly [created](#) dashboard item to [data source](#) fields, to display data.

- [Binding Concepts](#)
- [Create Binding](#)
- [Modify Binding](#)
- [Clear Binding](#)

Binding Concepts

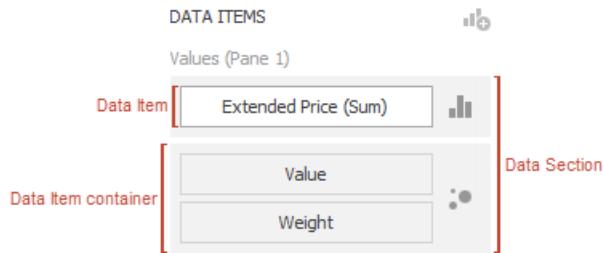
To bind dashboard items to data in the Dashboard Designer, the [DATA ITEMS](#) pane is used.



Each dashboard item type has a specific set of **data sections**, such as *Values*, *Arguments* and *Series* in the chart, *Columns* and *Sparklines* in the grid, and *Values*, *Columns* and *Rows* in the pivot grid. Each data section corresponds to a particular dashboard item area or element, and should be mapped to data to be displayed within this area/element.

Mapping is performed using **data items** - objects that are used to bind a dashboard item to data source fields. Data items are used to link the dashboard item to the required data source fields and, thus, visualize data within the dashboard item.

Another key concept in data binding is the **data item container**, which represents a set of data items. It can contain either a single data item or multiple data items, and allows you to specify various options related to how a [specific dashboard item](#) visualizes data.



The data item can process data in two ways - as **dimensions** or **measures**. This depends on the data section to which the data item is assigned, and the type of the data item container.

- **dimension** - a data item whose values are not intended to be summarized.

These values can be of any type - string, date-time or numeric. In any case, the dashboard does not summarize the dimension values, but groups identical values. You can perform [grouping](#), [sorting](#), or display the [top](#) values for the dimension values.

You can also customize [data format](#) settings for numeric and date-time values. To access the data shaping settings, use the data item's *menu button*.



For instance, dimensions are used to provide data for the chart argument axis, pivot grid column and row headers.

- **measure** - a data item whose values are summarized before they are used in the dashboard.

These values can be of any type - numeric, date-time or string. In any case, the dashboard will calculate an appropriate [summary](#) function against measure values. You can also customize the [data format](#) settings that affect how summary values are displayed. To access these settings, use the data item's *menu button*.



For example, measures are used to provide data for the chart's Y-axis, and to calculate pivot cell values.

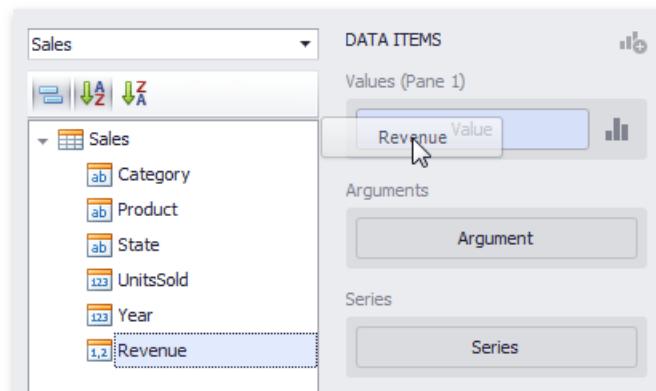
Specific data sections display *Options buttons* for each data item container. Use these buttons to invoke a dialog that allows you to specify the settings of this data item container. These settings affect how a particular dashboard item's area/element displays the provided data.



Create Binding

The DATA ITEMS pane displays data sections of the selected dashboard item. It can be used to add, rearrange or remove data items.

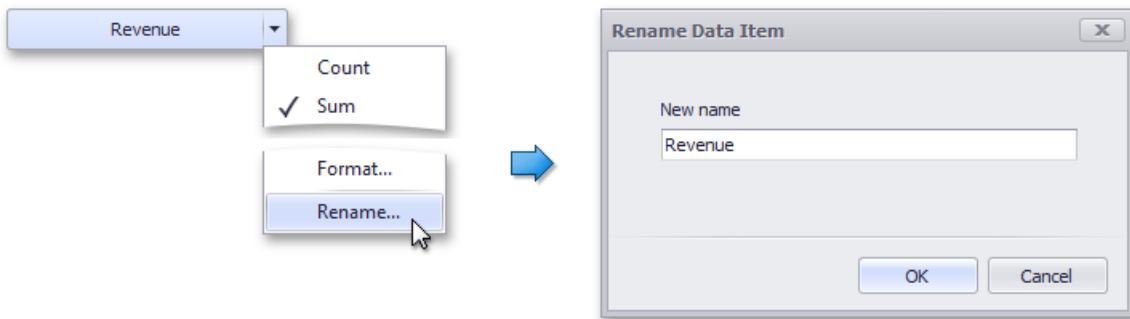
To bind a dashboard item to data, select the dashboard item. Then choose the required data field from the [Data Source Browser](#) and drop it onto the appropriate section in the DATA ITEMS pane.



You can remove the data item by dragging it outside the DATA ITEMS pane.

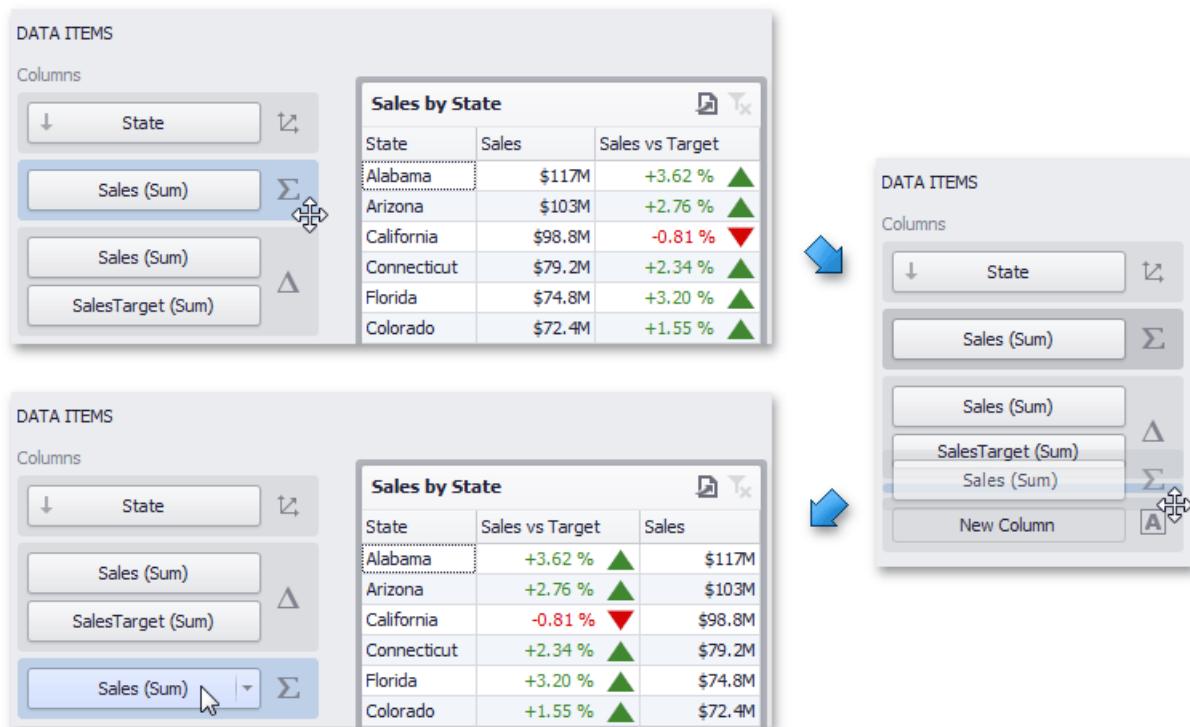
To learn how to bind a specific dashboard item to data, see the [Providing Data](#) topic for the required [dashboard item](#).

To rename the data item, click its menu button and select **Rename**, to invoke the **Rename Data Item** dialog.



Modify Binding

You can modify data binding by dragging data item containers within a data section. To do this, drag the data item container to the required position.

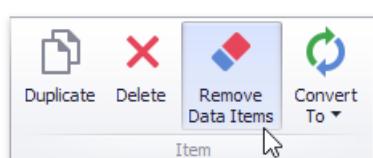


You can also modify data binding by dragging data items within the DATA ITEMS pane. This action has the following specifics.

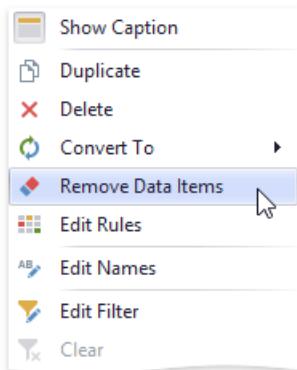
- If you drag the data item to a new position, the settings specified for the corresponding data item container will be restored to the default values.
- If you drag the data item to an existing data item placeholder, the settings of the corresponding data item container will be applied.

Clear Binding

To remove all data items for a selected dashboard item, use the **Remove Data Items** button in the **Home** ribbon tab.



You can also do this via the dashboard item's context menu.



Hidden Data Items

The **HIDDEN DATA ITEMS** area can be used to perform various [data shaping](#) and analysis operations by measures or dimensions that do not directly take part in the visual representation of data.

To create hidden data items, choose the required data field from the [Data Source Browser](#) and drop it onto the appropriate section in the HIDDEN DATA ITEMS area.

You can perform the following operations using hidden data items.

- [Filtering](#)
- [Sorting](#)
- [Top N](#)
- [Conditional Formatting](#)

Filtering

You can use **hidden dimensions** to [apply filtering](#) to the dashboard item. To do this, select the required hidden dimension in the Filter Editor dialog and specify the required condition.

The screenshot shows the Power BI Filter Editor dialog open over a grid visualization titled "Sales by State". The grid displays sales data for various US states, with California at the top and New Mexico at the bottom. The "Trend" column shows a red dot for each state. The "Sales" column shows values like "\$86M" for California and "\$29.6M" for New Mexico. The Filter Editor dialog has the following content:

- And** (operator)
- [CurrentDate (Year)] Equals 2016** (filter condition)
- [CurrentDate (Year)] = 2016** (highlighted condition in orange)
- OK**, **Cancel**, **Apply** (buttons)

The Power BI interface on the left includes sections for **DATA ITEMS** (Columns: Sales (Sum), State, Sales (Sum), New Column; Sparkline: CurrentDate (Month)), **HIDDEN DATA ITEMS** (Dimensions: CurrentDate (Year), Dimension; Measures: Measure), and a main area showing the "Sales by State" grid.

For instance, the [Grid](#) on the image above is filtered by the first quarter of the *OrderDate (Quarter)* dimension.

Sorting

You can [sort](#) values of the specified dimension by the **hidden measure**. To do this, select the required measure from the dimension's **Sort By** sub-menu.

DATA ITEMS

Columns

Category	Extended Price (Sum)
Beverages	\$268K
Dairy Products	\$235K
Confections	\$167K
	\$131K
	\$106K
	\$95.7K
	\$163K
	\$100K

Sparkline

HIDDEN DATA ITEMS

Dimensions

Measures

Quantity (Sum)

Measure

For instance, categories displayed in the [Grid](#) on the image above are sorted by values of the hidden *Quantity (Sum)* measure.

Top N

You can use **hidden measures** in [Top N](#) conditions. To do this, select the required measure from the **Measure** combo box in the [Top N Values](#) dialog.

DATA ITEMS

Columns

Category	Extended Price (Sum)
Beverages	\$268K
Dairy Products	\$235K
Confections	\$167K
Seafood	\$131K
Condiments	\$106K

Sparkline

HIDDEN DATA ITEMS

Dimensions

Measures

Quantity (Sum)

Measure

Top N Values

Enabled

Mode:

Count:

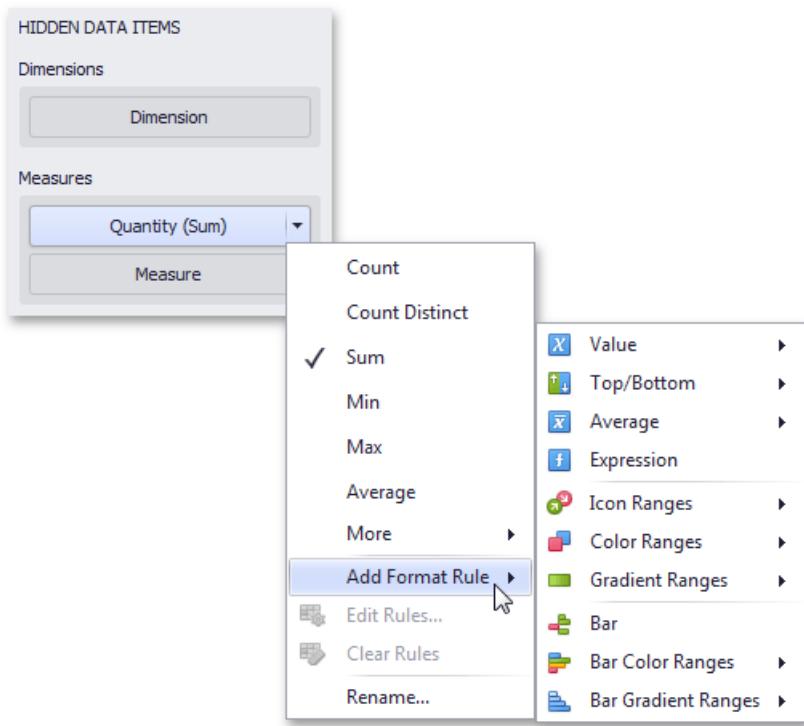
Measure:

Show "Others" value:

For instance, the [Grid](#) on the image above displays top 5 categories for the *Quantity (Sum)* hidden measure.

Conditional Formatting

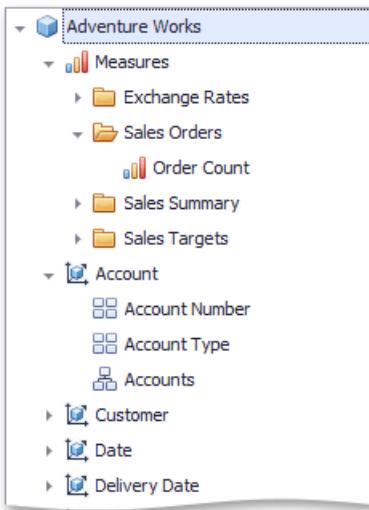
You can create format rules based on **hidden measures** to apply [conditional formatting](#) to elements corresponding to visible values. To do this, use the **Add Format Rule** menu of the hidden measure.



For the [Expression](#) format condition, you can use the required hidden measure in the same manner as in the [Filter Editor](#) dialog.

Bind Dashboard Items to Data in OLAP mode

In **OLAP** mode, the cube schema is fetched automatically, and the [Data Source Browser](#) displays the entire OLAP cube structure.



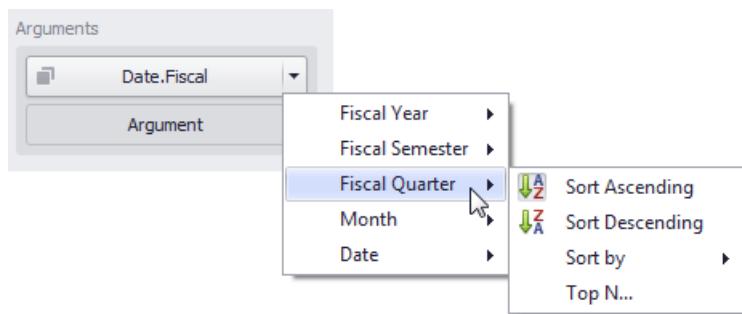
To visualize data from the OLAP cube, [drag-and-drop](#) measures, attributes or hierarchies onto the appropriate data sections in the **DATA ITEMS** area.

Note that OLAP measures can only be placed in the **Values** section, while dimension attributes and hierarchies can only be placed in other data sections.

NOTE

By default, the dashboard displays only dimension values that have intersections with measures in a cube. To show all available dimension values, add [hidden measures](#) to the dashboard item so that all dimension values of the dimension will have not be empty for at least one measure value of these measures.

OLAP hierarchies allow you to customize each level separately. To access hierarchy level options, invoke the data item menu for the hierarchy and then use the submenu that corresponds to the desired level.



NOTE

You can easily drill down through OLAP hierarchies using the [Drill-Down](#) feature.

Dashboard Item Settings

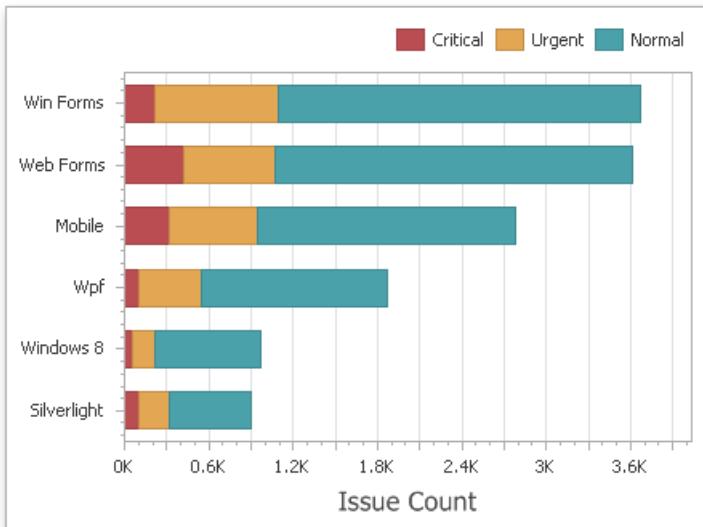
DevExpress Dashboard provides a number of visualization elements designed to present visual or textual information in a dashboard - **dashboard items**.

This section describes the available dashboard items and their settings.

- [Chart](#)
- [Scatter Chart](#)
- [Grid](#)
- [Pies](#)
- [Cards](#)
- [Gauges](#)
- [Pivot](#)
- [Choropleth Map](#)
- [Geo Point Maps](#)
- [Range Filter](#)
- [Date Filter](#)
- [Images](#)
- [Text Box](#)
- [Treemap](#)
- [Filter Elements](#)
- [Dashboard Item Group](#)
- [Tab Container](#)

Chart

The topics in this section describe the features available in the **Chart** dashboard item, and provide extensive information on how to create and customize charts in the Dashboard Designer.



This section is divided into the following subsections.

- [Providing Data](#)

Explains how to supply the Chart dashboard item with data.

- [Series](#)

Enumerates and describes different types of series that can be displayed within the Chart dashboard item.

- [Panes](#)

Introduces the concept of chart panes (visual areas within a diagram that display chart series), and describes how to create them.

- [Interactivity](#)

Describes features that enable interaction between the Chart and other dashboard items.

- [Coloring](#)

Describes coloring capabilities of the Chart dashboard item.

- [Axes](#)

Describes how to customize settings related to chart axes.

- [Legend](#)

Describes the chart legend and its options.

- [Orientation](#)

Describes how to toggle the chart's orientation.

- [Conditional Formatting](#)

Describes the format condition settings.

Providing Data

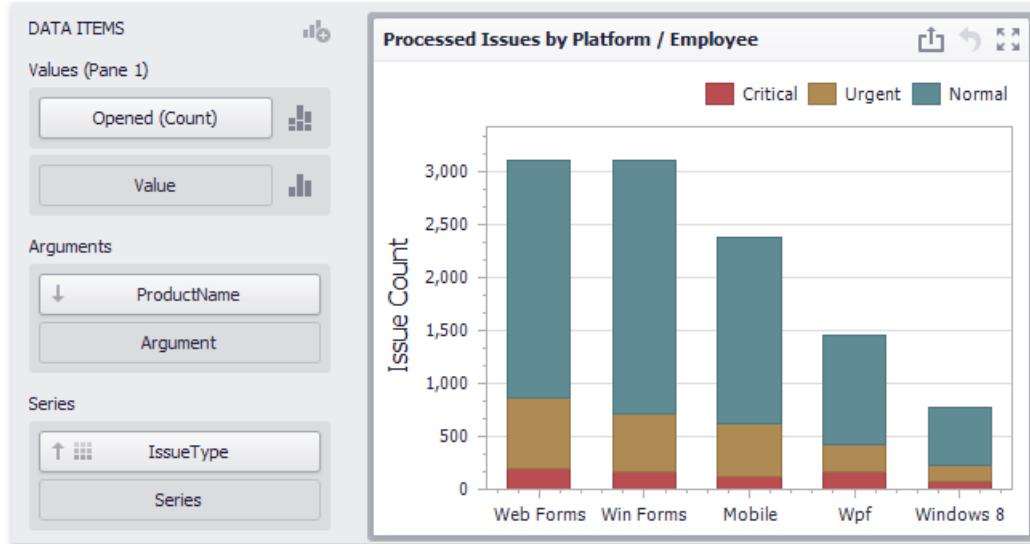
The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner. To learn more, see the [Bind Dashboard Items to Data](#) topic.

The only difference is in the data sections that the required dashboard item has. This topic describes how to bind a **Chart** dashboard item to data in the Designer.

- [Binding to Data in the Designer](#)
- [Transposing Arguments and Series](#)

Binding to Data in the Designer

The image below shows a sample Chart dashboard item that is bound to data.

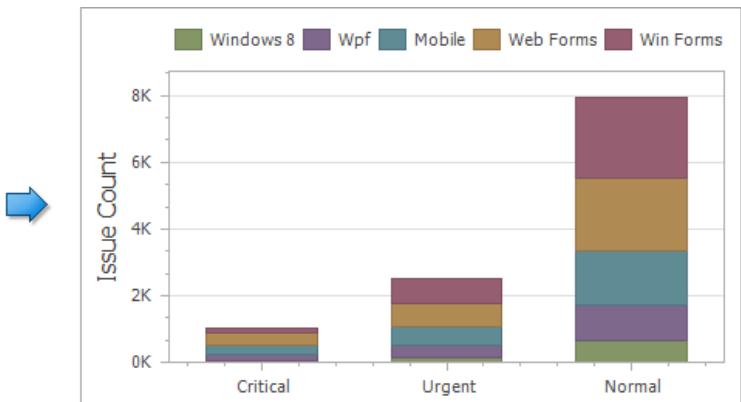
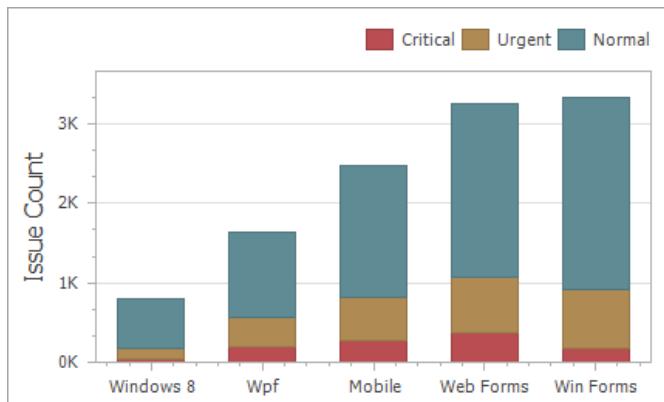


To bind the Chart dashboard item to data, drag and drop a data source field to a placeholder contained in one of the available data sections. The table below lists and describes the Chart's data sections.

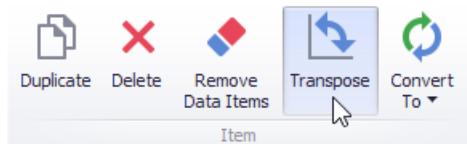
SECTION	DESCRIPTION
Values	Contains data items against which the Y-coordinates of data points are calculated. The Options button next to the Value data item allows you to select the series type and specify different options. Note that some types of series accept several measures. To learn more, see the documentation for the required series type .
Arguments	Contains data items that provide values displayed along the X-axis of the chart.
Series	Contains data items whose values are used to create chart series .

Transposing Arguments and Series

The Chart dashboard item provides the capability to transpose chart arguments and series. In this case, data items contained in the **Arguments** section are moved to the **Series** section, and vice versa.



To transpose the selected Chart dashboard item, use the **Transpose** button in the **Home** ribbon tab.



Series

This section describes how to select a desired series type in the overview topic, and lists the variety of available series types.

The section consists of the following topics.

- [Series Overview](#)

Provides information on how to specify a series type in the Dashboard Designer.

- [Bar Series](#)

Lists the available types of bar series.

- [Point and Line Series](#)

Lists the available types of point and line series.

- [Area Series](#)

Lists the available types of area series.

- [Range Series](#)

Lists the available types of range series.

- [Weighted Series](#)

Lists the available types of weighted series.

- [Financial Series](#)

Lists the available types of financial series.

Series Overview

The Chart dashboard item supports a variety of series types - from simple bar and line charts to complex candle stick and bubble graphs.

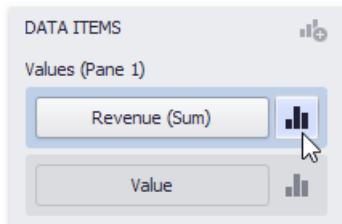
- [Bar Series](#)
- [Point and Line Series](#)
- [Area Series](#)
- [Range Series](#)
- [Weighted Series](#)
- [Financial Series](#)

This topic describes how to change the series type and specify various series options (for instance, how to use secondary axis or enable point labels).

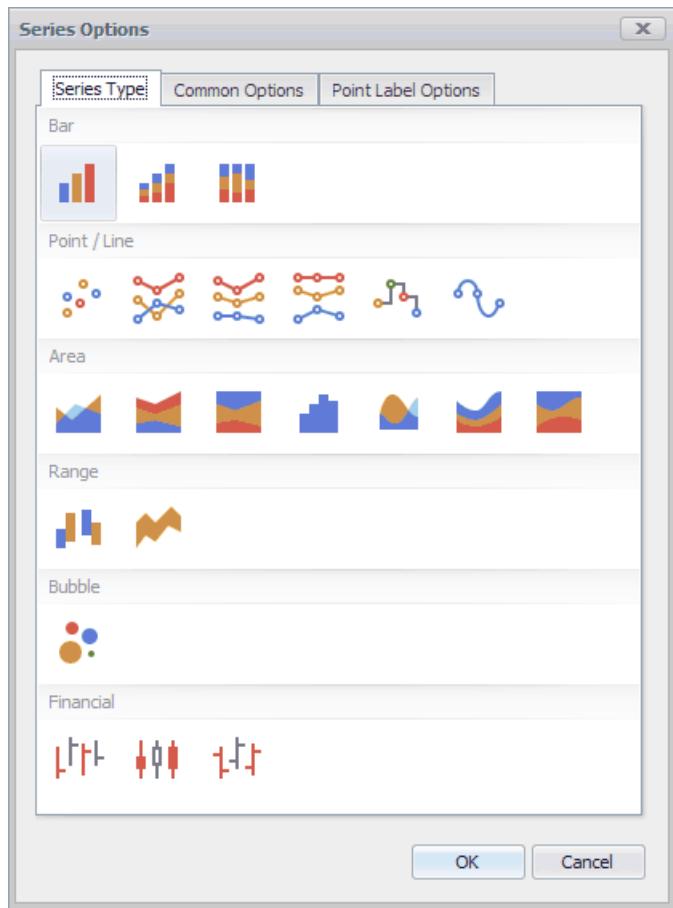
- [Series Types](#)
- [Series Options](#)
- [Series Point Labels](#)

Series Types

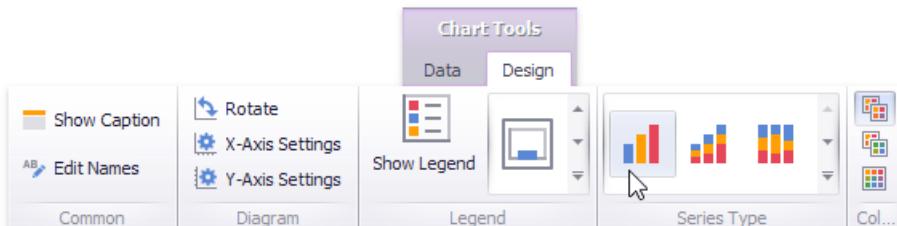
To switch between series types in the Dashboard Designer, click the **Options** button next to the required data item (or placeholder) in the **Values** section.



In the invoked **Series Options** dialog, select the required series type and click **OK**.

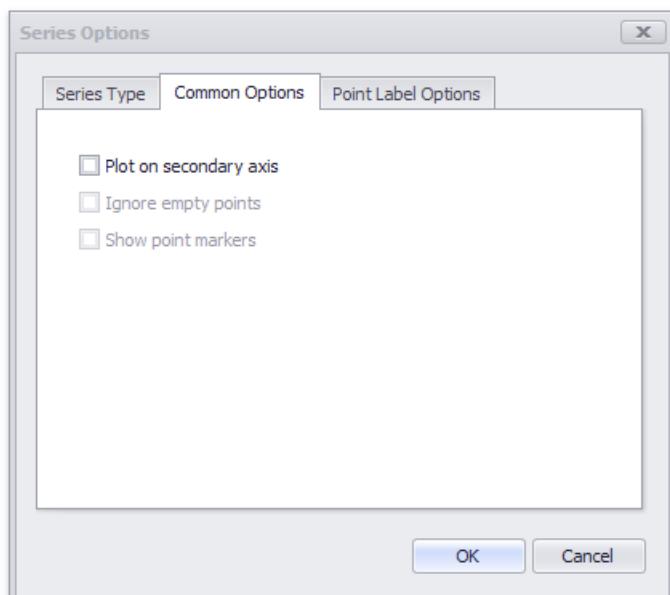


You can also do this using the **Series Type** gallery in the **Design** Ribbon tab.



Series Options

To manage common series options, use the **Common Options** tab of the **Series Options** dialog.



- **Plot on secondary axis** - Specifies whether or not the secondary axis is used to plot the current series.
 - **Ignore empty points** - Specifies whether or not empty points are ignored when plotting the current series.
- Note that this option is in effect for the [Line](#), [Area](#) and [Range Area](#) series.
- **Show point markers** - Specifies whether or not to show point markers for the current series.

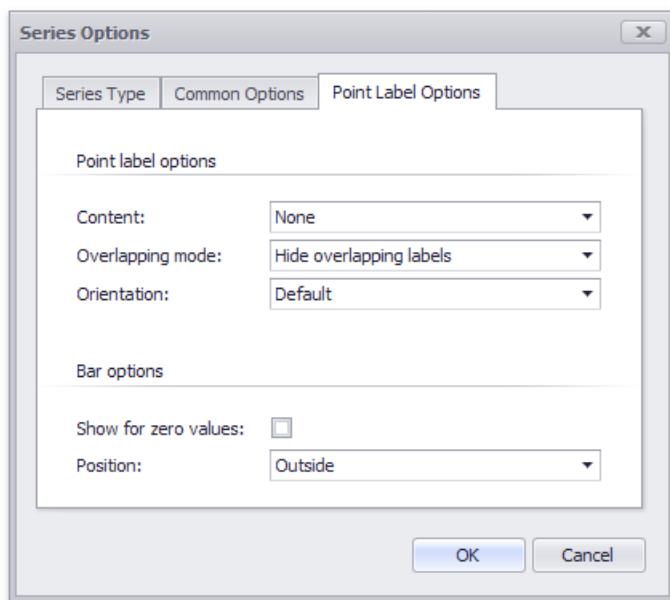
NOTE

Note that point markers are always shown when [Master Filtering](#) is enabled for the Chart dashboard item.

Note that this option is in effect for the [Line](#) and [Area](#) series.

Series Point Labels

The **Point Label Options** tab of the **Series Options** dialog allows you to enable series point labels and manage their settings.



- **Show point labels** - Specifies whether or not to show point labels for the current series.
- **Content** - Specifies the type of content displayed within point labels.
- **Overlapping mode** - Specifies the label overlap mode.

NOTE

This option is not in effect when the dashboard is displayed in the Web Viewer.

- **Orientation** - Specifies the orientation of point labels.

Bar options

NOTE

These settings are in effect for [Bar](#) series only.

- **Show for zero values** - Specifies whether or not to show labels for points with zero values.
- **Position** - Specifies the position of point labels relative to bars.

Bar Series

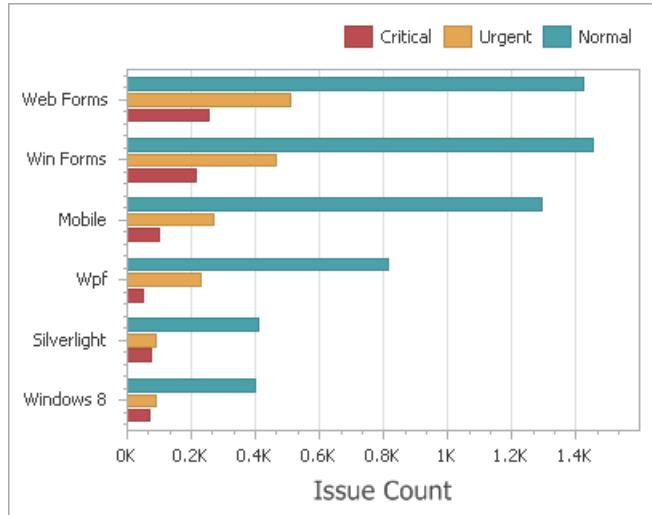
Bar series visualize data using rectangular bars with lengths proportional to the values that they represent.

The following types of Bar series are available.

- [Bar](#)
- [Stacked Bar](#)
- [Full-Stacked Bar](#)

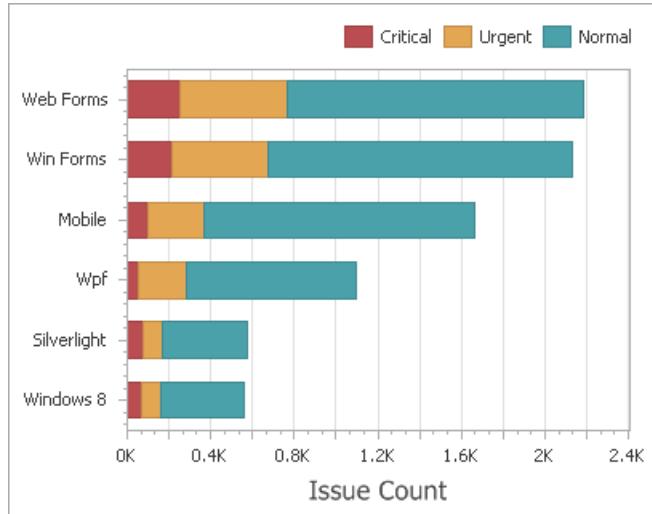
Bar

Bar series can be used to compare values across categories.



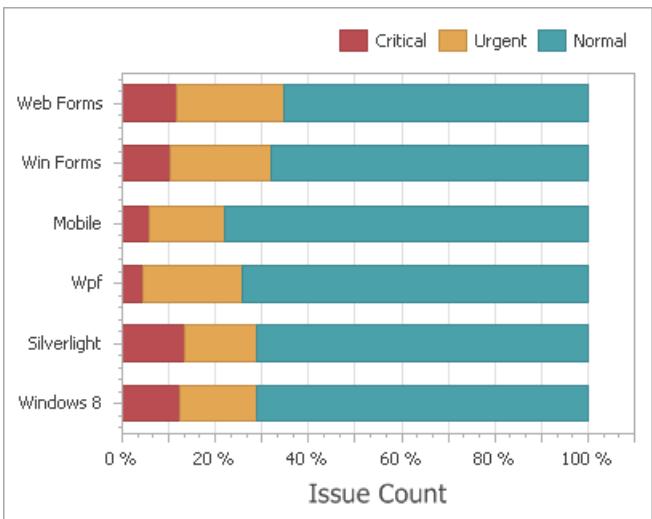
Stacked Bar

Stacked Bar series show the contribution of individual categories to the whole.



Full-Stacked Bar

Full-Stacked Bar series allow you to compare the percentage that each value contributes to a total across categories.



Point and Line Series

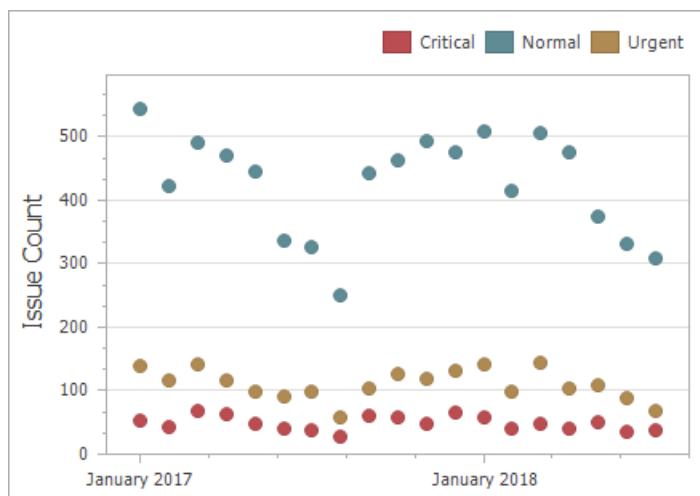
Point series visualize data as a set of individual numeric data points. Line series are used to connect numeric data points by different types of line segments.

The following types of Point and Line series are available.

- [Point](#)
- [Line](#)
- [Stacked Line](#)
- [Full-Stacked Line](#)
- [Step Line](#)
- [Spline](#)

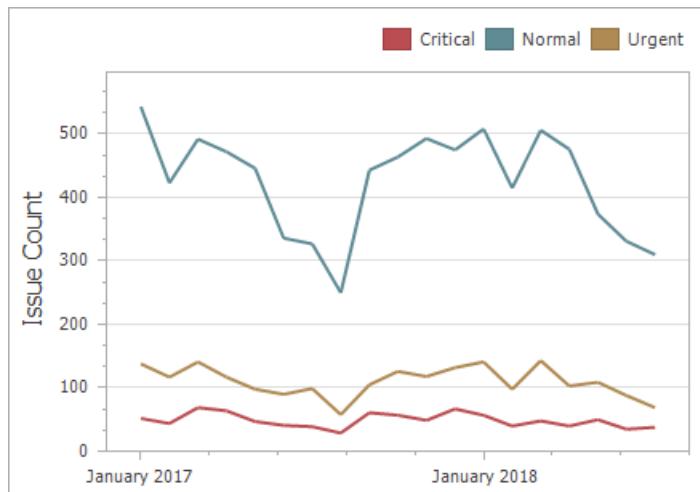
Point

Point series visualize data as a set of individual numeric data points.



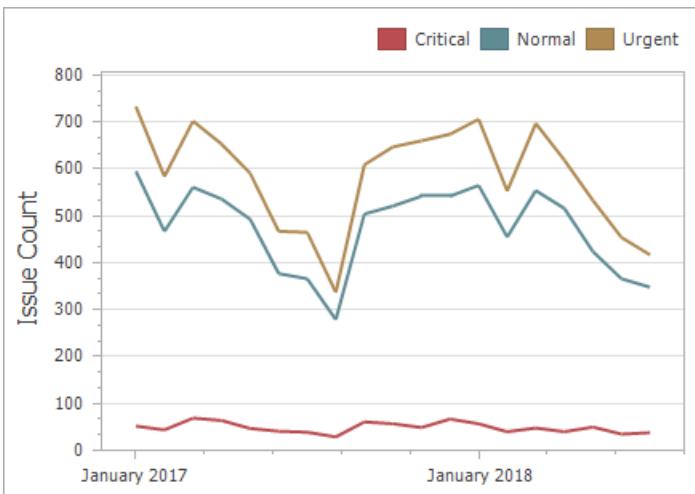
Line

Line series connect numeric data points by straight line segments.



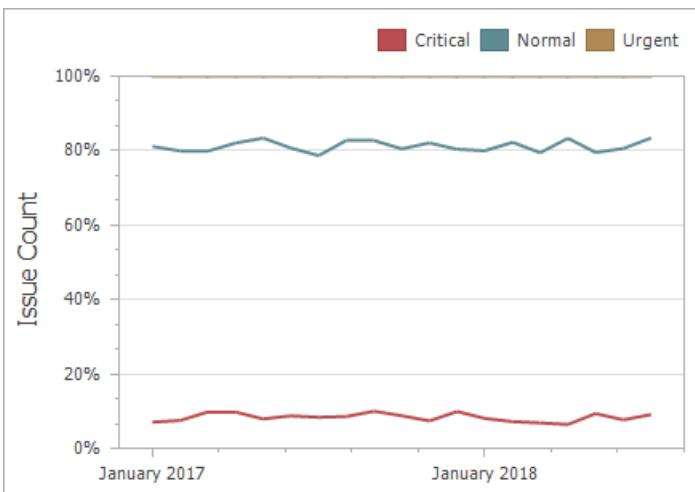
Stacked Line

Stacked Line series can be used to show the trend of the contribution for each value.



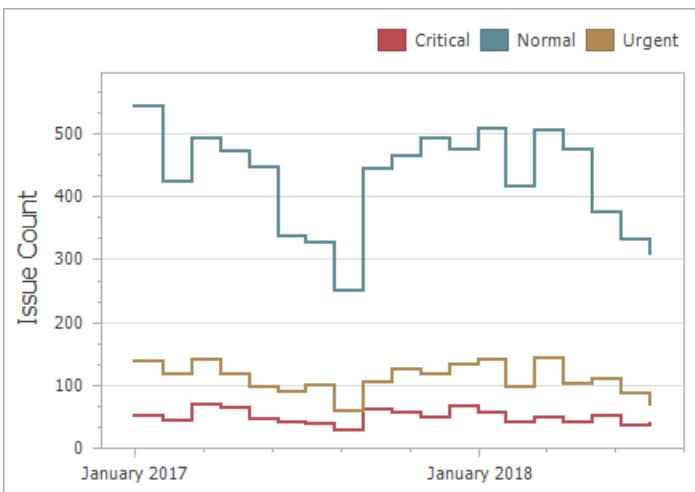
Full-Stacked Line

Stacked Line series are useful for showing the trend of the percentage for each value.



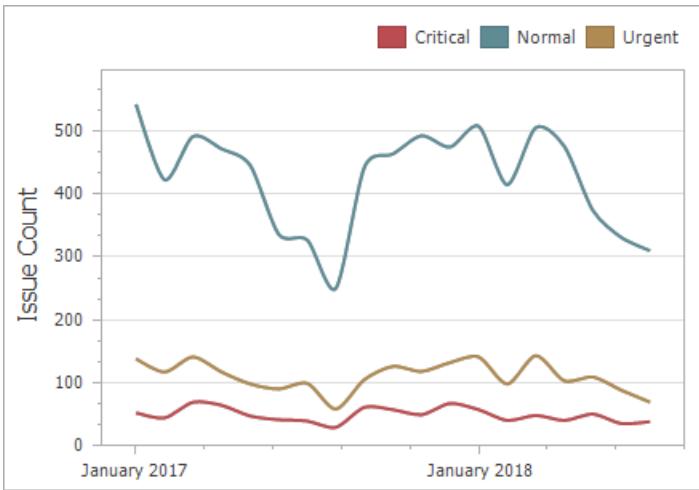
Step Line

Step Line series use vertical and horizontal lines to connect the numeric data points forming a step-like progression.



Spline

Spline series plot a fitted curve through each numeric data point.



Area Series

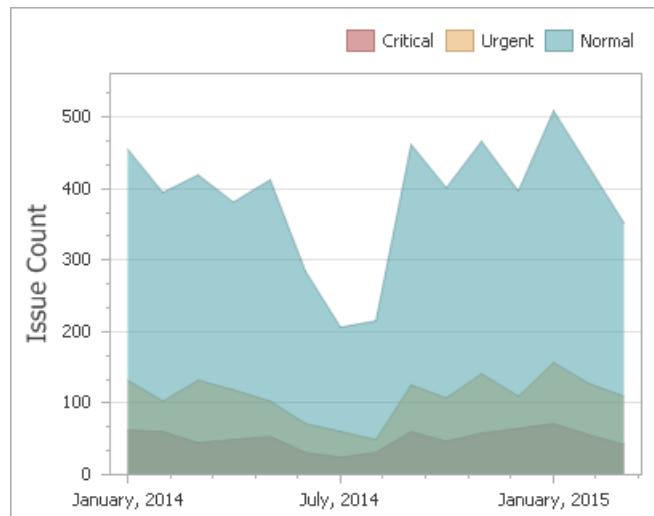
Area series connect numeric data points by different types of line segments and fill the area between the line and X-axis/other series.

The following types of Point and Line series are available.

- [Area](#)
- [Stacked Area](#)
- [Full-Stacked Area](#)
- [Step Area](#)
- [Spline Area](#)
- [Stacked Spline Area](#)
- [Full-Stacked Spline Area](#)

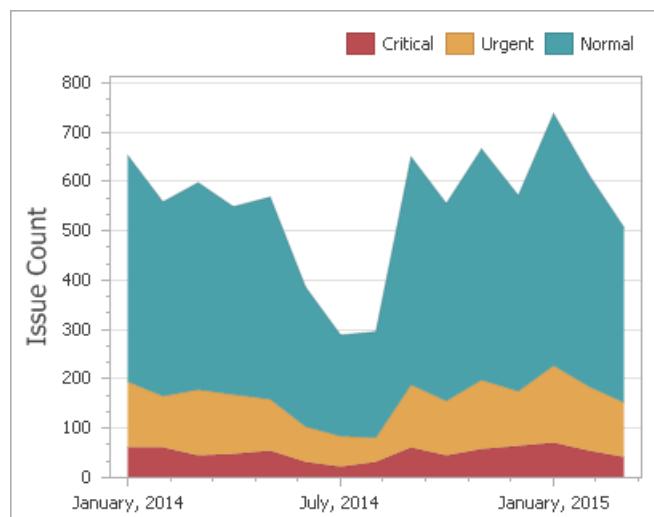
Area

Area series connect numeric data points by straight line segments and fill the area between the line and X-axis.



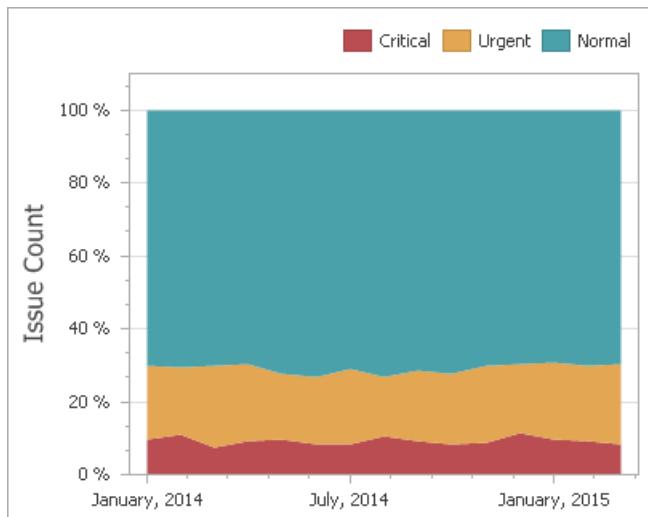
Stacked Area

Stacked Area series can be used to show the trend of the contribution for each value. Stacked Area series connect numeric data points by straight line segments and fill the area between the line and previous series.



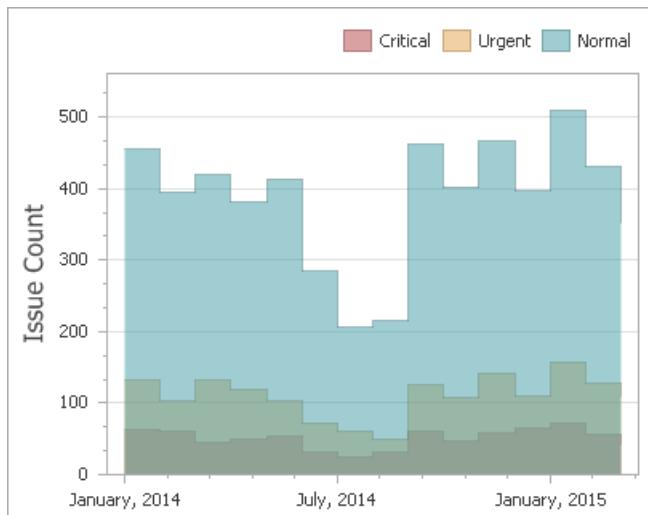
Full-Stacked Area

Full-Stacked Area series are useful to show the trend of the percentage for each value.



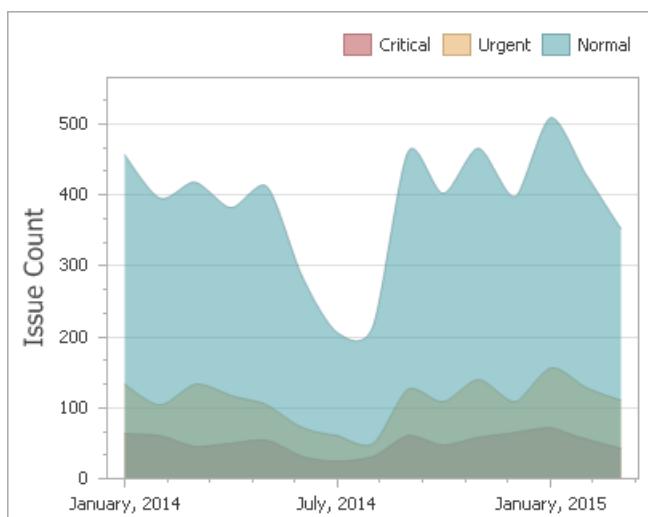
Step Area

Step Area series use vertical and horizontal lines to connect the numeric data points forming a step-like progression and fill the area between the line and X-axis.



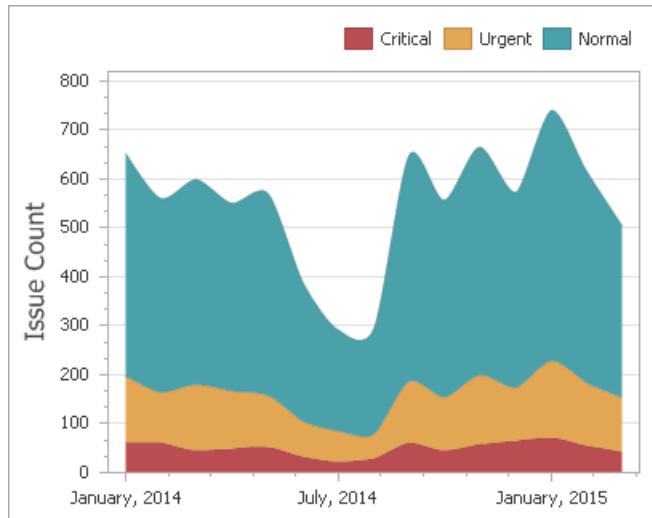
Spline Area

Spline Area series plot a fitted curve through each numeric data point and fill the area between the line and X-axis.



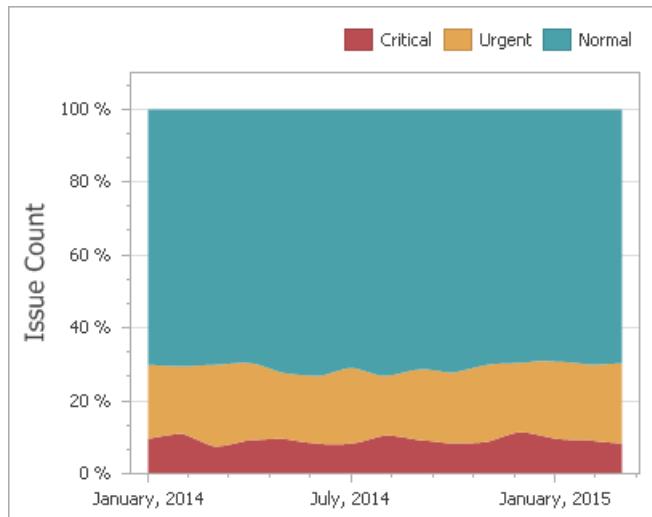
Stacked Spline Area

Stacked Area series can be used to show the trend of the contribution for each value. Stacked Area series plot a fitted curve through each numeric data point, and fill the area between the line and previous series.



Full-Stacked Spline Area

Full-Stacked Spline Area series are useful to show the trend of the percentage for each value.



Range Series

Range series are generally used to show variations in a specified time range like temperature, price, etc.

The following types of Range series are available.

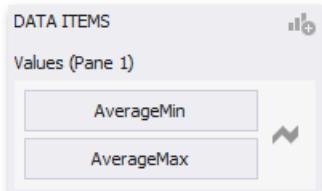
- [Range Bar](#)
- [Range Area](#)

Data Binding Specifics

A range series is a space between two simple series displayed as a filled area (**Range Area**) or bars that stretch from a point in one series to the corresponding point in the other (**Range Bar**). Thus, you need to provide two measures instead of one to display a range series.

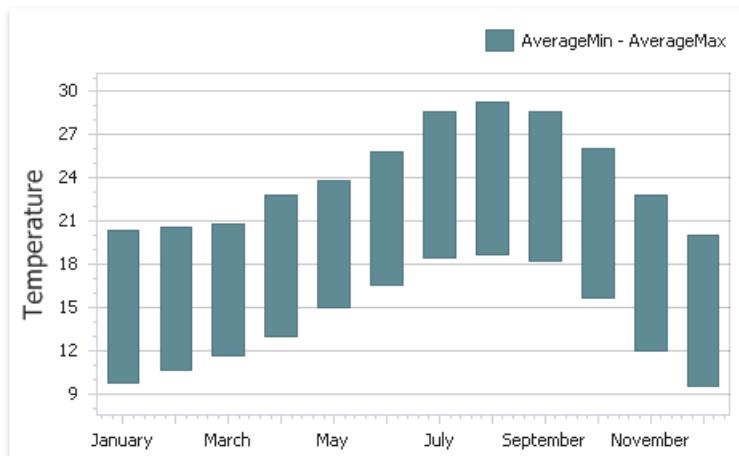
- **Value 1** - a measure against which the first set of values is calculated.
- **Value 2** - a measure against which the second set of values is calculated.

When you select the **Range Bar** or **Range Area** series type in the Designer, the **DATA ITEMS** area displays two data item placeholders. Drag and drop the required measures to corresponding placeholders.



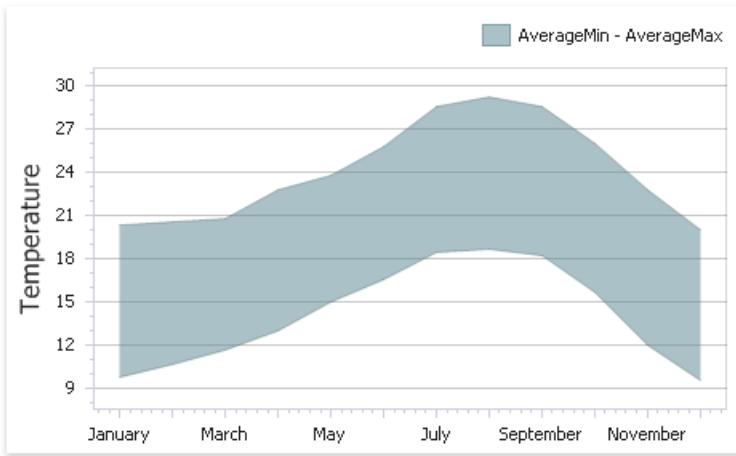
Range Bar

Range Bar series are similar to [Bar series](#) except that they are drawn between a range of values.



Range Area

Range Area series are similar to [Area series](#) except that their areas are filled between a range of values.



Weighted Series

Weighted series allow you to visualize data in three dimensions.

The following types of Weighted series are available.

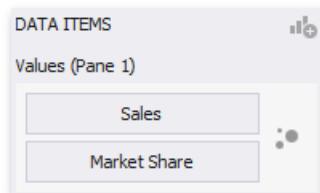
- [Bubble](#)

Data Binding Specifics

Data points in a weighted series present the following two measures.

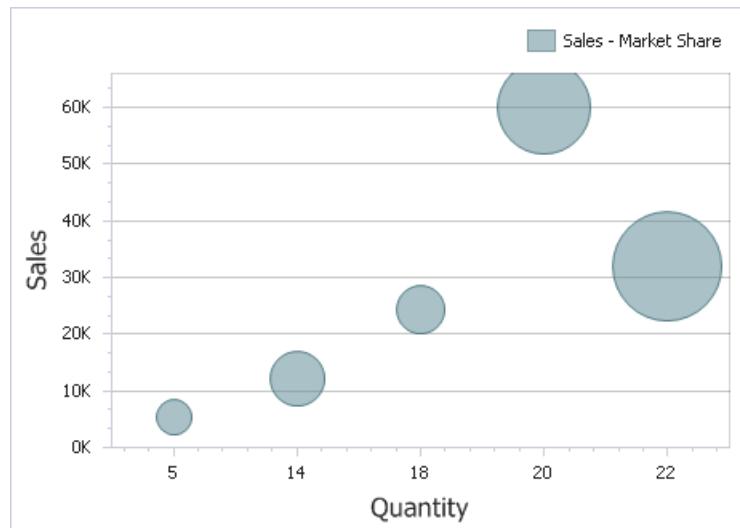
- **Value** - the Y-coordinate of series points.
- **Weight** - the size of series points.

When you select the **Bubble** series type in the Designer, the [DATA ITEMS](#) area displays two data item placeholders. Drag and drop the required measures to corresponding placeholders.



Bubble

Bubble series are similar to [Point series](#) except that they allow you to provide an additional measure whose values are expressed in a bubble size.



Financial Series

Financial series are used to illustrate stock prices.

The following types of Financial series are available.

- [High-Low-Close](#)
- [Stock](#)
- [Candle Stick](#)

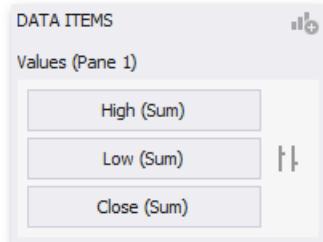
Coloring Specifics

Note that financial series do not support a standard [coloring](#) mechanism used to color chart series points. The Chart dashboard item colors series points of financial series in the following way.

- **Black** if the price at the end of the previous period is lower than the price at the end of the current period.
- **Red** if the price at the end of the previous period is larger than the price at the end of the current period.

High-Low-Close

When you select the High-Low-Close series type in the Designer, the [DATA ITEMS](#) area displays three data item placeholders. High-Low-Close series require three measures to be provided.



- **High** - the maximum price within the specified period (the top of the series point).
- **Low** - the minimum price within the specified period (the bottom of the series point).
- **Close** - the price at the end of the specified period (the tick mark).



Stock

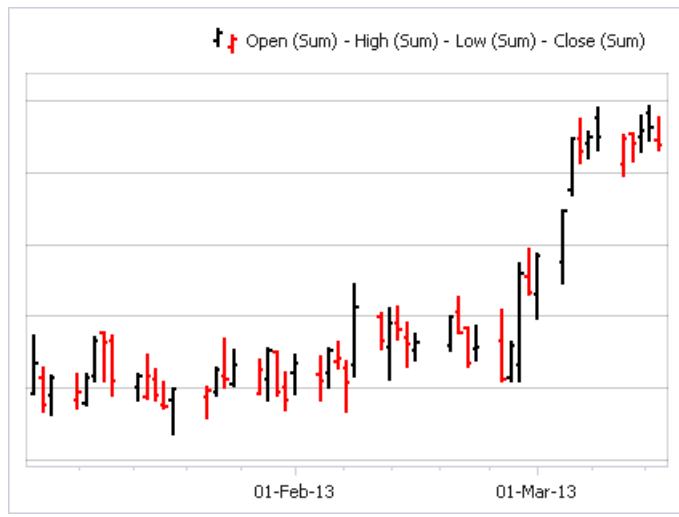
When you select the Stock series type in the Designer, the [DATA ITEMS](#) area displays four data item placeholders. Stock series require four measures to be provided.

DATA ITEMS

Values (Pane 1)

Open (Sum)
High (Sum)
Low (Sum)
Close (Sum)

- **Open** - the price at the beginning of the specified period (the left tick mark).
- **High** - the maximum price within the specified period (the top of the series point).
- **Low** - the minimum price within the specified period (the bottom of the series point).
- **Close** - the price at the end of the specified period (the right tick mark).



Candle Stick

When you select the Candle Stick series type in the Designer, the **DATA ITEMS** area displays four data item placeholders. Candle Stick series require four measures to be provided.

DATA ITEMS

Values (Pane 1)

Open (Sum)
High (Sum)
Low (Sum)
Close (Sum)

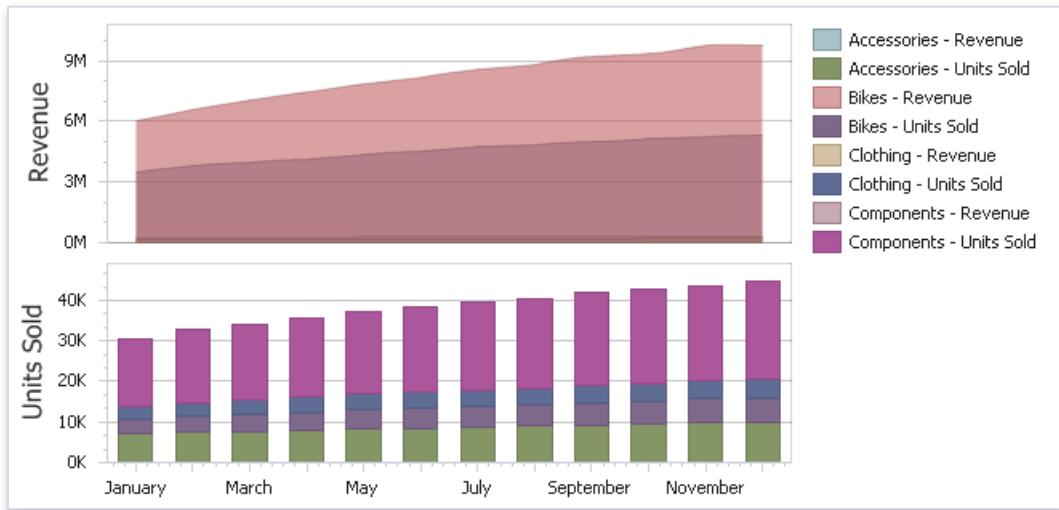
- **Open** - the price at the beginning of the specified period.
- **High** - the maximum price within the specified period (the upper shadow top).
- **Low** - the minimum price within the specified period (the lower shadow bottom).
- **Close** - the price at the end of the specified period.



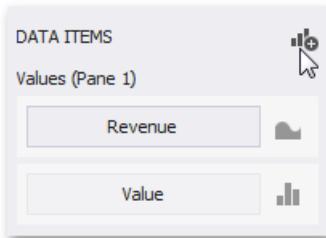
Panes

The Chart dashboard item can contain any number of **panes**. Panes are visual areas within a diagram that display chart series.

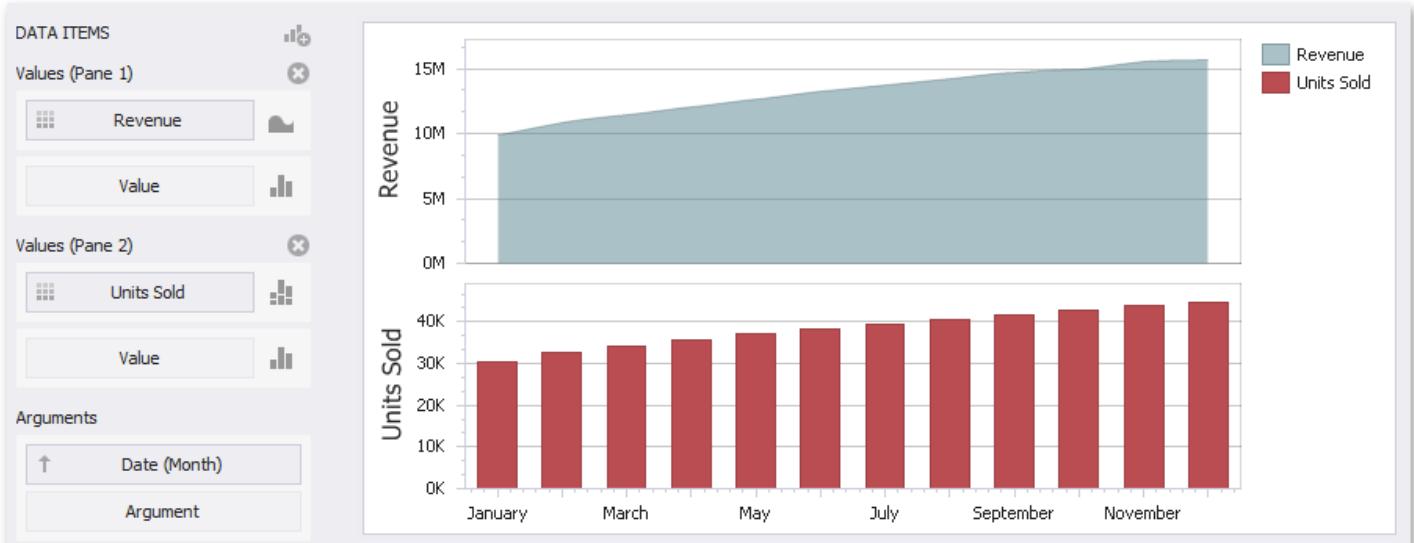
Each pane has its own **Y-axis** and displays a specific set of series. All panes in a chart share the same **X-axis**.



To add a pane, click the **Add Pane** button (the icon) at the top right of the **DATA ITEMS** pane.



Once a new pane is added, the Dashboard Designer creates another **Values** section in the DATA ITEMS pane.



Use this section to provide data items that supply values to be displayed in the new pane (see [Providing Data](#) for details on data binding).

To remove a pane, click the **Remove Pane** button (the icon) displayed in the corresponding **Values** section.

Interactivity

This section describes features that enable interaction between the **Chart** and other dashboard items. These features include **Master Filtering** and **Drill-Down**.

The section contains the following topics.

- [Master Filtering](#)
- [Drill-Down](#)

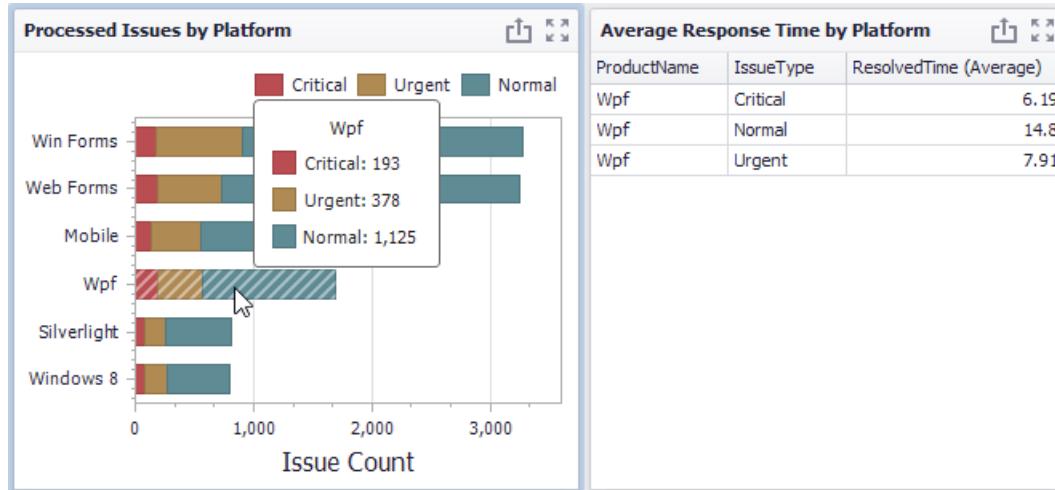
Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more, see the [Master Filtering](#) topic, which describes filtering concepts common to all dashboard items.

The Chart dashboard item supports filtering by **argument**, **series** or **points**.

Filtering by Arguments

When filtering by arguments is enabled, you can click series points to make other dashboard items only display data related to selected argument values.

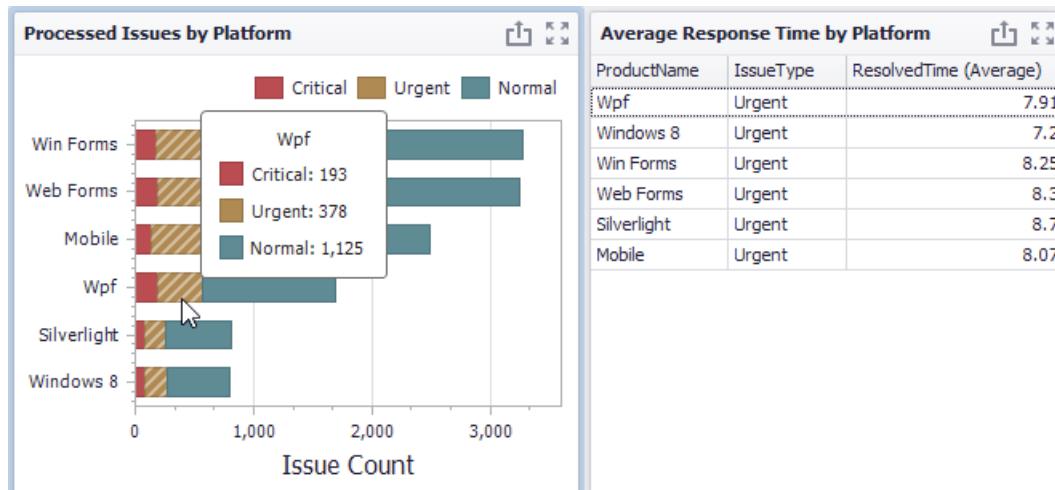


To enable filtering by arguments in the Designer, set the required [Master Filter mode](#) and click the **Arguments** button in the **Data** Ribbon tab (or the button if you are using the toolbar menu).



Filtering by Series

When filtering by series is enabled, you can click a series point to make other dashboard items only display data related to the selected series.



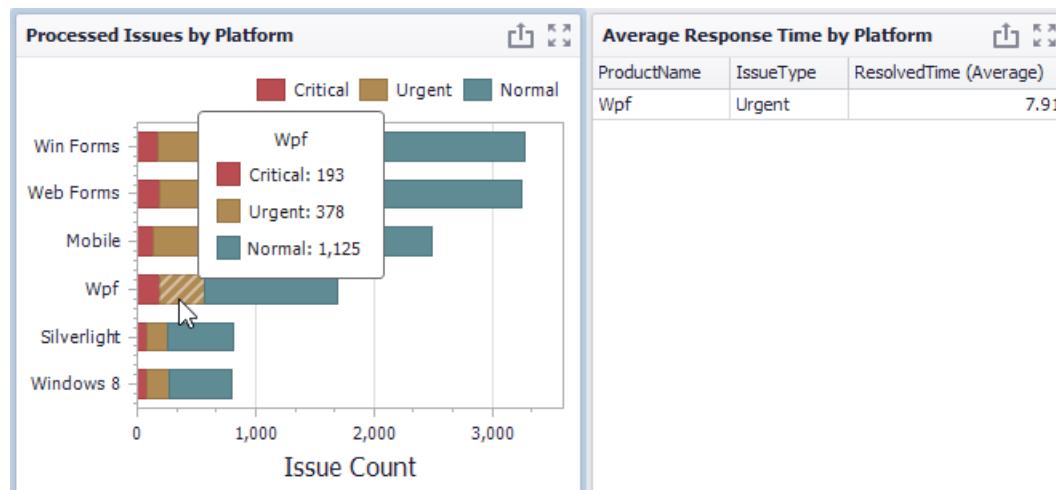
To enable filtering by series in the Designer, set the required [Master Filter mode](#) and click the **Series** button in the **Data** Ribbon

tab (or the  button if you are using the toolbar menu).



Filtering by Points

When filtering by points is enabled, you can click a individual point to make other dashboard items display only data related to the selected point.

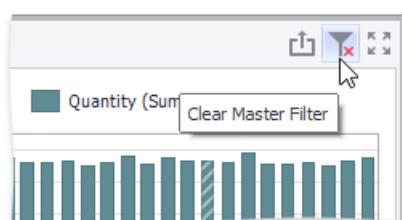


To enable filtering by points in the Designer, set the required [Master Filter mode](#) and click the **Points** button in the **Data** Ribbon tab.

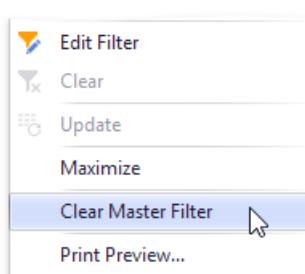


Reset Filtering

To reset filtering, use the **Clear Master Filter** button in the Chart's caption area...



...or the corresponding command in the Chart's context menu.



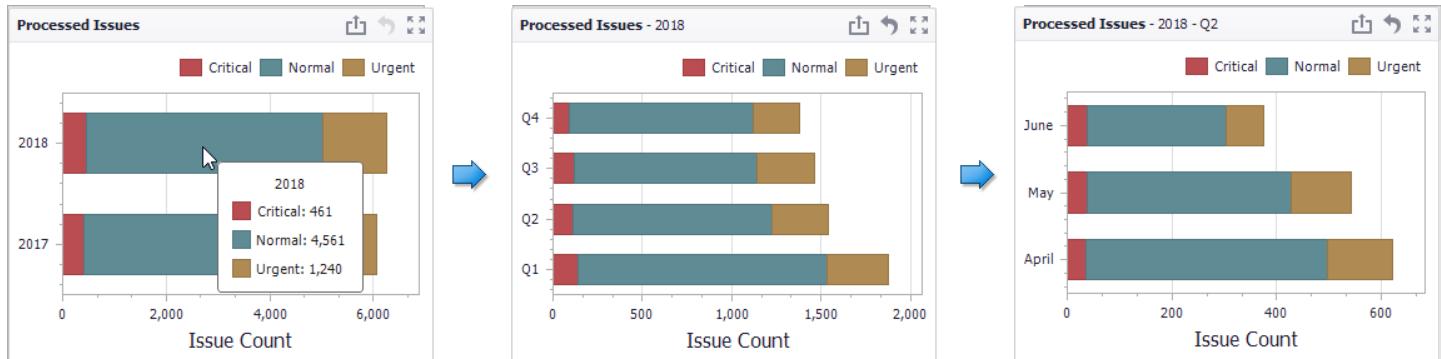
Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more about drill-down concepts common to all dashboard items, see the [Drill-Down](#) topic.

The Chart dashboard item supports drill down on argument or series values.

Drill Down on an Argument

When drill down on arguments is enabled, you can click a series point to view a detail chart for the corresponding argument value.



NOTE

When [Filtering by Arguments](#) is enabled, you can view the details by double-clicking a series point.

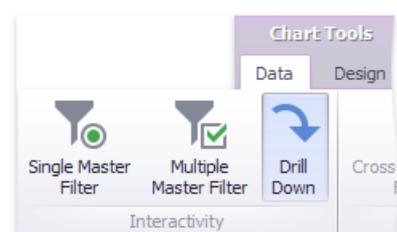
Drill down on arguments requires that the Arguments section contains several data items, from the least detailed to the most detailed item.



NOTE

In OLAP mode, you can perform drill-down for either a hierarchy data item or several dimension attributes.

To enable drill down on arguments, click the **Drill Down** button in the **Data** Ribbon tab (or the button if you are using the toolbar menu)...

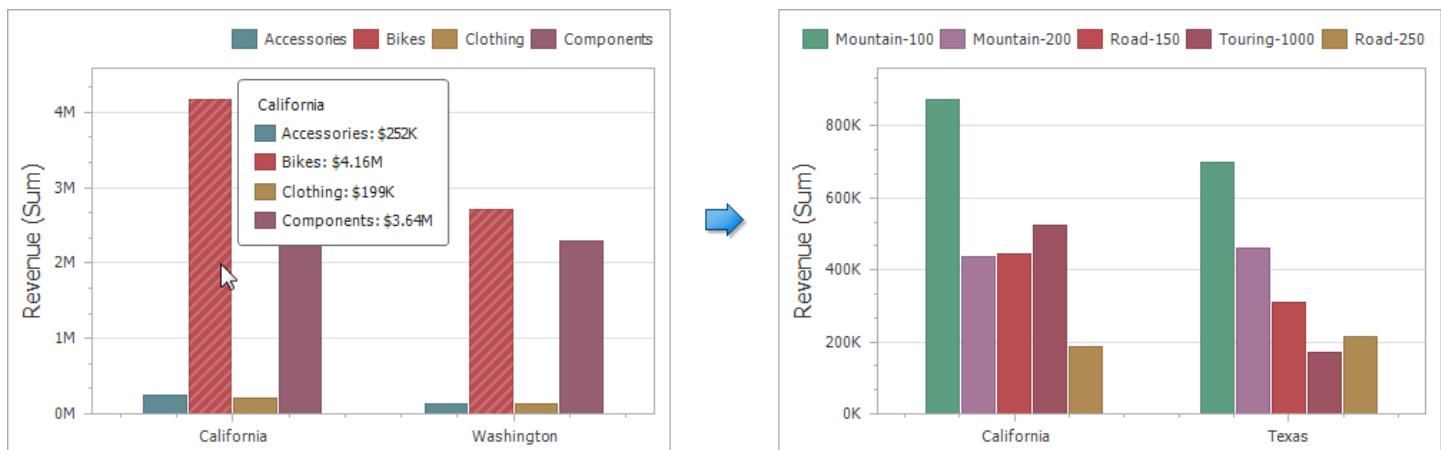


...and the **Arguments** button (or the button if you are using the toolbar menu).



Drill Down on a Series

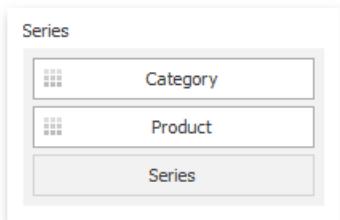
When drill down on a series is enabled, you can click a series point (or corresponding legend item) to view a detail chart for the corresponding series.



NOTE

When **Filtering by Series** is enabled, you can view the details by double-clicking a series point.

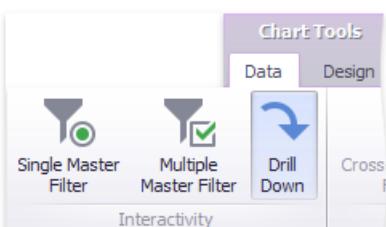
Drill down on a series requires that the Series section contains several data items, from the least detailed to the most detailed item.



NOTE

In OLAP mode, you can perform drill-down for either a hierarchy data item or several dimension attributes.

To enable drill down on a series, click the **Drill Down** button in the **Data** Ribbon tab (or the button if you are using the toolbar menu)...



...and the **Series** button (or the button if you are using the toolbar menu).



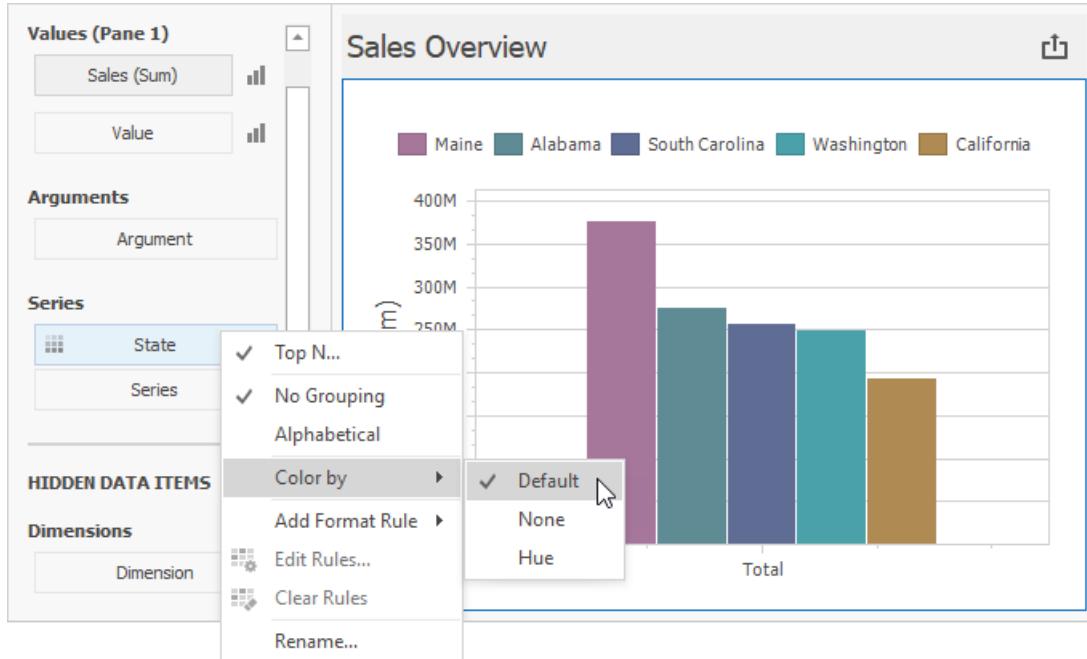
Drill Up

To return to the previous detail level (drill up), use the **Drill Up** button within the Chart [caption](#) or in the context menu.



Coloring

The Chart dashboard item paints different measures and series dimensions by **hue** in **Default** color mode. The image below shows the chart item whose *State* series dimension values are painted in different colors. A special icon (■) on the data item shows that color variation is enabled.



NOTE

Note that the Chart dashboard item does not support coloring for the financial series.

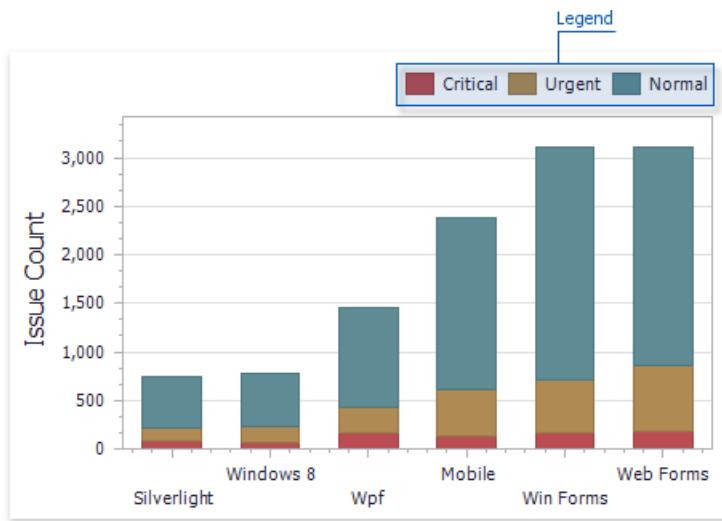
TIP

Documentation:

- [Conditional Formatting](#)
- [Coloring Basics](#)

Legend

A **legend** is an element of a chart that identifies [chart series](#) and series points (for instance, colored points corresponding to argument values).



This topic describes how to customize various legend settings.

Visibility

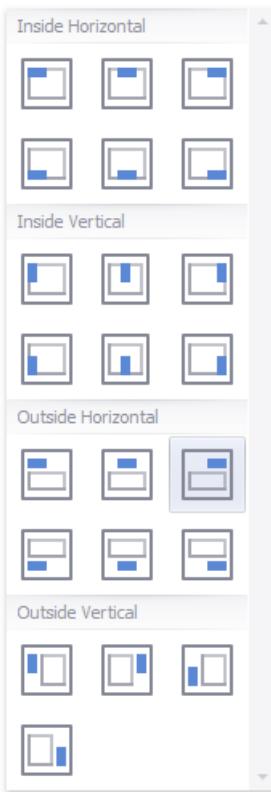
You can specify whether or not a chart should display a legend.

In the Designer, use the **Show Legend** button in the **Legend** section of the **Design** Ribbon tab.



Position and Orientation

To specify the legend's position and orientation, select one of the predefined options from the gallery in the **Design** Ribbon tab.



Axes

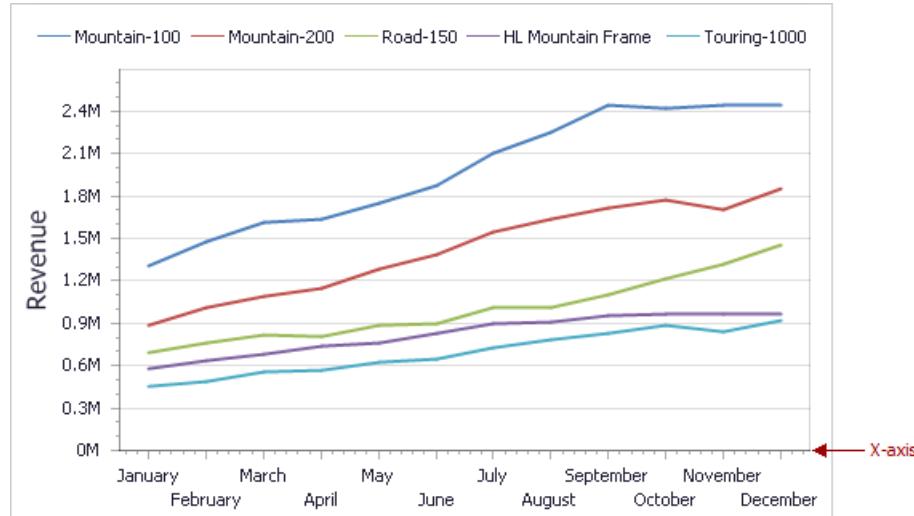
The **Chart** dashboard item displays two axes by default: the *X-axis* and the *Y-axis*. The topics in this section describe how to customize axis settings.

The section contains the following topics.

- [X-Axis](#)
- [Y-Axis](#)

X-Axis

The **X-axis** is the axis of arguments.



This topic consists of the following sections.

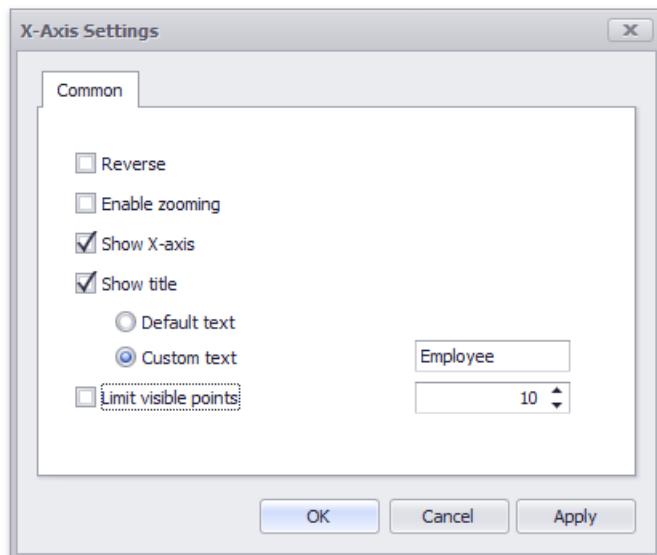
- [Common X-Axis Settings](#)
- [Numeric Formats](#)
- [DateTime Formats](#)
- [Continuous and Discrete X-Axes](#)

Common X-Axis Settings

To access X-axis settings, use the **X-Axis Settings** button in the **Diagram** section of the **Design** Ribbon tab.



This will invoke the **X-Axis Settings** dialog.

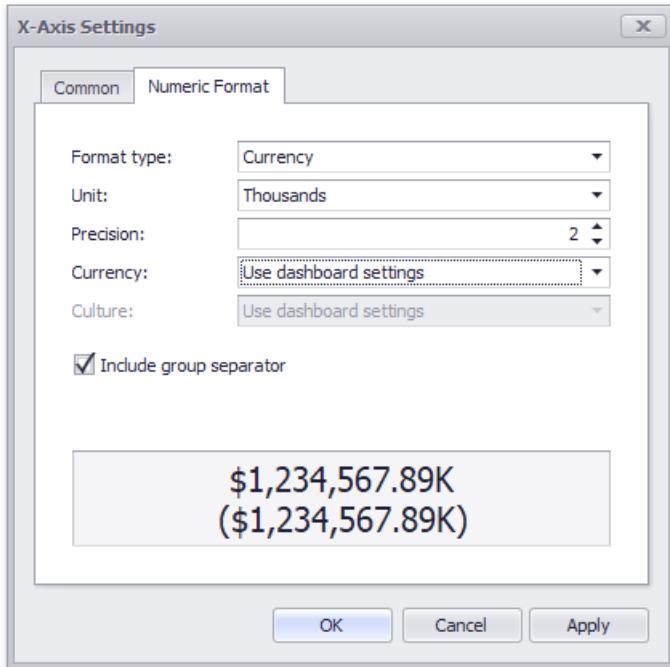


This dialog contains the following settings.

Setting	Description
Reverse	Allows you to reverse the X-axis. If the X-axis is reversed, its values are ordered from right to left.
Show X-axis	Allows you to hide and show the X-axis.
Show title	Allows you to hide and show the X-axis title. You can choose whether to use the default text or specify a custom string.
Enable zooming	Allows you to enable zooming for the X-axis. The X-axis' scroll bar provides the capability to perform navigation in the zoomed diagram.
Limit visible points	Allows you to limit the number of points displayed on the chart's diagram along the X-axis. The X-axis' scroll bar provides the capability to perform navigation if the number of all points exceeds the number of visible points.

Numeric Format X-Axis Settings

If arguments are numeric, the **X-Axis Settings** dialog contains a **Numeric Format** tab. It allows you to specify the numeric display formats for X-Axis data, as described in the [Formatting Data](#) document.



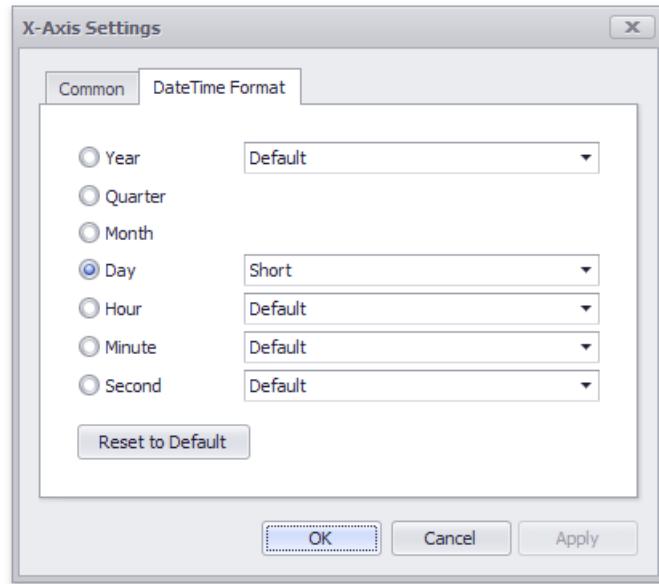
The tab contains the following settings.

- **Format type** - Specifies format types for numeric values.
- **Unit** - Specifies the unit to convert the numeric values.
- **Precision** - Specifies the number of fractional digits to display.
- **Currency** - Specifies the currency symbol and format provided by the current culture settings.
- **Culture** - Specifies the name of a culture that defines the currency symbol and format.
- **Include group separator** - Specifies whether separators should be inserted between digit groups.

Date/Time Format X-Axis Settings

For date and time arguments, the **X-Axis Settings** dialog displays a **Numeric Format** tab. It allows you to specify the date and time display formats for X-Axis data.

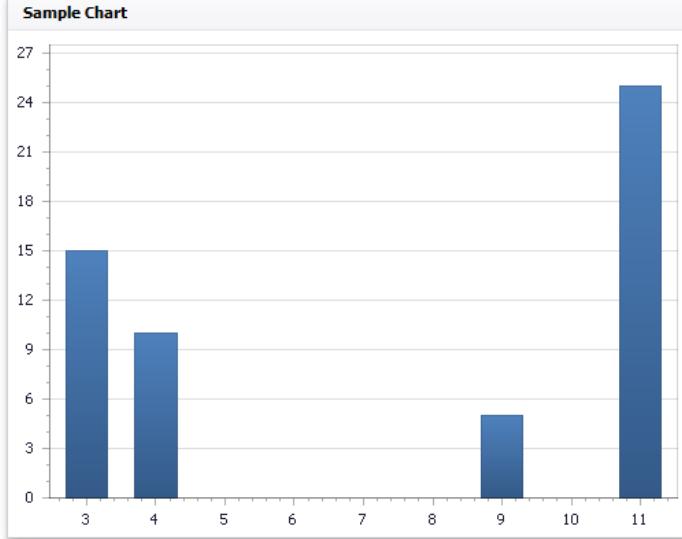
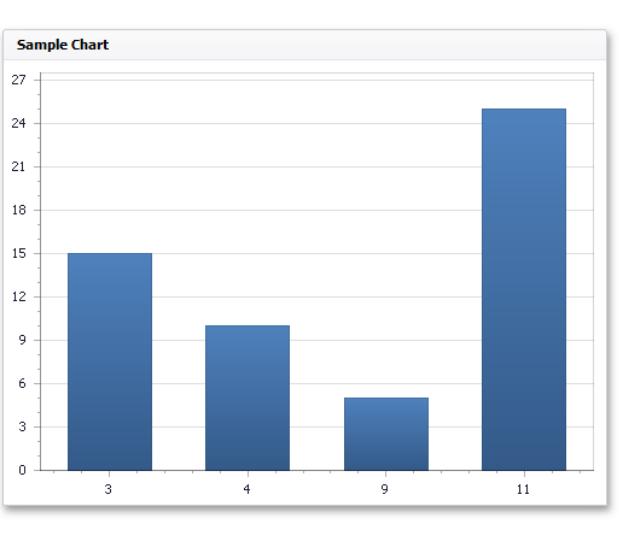
Using the dialog, you can override default formats applied according to the data grouping type, as described in the [Grouping](#) document. The following image shows the Date Time Format tab in the dialog when the grouping type is set to **Exact Date**. Click the **Reset to Default** button to return all format settings back to their default values.



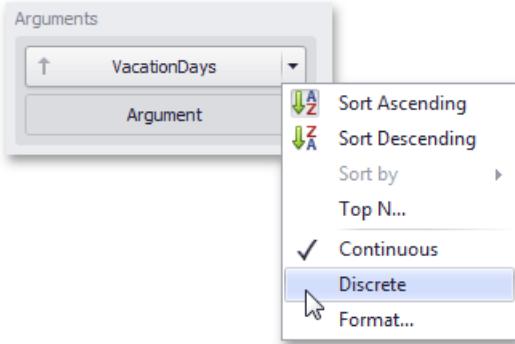
The tab contains settings described in detail in the [Formatting Data](#) document.

Continuous and Discrete X-Axes

If the dimension in the Arguments section contains numeric data, the Chart can create either a continuous X-axis or a discrete X-axis.

CONTINUOUS X-AXIS	DISCRETE X-AXIS																				
If a continuous axis is used, the distance between argument values is proportional to their values.	On a discrete axis, all argument values are an equal distance from each other.																				
 A bar chart titled 'Sample Chart' showing a continuous X-axis. The X-axis has tick marks at 3, 4, 5, 6, 7, 8, 9, 10, and 11. The Y-axis ranges from 0 to 27 with major grid lines every 3 units. There are four blue bars representing data points at X=3, X=4, X=9, and X=11. The heights of the bars are approximately 15, 10, 5, and 25 respectively, showing a non-linear relationship where the distance between bars increases as their value increases. <table border="1"><caption>Data for Continuous X-axis Sample Chart</caption><thead><tr><th>X</th><th>Y</th></tr></thead><tbody><tr><td>3</td><td>15</td></tr><tr><td>4</td><td>10</td></tr><tr><td>9</td><td>5</td></tr><tr><td>11</td><td>25</td></tr></tbody></table>	X	Y	3	15	4	10	9	5	11	25	 A bar chart titled 'Sample Chart' showing a discrete X-axis. The X-axis has tick marks at 3, 4, 9, and 11. The Y-axis ranges from 0 to 27 with major grid lines every 3 units. There are four blue bars representing data points at X=3, X=4, X=9, and X=11. The heights of the bars are approximately 15, 10, 5, and 25 respectively, showing a linear relationship where the distance between bars is constant. <table border="1"><caption>Data for Discrete X-axis Sample Chart</caption><thead><tr><th>X</th><th>Y</th></tr></thead><tbody><tr><td>3</td><td>15</td></tr><tr><td>4</td><td>10</td></tr><tr><td>9</td><td>5</td></tr><tr><td>11</td><td>25</td></tr></tbody></table>	X	Y	3	15	4	10	9	5	11	25
X	Y																				
3	15																				
4	10																				
9	5																				
11	25																				
X	Y																				
3	15																				
4	10																				
9	5																				
11	25																				

To specify the X-axis type in the Designer, invoke the data item menu for the argument dimension and select the axis type.

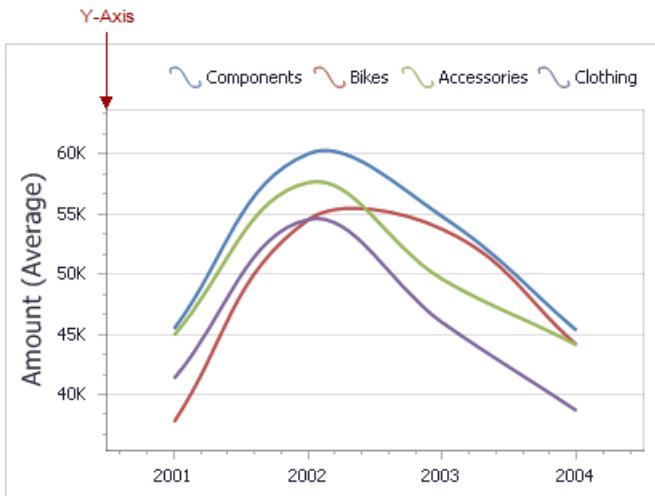


NOTE

Note that the continuous X-axis is not supported in OLAP mode.

Y-Axis

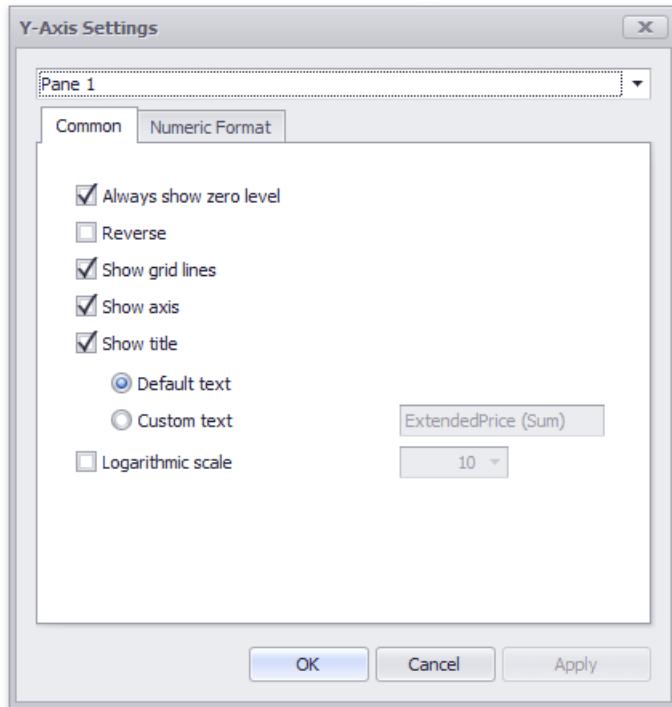
The **Y-axis** is the numerical axis of values.



To access the Y-axis settings, use the **Y-Axis Settings** button in the **Diagram** section of the **Design** Ribbon tab.



This will invoke the **Y-Axis Settings** dialog.

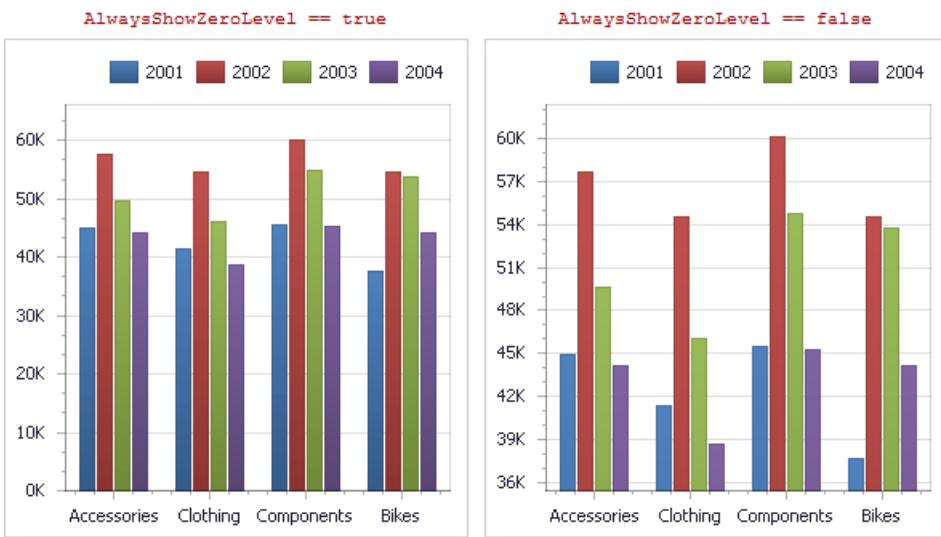


Use the combo box at the top to select the **pane** for the Y-axis settings you need to edit.

Common Settings

The dialog contains the following settings.

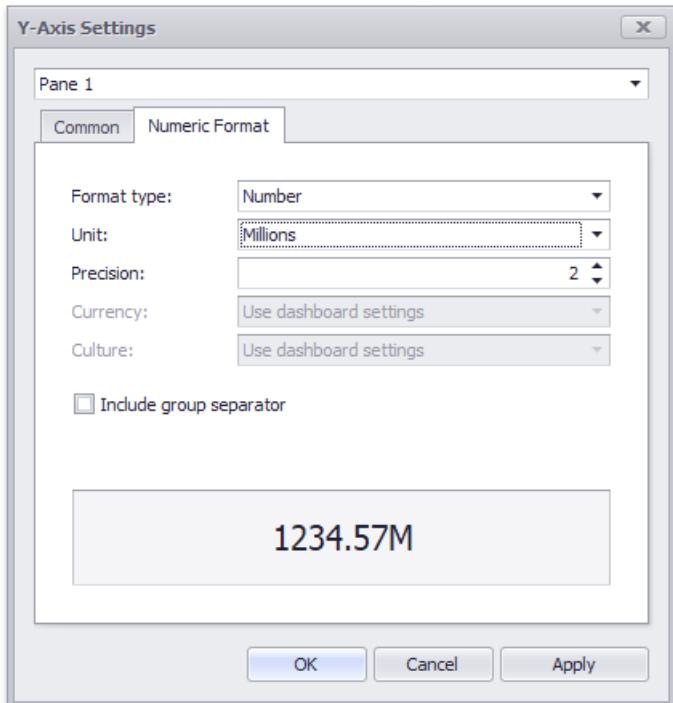
- **Always show zero level** - Specifies whether or not the axis' zero level is visible. If this option is unchecked, the visible axis range is defined based on the values plotted in the chart.



- **Reverse** - Allows you to reverse the X-axis. If the X-axis is reversed, its values are ordered from top to down.
- **Show grid lines** - Allows you to hide and show grid lines for the Y-axis.
- **Show Y-axis** - Allows you to hide and show the Y-axis.
- **Show title** - Allows you to hide and show the Y-axis title. You can choose whether to use the default text or specify a custom string.
- **Logarithmic scale** - Specifies whether the axis should display its numerical values using a logarithmic scale. The combo box next to this option allows you to select the logarithmic base from one of the predefined values.

Numeric Format

The **Numeric Format** tab allows you to specify the numeric display formats for Y-Axis data, as described in the [Formatting Data](#) document.



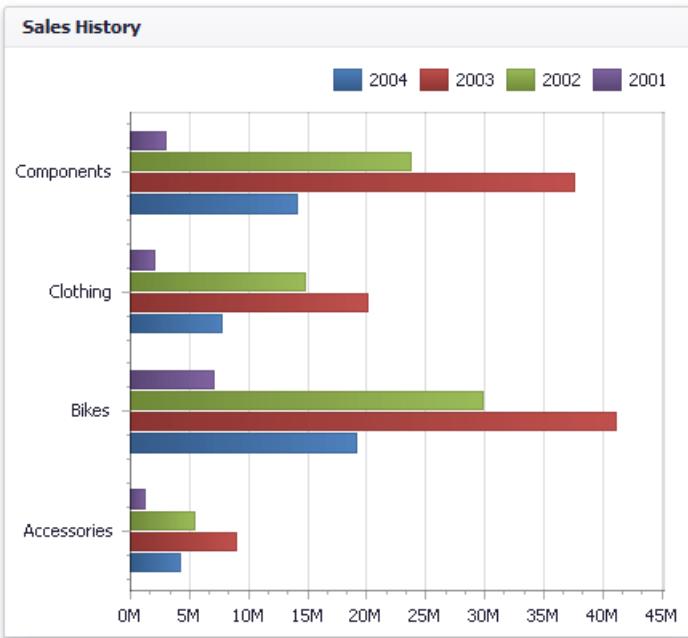
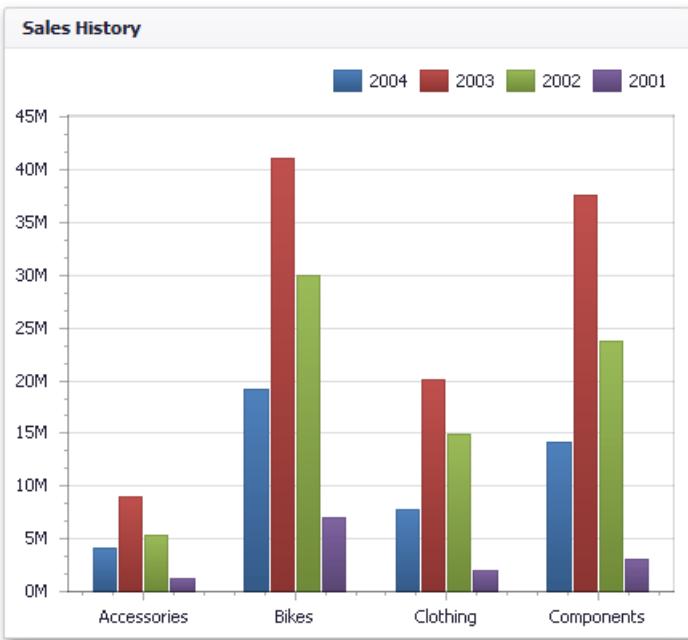
The tab contains the following settings.

- **Format type** - Specifies format types for numeric values.
- **Unit** - Specifies the unit to convert the numeric values.
- **Precision** - Specifies the number of fractional digits to display.
- **Currency** - Specifies the currency symbol and format provided by the current culture settings.

- **Culture** - Specifies the name of a culture that defines the currency symbol and format.
- **Include group separator** - Specifies whether separators should be inserted between digit groups.

Orientation

You can rotate the Chart so that the X-axis becomes vertical, and the Y-axis becomes horizontal.



To rotate a Chart in the Designer, use the **Rotate** button in the **Diagram** group of the **Design** Ribbon tab.

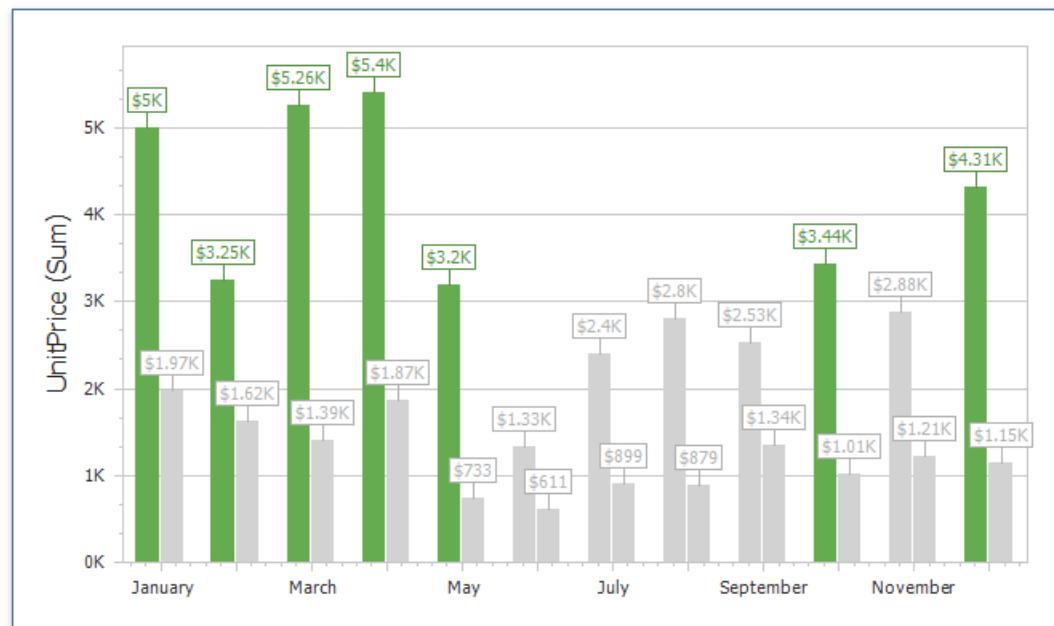


Conditional Formatting

Use conditional formatting to highlight chart elements such as [bars](#), [lines](#), [areas](#), and [data points](#).

The following series types support conditional formatting:

- [Bar](#)
- [Point/Line](#)
- [Area](#)
- [Bubble](#)
- [Range Bar](#)



Supported Format Rules

You can use the following data in rule calculations:

- [measures](#) from the **Values** section
- [dimensions](#) from the **Arguments/Series** section
- hidden measures

The following list contains available format rules and corresponding data types:

- numeric
 - [Value](#)
 - [Top-Bottom](#)
 - [Average](#)
 - [Expression](#)
 - [Color Ranges](#)
 - [Gradient Ranges](#)
- string
 - [Value](#) (with a condition type set to *Equal To*, *Not Equal To* or *Text that Contains*)
 - [Expression](#)
- date-time
 - [Value](#)

- [A Date Occurring](#) (for dimensions with a continuous date-time group interval)
- [Expression](#)
- [Color Ranges](#)
- [Gradient Ranges](#)

Create and Edit a Format Rule

You can create and edit format rules in the following ways:

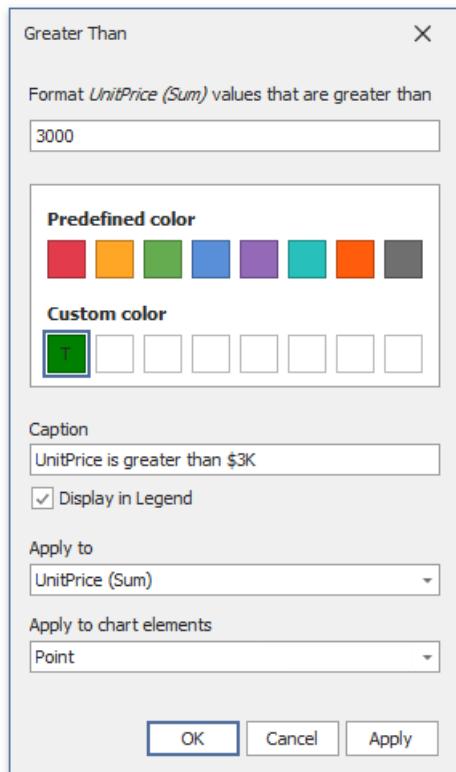
- Click the **Edit Rules** button on the **Home** ribbon tab.
- Click the measure/dimension menu button in the Data Item's pane and select **Add Format Rule/Edit Rules**.

Refer to the following topic for information on how to create and edit format rules: [Conditional Formatting Common](#).

Chart-Specific Format Condition Settings

Specify appearance settings and set the condition's value to create a format rule. Available settings depend on the selected format condition type.

The image below displays the **Greater Than** dialog (a [Value](#) format condition applied to a chart). The condition colors points/bars if their values exceed 3000.

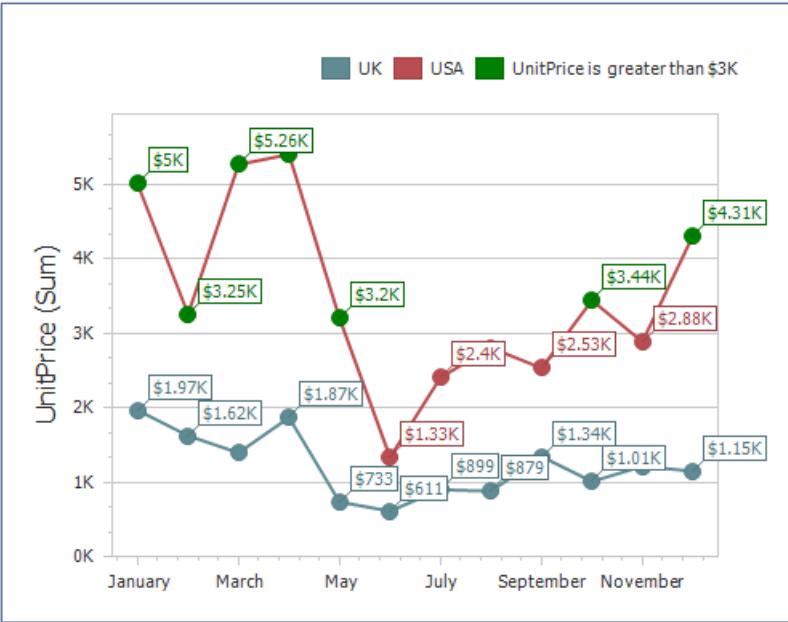


Enable **Display in Legend** to add information about the applied rule to the chart. Set the **Caption** field to specify the legend's text. For Range format rules, the legend's text is generated automatically and depends on the range intervals.

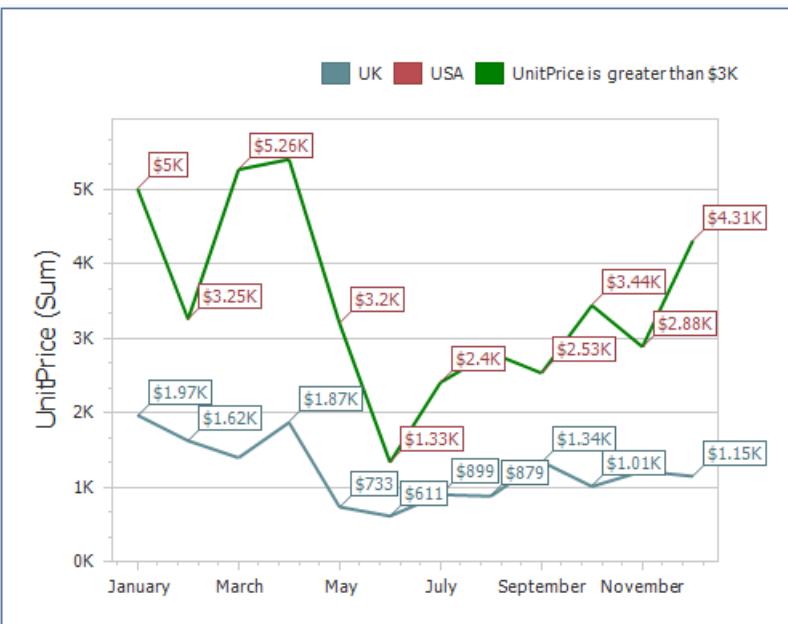
Use the **Apply to chart elements** drop-down list to apply a rule to points or lines.

- **Point:** A rule applies to the data points such as bars, points and bubbles.
- **Line/Area:** A rule applies to lines and areas.

The image below displays the Chart item with the applied **Greater Than** format rule. The **Apply to chart elements** option is set to **Point** and the rule is applied to points of the line series.

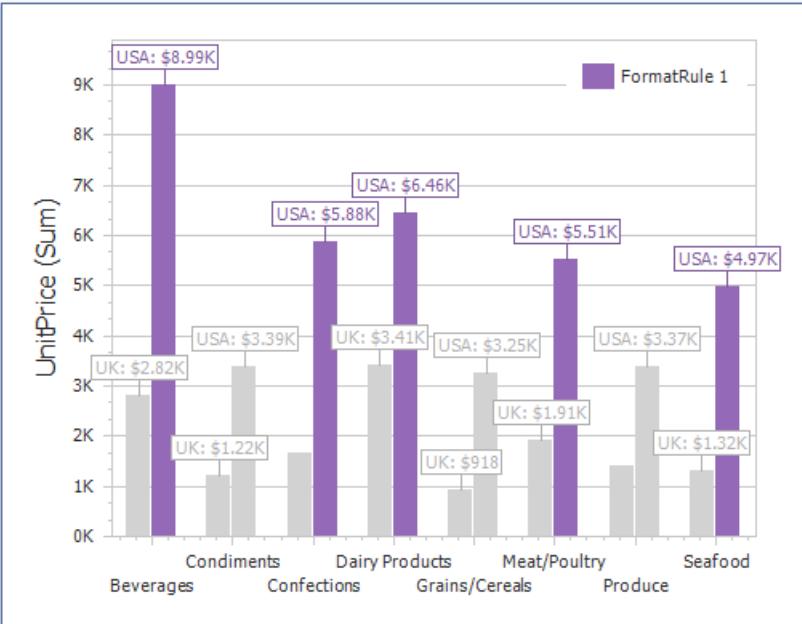


If you select **Line/Area**, the format rule applies to the line when at least one line point meets the rule's condition:

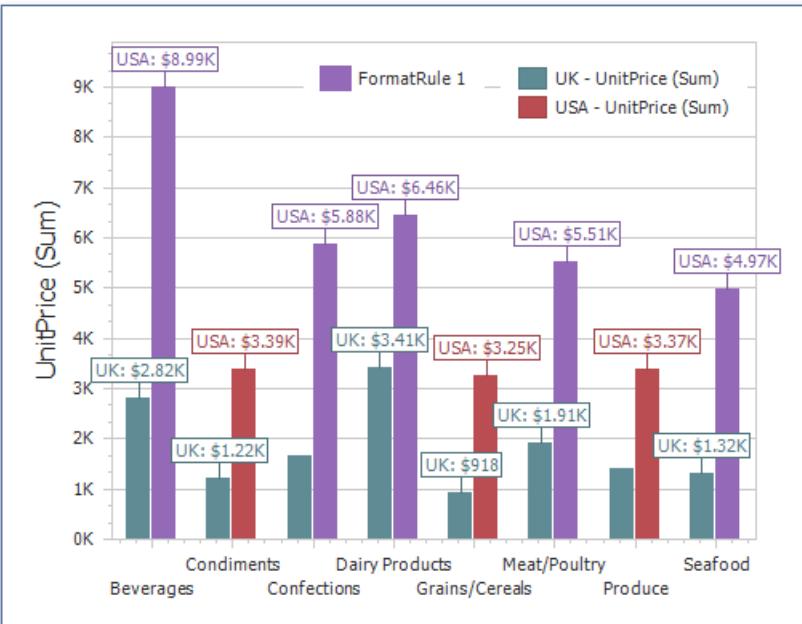


Coloring

A Chart item paints elements in pale gray if they do not meet the applied format condition. Note that this does not apply to elements that use the [Hue](#) color mode.



Select the **Color by Hue** option in a Data item's pane to restore the color scheme.

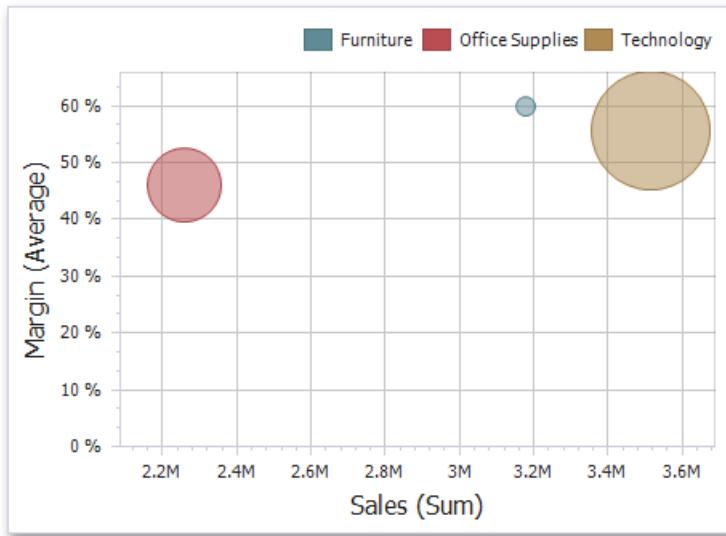


TIP

[Documentation: Chart - Coloring](#)

Scatter Chart

The topics in this section describe the features available in the **Scatter Chart** dashboard item, and provide information on how to create and customize scatter charts in the **DevExpress Dashboard Suite**.



This section is divided into the following subsections.

- [Providing Data](#)

Explains how to supply the Scatter Chart dashboard item with data.

- [Interactivity](#)

Describes features that enable interaction between the Scatter Chart and other dashboard items.

- [Coloring](#)

Describes coloring capabilities of the Scatter Chart dashboard item.

- [Legend](#)

Describes the chart legend and its options.

- [Axes](#)

Describes how to customize settings related to chart axes.

- [Orientation](#)

Describes how to toggle the chart's orientation.

- [Labels](#)

Describes point labels and tooltips that contain descriptions of data points.

- [Conditional Formatting](#)

Describes the format condition settings.

Providing Data

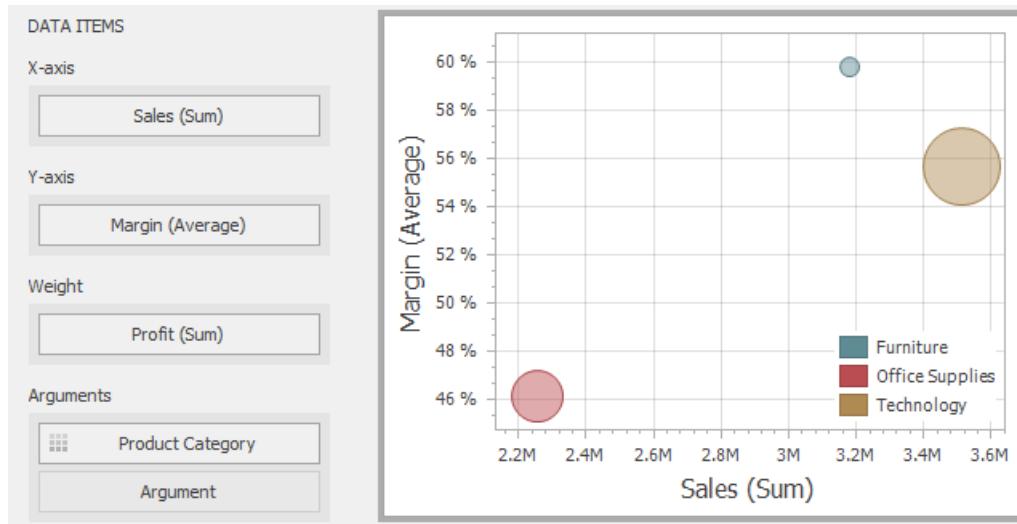
The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner. To learn more, see the [Bind Dashboard Items to Data](#) topic.

The only difference is in the data sections that the required dashboard item has. This topic describes how to bind a **Scatter Chart** dashboard item to data in the Designer.

- [Binding to Data in the Designer](#)
- [Transposing X- and Y-axis](#)

Binding to Data in the Designer

The image below shows a sample Scatter Chart dashboard item that is bound to data.

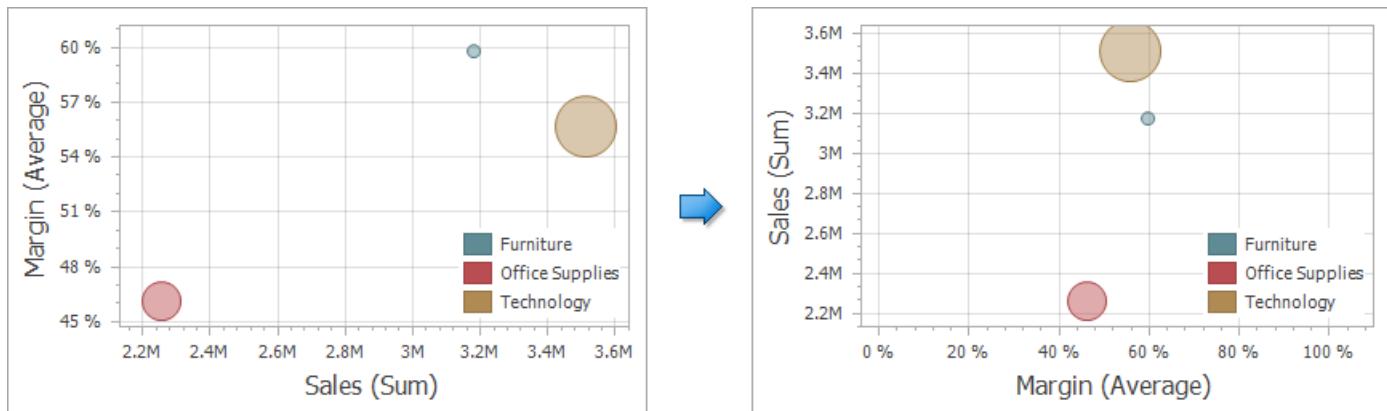


To bind the Scatter Chart dashboard item to data, drag and drop a data source field to a placeholder contained in one of the available data sections. A table below lists and describes Scatter Chart data sections.

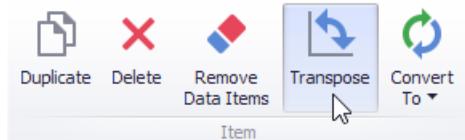
SECTION	DESCRIPTION
X-Axis	Contains the data item against which the X-coordinates of data points are calculated.
Y-Axis	Contains the data item against which the Y-coordinates of data points are calculated.
Weight	Contains the data item whose values are used to calculate the weight of data points.
Arguments	Contains data items providing scatter chart arguments that are used to create data points.

Transposing X- and Y-axis

The Scatter Chart dashboard item provides the capability to transpose its axes. In this case, the data item contained in the **X-Axis** section is moved to the **Y-Axis** section, and vice versa.



To transpose the selected Scatter Chart dashboard item, use the **Transpose** button in the **Home** ribbon tab.



Interactivity

This section describes features that enable interaction between the Scatter Chart and other dashboard items. These features include Master Filtering and Drill-Down.

The section contains the following topics.

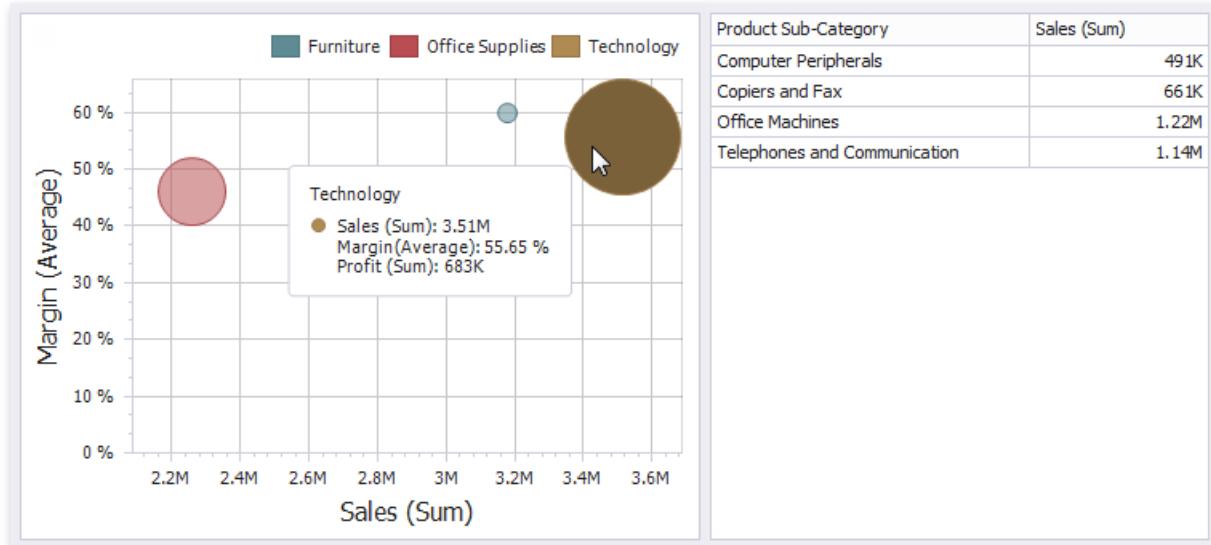
- [Master Filtering](#)
- [Drill-Down](#)

Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more, see the [Master Filtering](#) topic, which describes filtering concepts common to all dashboard items.

The Scatter Chart dashboard item supports filtering by points that correspond to specific argument values or their combinations.

When Master Filtering is enabled, you can click a point (or multiple points by holding down the **CTRL** key) to make other dashboard items only display data related to the selected point(s).



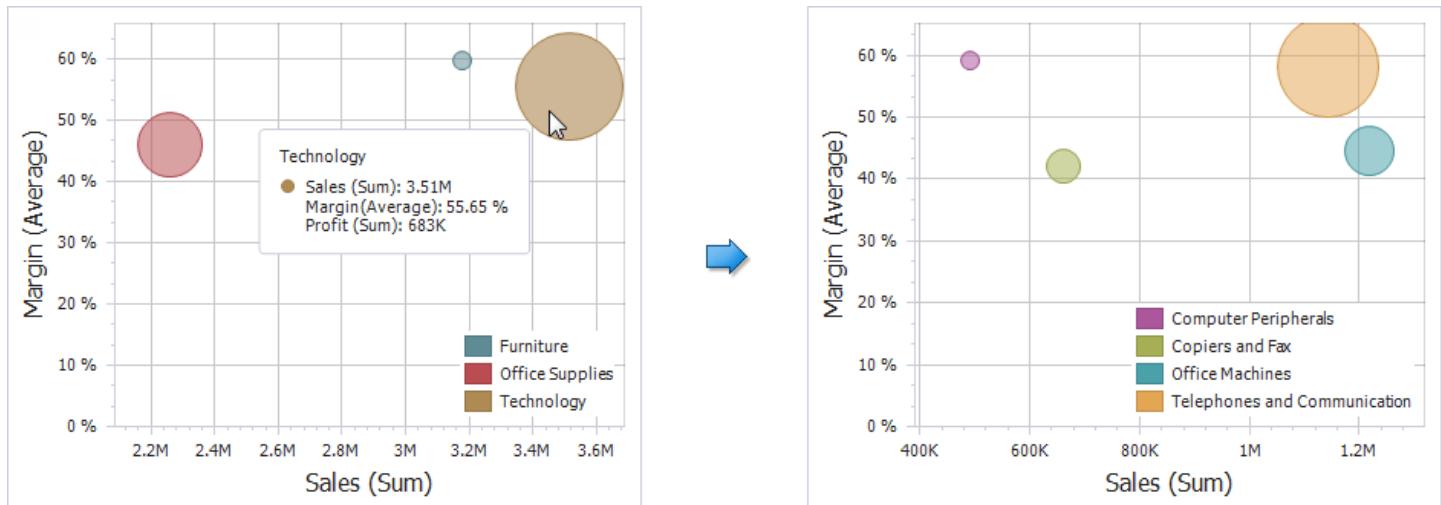
To learn how to enable Master Filtering in the Designer, see the [Master Filtering](#) topic.

To reset filtering, use the **Clear Master Filter** (✖) button in the Chart's caption area, or the **Clear Master Filter** command in the context menu.

Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more about drill-down concepts common to all dashboard items, see the [Drill-Down](#) topic.

When drill-down is enabled, you can click a point to view the details.



NOTE

When [Master Filtering](#) is enabled, you can view the details by double-clicking a point.

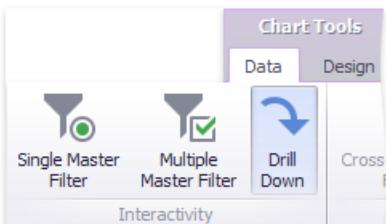
Drill-down requires that the **Arguments** section contain several dimensions, from the least to the most detailed dimension.



NOTE

In OLAP mode, you can perform drill-down for either a hierarchy data item or several dimension attributes. To learn more about OLAP mode, see [Bind Dashboard Items to Data in OLAP mode](#).

To enable drill-down, click the **Drill Down** button in the **Data** Ribbon tab (or the button if you are using the toolbar menu).

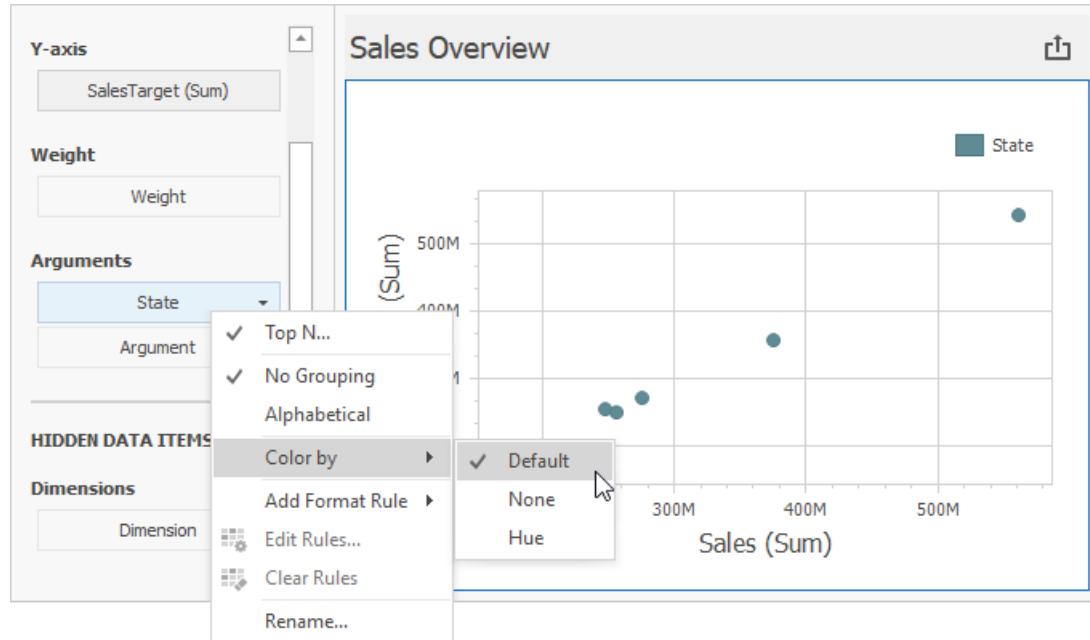


To return to the previous detail level (drill up), use the **Drill Up** () button in the caption of the Scatter Chart dashboard item, or the **Drill Up** command in the context menu.

Coloring

The Scatter Chart dashboard item does not paint its arguments in **Default** mode.

The image below displays the Scatter Chart dashboard item whose *State* points use **Default** mode:



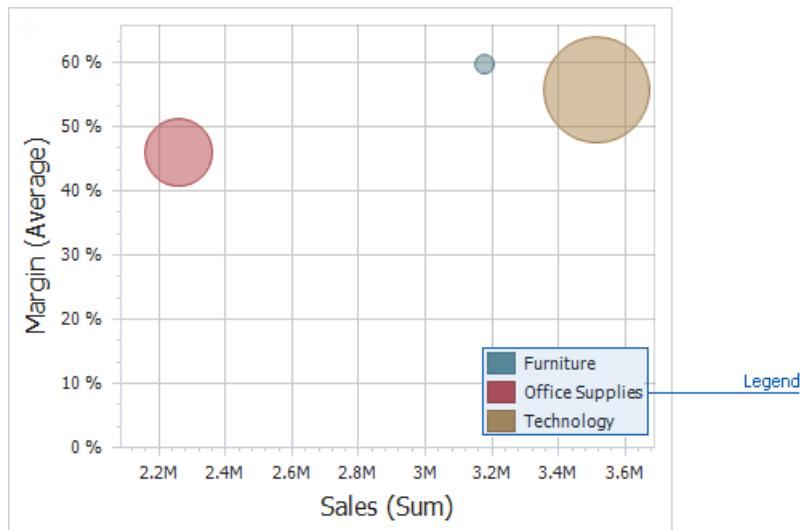
💡 TIP

Documentation:

- [Conditional Formatting](#)
- [Coloring Basics](#)

Legend

A **legend** is an element of a scatter chart that identifies chart points (for instance, [colored points](#) corresponding to argument values).

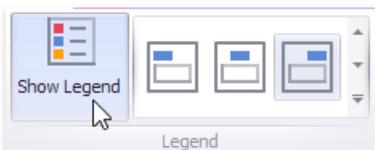


This topic describes how to customize various legend settings.

Visibility

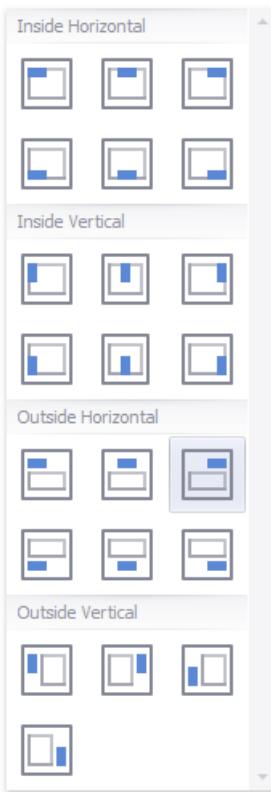
You can specify whether or not a chart should display a legend.

In the Designer, use the **Show Legend** button in the **Legend** section of the **Design** Ribbon tab.



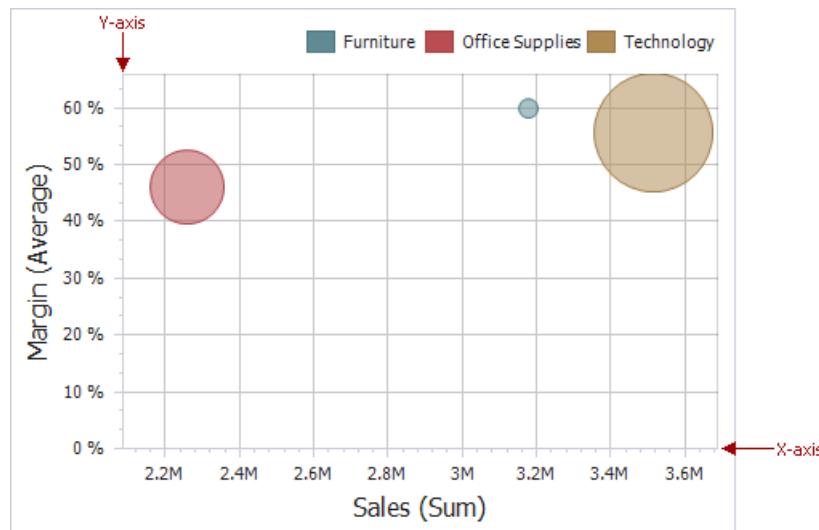
Position and Orientation

To specify the legend's position and orientation, select one of the predefined options from the gallery in the **Design** Ribbon tab.



Axes

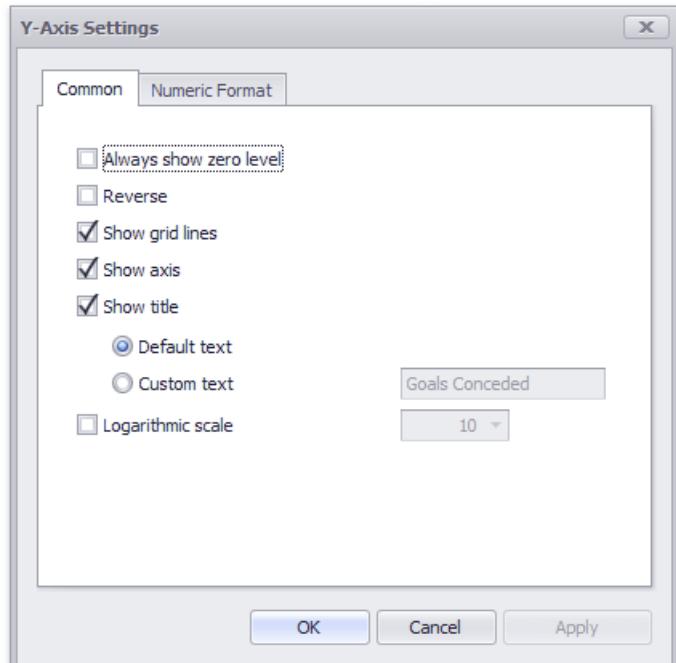
Scatter Chart X and Y-axes are numerical axis of values. You can specify various axes settings to change visual data presentation.



To access X and Y-axis settings, use the **X-Axis Settings/Y-Axis Settings** buttons in the **Diagram** section of the **Design** Ribbon tab.



This will invoke the **X-Axis Settings/Y-Axis Settings** dialog.



In this dialog, you can specify the following settings.

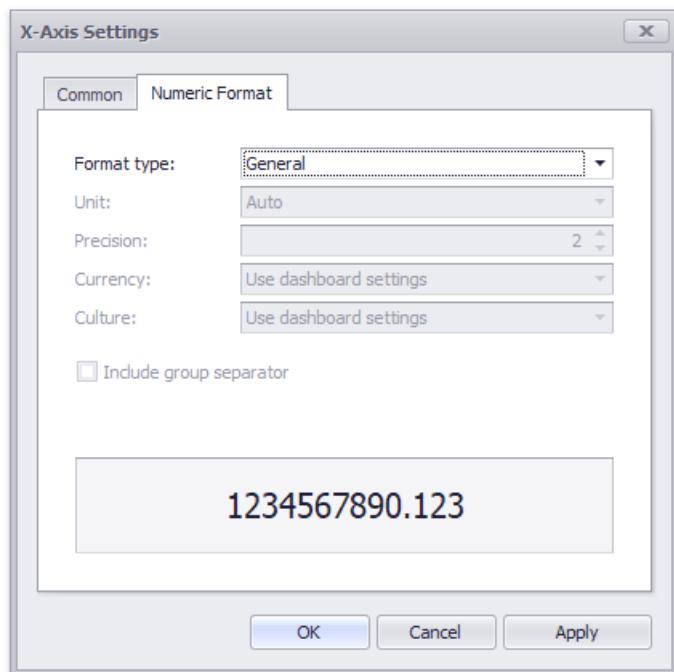
- **Always show zero level** - Specifies whether or not the axis' zero level is visible. If this option is unchecked, the visible axis range is defined based on the values plotted in the chart.

NOTE

Note that the **X-Axis Settings** dialog does not contain this option.

- **Reverse** - Allows you to reverse the axis. If the axis is reversed, its values are ordered from top to down.
- **Show grid lines** - Allows you to hide and show grid lines for the axis.
- **Show axis** - Allows you to hide and show the axis.
- **Show title** - Allows you to hide and show the axis title. You can choose whether to use the default text or specify a custom string.
- **Logarithmic scale** - Specifies whether or not the axis should display its numerical values using a logarithmic scale. The combo box next to this option allows you to select the logarithmic base from one of the predefined values.

The **Numeric Format** tab allows you to specify the numeric display formats for axis data, as described in the [Formatting Data](#) document.



The tab contains the following settings.

- **Format type** - Specifies format types for numeric values.
- **Unit** - Specifies the unit to convert the numeric values.
- **Precision** - Specifies the number of fractional digits to display.
- **Currency** - Specifies the currency symbol and format provided by the current culture settings.
- **Culture** - Specifies the name of a culture that defines the currency symbol and format.
- **Include group separator** - Specifies whether separators should be inserted between digit groups.

Orientation

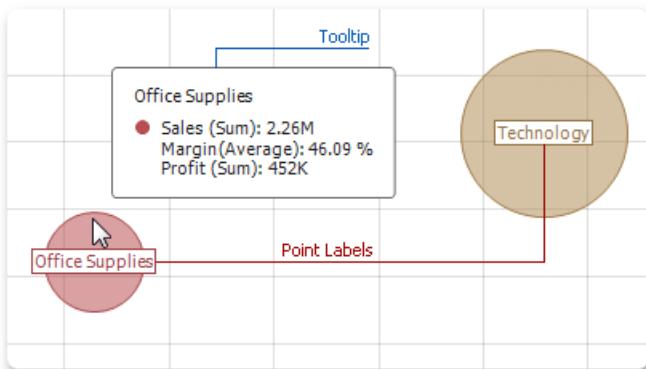
You can rotate the Scatter Chart so that the [X-axis](#) becomes vertical, and the [Y-axis](#) becomes horizontal.

To rotate a Chart in the Designer, use the **Rotate** button in the **Diagram** section of the **Design** Ribbon tab.



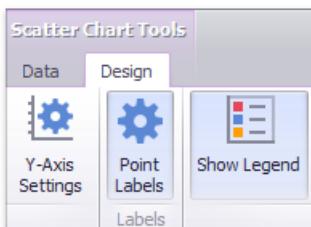
Labels

The Scatter Chart display can display **point labels** that contain descriptions for data points, and provide **tooltips** with additional information.

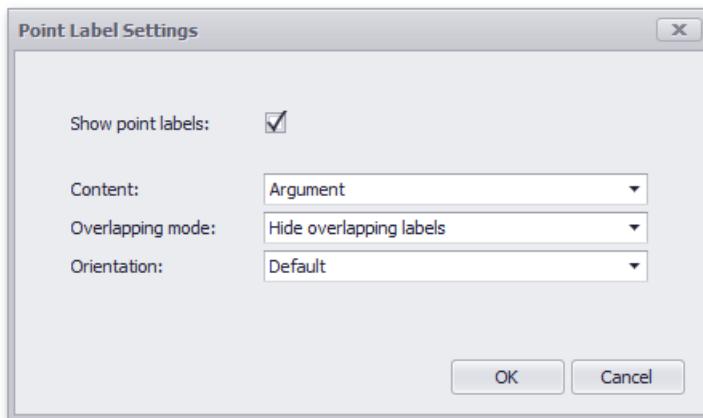


Point Labels

To manage the visibility of point labels, click the **Point Labels** button in the **Design** ribbon tab.



In the invoked **Point Label Settings** dialog, enable the **Show point labels** check box to show point labels.



You can specify the following settings for point labels:

- **Content** - Specifies the type of content displayed within point labels. You can select one of the following options.
 - *Values* - Point labels show summary values from X and Y-axes.
 - *Argument* - Point labels show argument values.
 - *Argument and values* - Point labels show argument values and corresponding summary values.
 - *Weight* - Point labels show the weight summary value.
 - *Argument and weight* - Point labels show the argument value and the corresponding weight summary value.
- **Overlapping mode** - Specifies the label overlap mode. The following options are available.
 - *Hide overlapping labels* - If two or more labels overlap, some of them are automatically hidden to avoid overlapping.
 - *None* - The overlapping resolving algorithm is disabled.
 - *Reposition overlapping labels* - The default algorithm to re-position point labels in a random way, and avoid

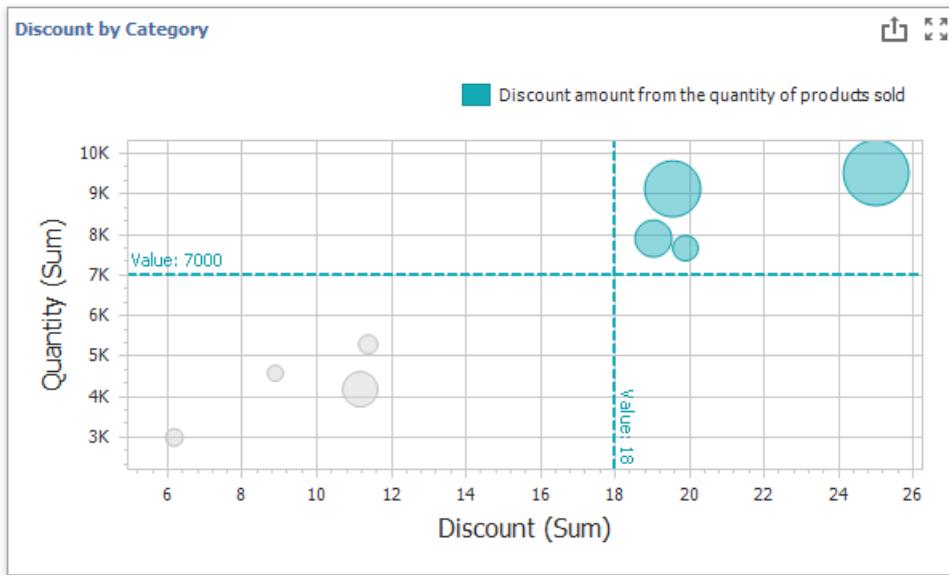
overlapping labels.

- **Orientation** - Specifies the orientation of point labels. The following options are available.

- *Default* - A point label is displayed in its default orientation.
- *Rotate to the Right* - A point label is rotated 90 degrees clockwise.
- *Rotate to the Left* - A point label is rotated 90 degrees counter clockwise.

Conditional Formatting

Use conditional formatting to highlight points in a Scatter Chart dashboard item.



Supported Format Rules

You can use the following data in rule calculations:

- [measures](#) from the **X and Y axis** sections
- [measures](#) from the **Weight** section
- [dimensions](#) from the **Arguments** section
- hidden measures

The following list contains available format rules and corresponding data types:

- numeric
 - [Value](#)
 - [Top-Bottom](#)
 - [Average](#)
 - [Expression](#)
 - [Color Ranges](#)
 - [Gradient Ranges](#)
- string
 - [Value](#) (with a condition type set to *Equal To*, *Not Equal To* or *Text that Contains*)
 - [Expression](#)
- date-time
 - [Value](#)
 - [A Date Occurring](#) (for dimensions with a continuous date-time group interval)
 - [Expression](#)
 - [Color Ranges](#)
 - [Gradient Ranges](#)

Create and Edit a Format Rule

You can create and edit format rules in the following ways:

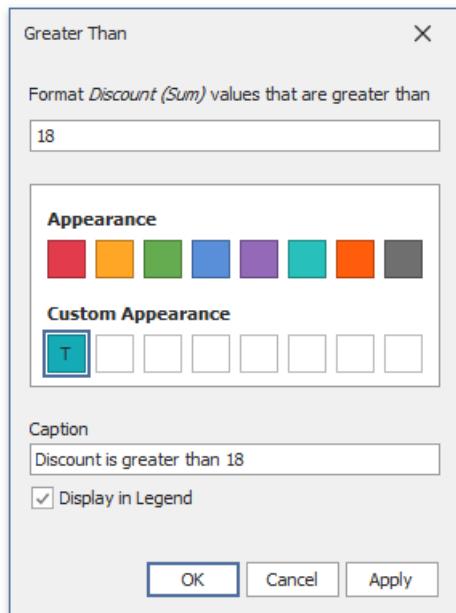
- Click the **Edit Rules** button on the **Home** ribbon tab.
- Click the measure/dimension menu button in the Data Item's pane and select **Add Format Rule/Edit Rules**.

Refer to the following topic for information on how to create and edit format rules: [Conditional Formatting Common](#).

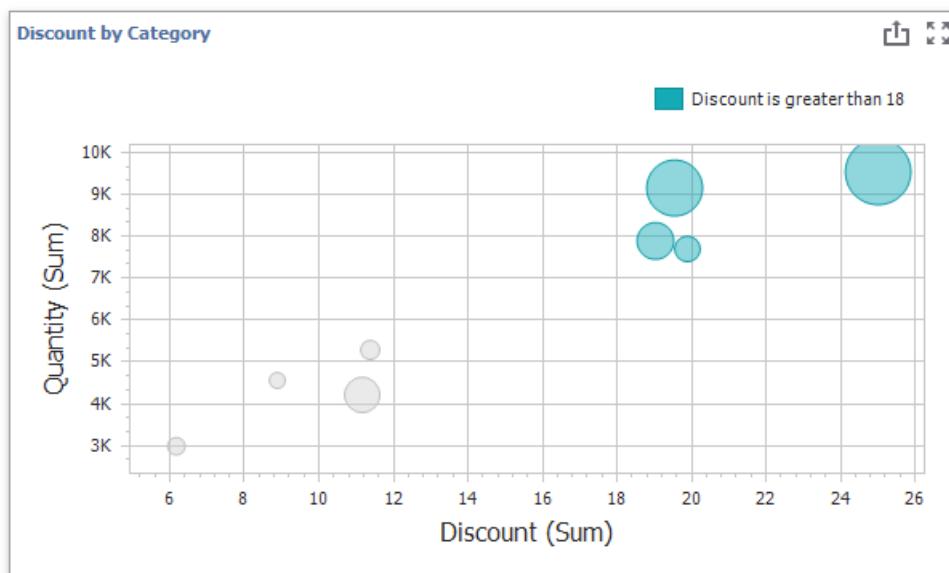
Format Condition Settings Specific to Scatter Charts

Specify appearance settings and set the condition's value to create a format rule. Available settings depend on the selected format condition type.

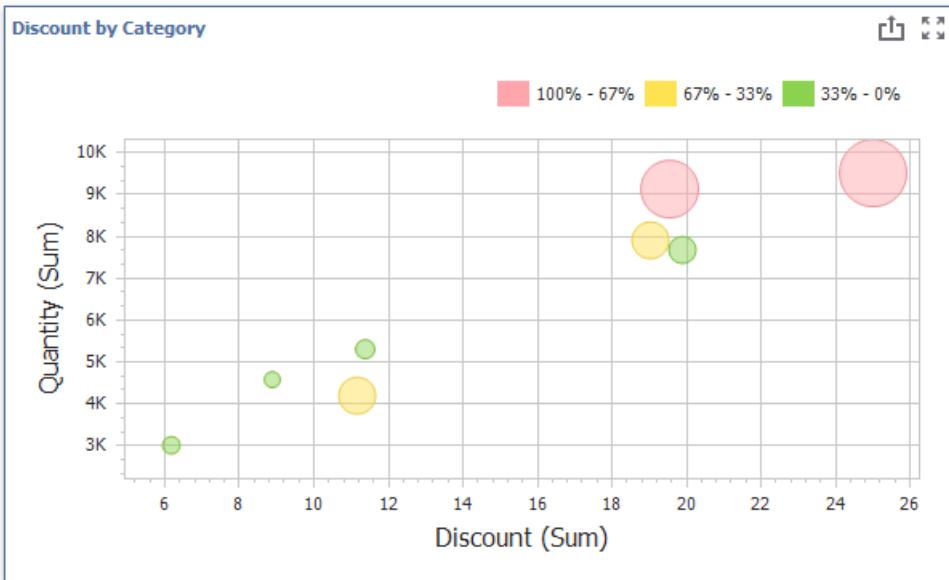
The image below displays the **Greater Than** dialog (a **Value** format condition applied to a scatter chart). The condition colors bubbles if their values exceed 18.



If you enable **Display in Legend**, the chart shows information about the applied rule. Set the **Caption** field to specify the legend's text. The image below displays the Scatter Chart item with the applied **Greater Than** format rule. The **Display in Legend** option is activated and the rule's caption is displayed in the legend:



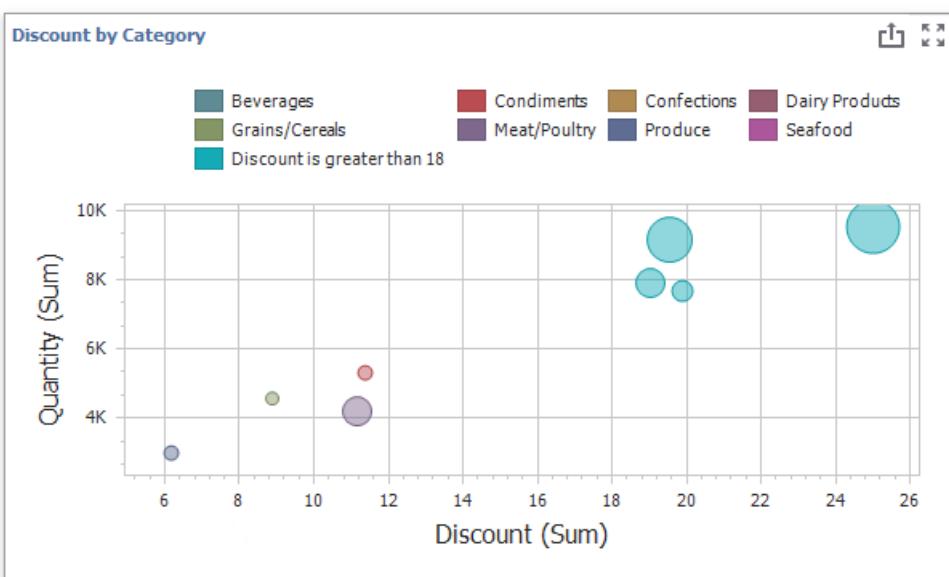
For Range format rules, the legend display text is generated automatically and depends on the range intervals:



Coloring

A Scatter Chart item paints elements in pale gray if they do not meet the applied format condition. Note that this does not apply to elements that use the [Hue](#) color mode.

Select the **Color by Hue** option in a Data item's pane to restore the color scheme.



TIP

[Documentation: Scatter Chart - Coloring](#)

Grid

The topics in this section describe the features available in the **Grid** dashboard item, and provide extensive information on how to create and customize grids in the **Dashboard Designer**.

State	Trend	Sales	Sales vs Target
Washington		\$269M	-6.49 %
New York		\$266M	+9.39 %
California		\$207M	+1.53 %
Ohio		\$207M	+5.52 %
Texas		\$192M	+0.55 %
Utah		\$180M	-1.60 %
Mississippi		\$172M	+4.07 %
Nevada		\$164M	+1.00 %
Maine		\$161M	+0.62 %
Missouri		\$152M	+6.27 %

This section consists of the following subsections.

- [Providing Data](#)

Provides information about how to supply the Grid dashboard item with data.

- [Columns](#)

Describes different types of grid columns.

- [Interactivity](#)

Describes features that imply interaction between the Grid and other dashboard items.

- [Conditional Formatting](#)

Describes the conditional formatting feature that provides the capability to apply formatting to grid cells whose values meet the specified condition.

- [Totals](#)

Describes totals that allow you to calculate summaries against values displayed within Grid columns.

- [Layout](#)

Describes the Grid's layout options.

- [Style](#)

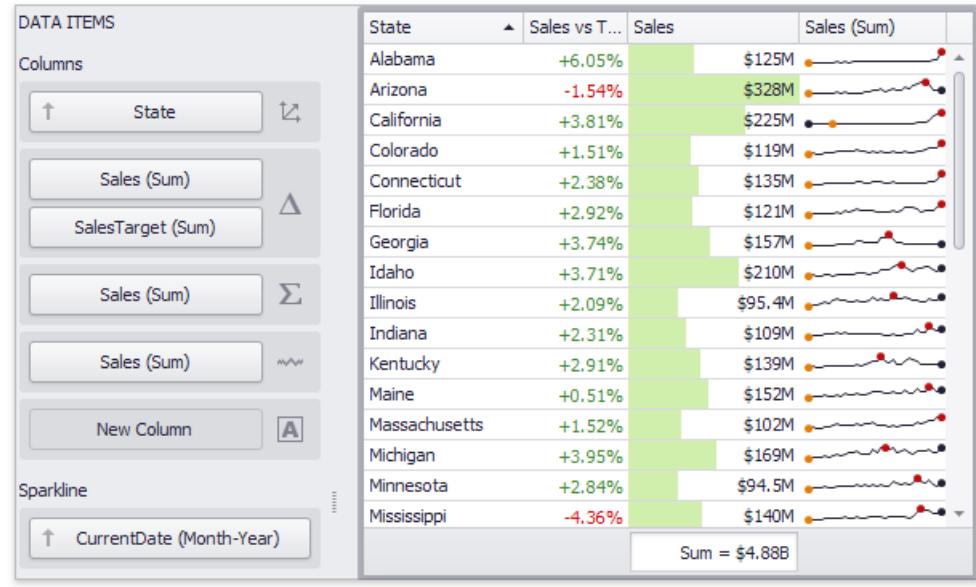
Describes the Grid's style settings.

Providing Data

The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner. To learn more, see the [Bind Dashboard Items to Data](#) topic.

The only difference is in the data sections that the required dashboard item has. This topic describes how to bind a **Grid** dashboard item to data in the Designer.

The image below shows a sample Grid dashboard item that is bound to data.



To bind the Grid dashboard item to data, drag and drop a data source field to a placeholder contained in one of the available data sections. A table below lists and describes a Grid's data sections.

SECTION	DESCRIPTION
Columns	Contains data items that provide values for grid columns. The Options button next to the Column data item allows you to select the column type and specify their options.
Sparkline	Contains a data item that provides arguments for sparkline columns. To learn more, see Sparkline Column .

Columns

The topics in this section describe the different types of grid columns, and contain information on when to use each column type and how to customize them based on the type.

This section consists of the following topics.

- [Column Type Overview](#)

Provides general information about column types and describes how to change the type of a particular column.

- [Dimension Column](#)

Describes dimension column specifics.

- [Hyperlink Column](#)

Describes hyperlink column specifics.

- [Measure Column](#)

Describes measure column specifics.

- [Delta Column](#)

Describes delta column specifics.

- [Sparkline Column](#)

Describes sparkline column specifics.

Column Type Overview

The **Grid** dashboard item supports four types of columns.

- [Dimension Column](#)

Displays values in the bound data item "as is".

- [Hyperlink Column](#)

Allows you to display hyperlinks in the Grid dashboard item.

- [Measure Column](#)

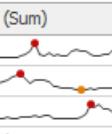
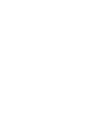
Displays summaries calculated against data in the bound data item.

- [Delta Column](#)

Bound to two measures, it calculates summaries for both measures, and displays the difference between these summaries.

- [Sparkline Column](#)

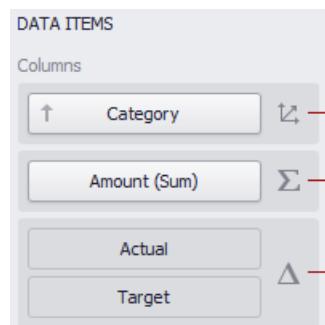
Displays values in the bound data item using sparklines.

Dimension column	Hyperlink column	Measure column	Delta column	Sparkline column
State	State	Sales	Sales vs Target	Sales (Sum)
Indiana	Indiana	\$296M	+0.80 % ▲	
California	California	\$271M	-0.20 % ▼	
Michigan	Michigan	\$245M	-3.68 % ▼	
New York	New York	\$227M	+6.35 % ▲	

When you drop a data item into the **Columns** section, the type for the new column is determined automatically, based on the data type.

Column Type Indication

The type of the column is indicated within the corresponding data item container in the DATA ITEMS area.



DATA ITEMS

Columns

- Category
- Amount (Sum)
- Actual
- Target

Column Type Indicators

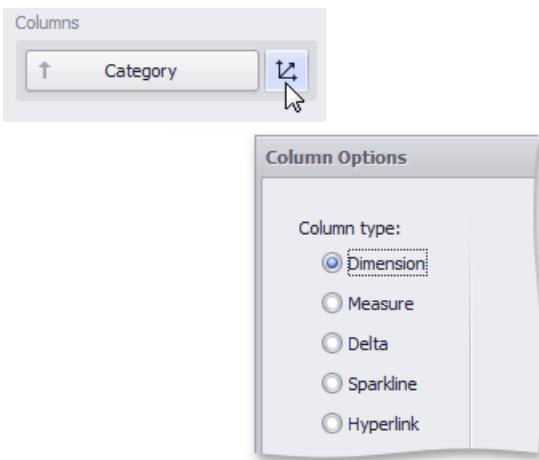
Column type indicators are defined as follows:

ICON	COLUMN TYPE
	Dimension Column
	Hyperlink Column
	Measure Column

ICON	COLUMN TYPE
Δ	Delta Column
~~~~	Sparkline Column

## Changing Column Type

To change the column type, click the column type indicator. In the invoked **Column Options** window, select the required column type in the **Column type** section.



# Dimension Column

The **dimension column** displays values from the bound data item "as is".

Dimension column	Hyperlink column	Measure column	Delta column	Sparkline column
State	State	Sales	Sales vs Target	Sales (Sum)
Indiana	<a href="#">Indiana</a>	\$296M	+0.80 % 	
California	<a href="#">California</a>	\$271M	-0.20 % 	
Michigan	<a href="#">Michigan</a>	\$245M	-3.68 % 	
New York	<a href="#">New York</a>	\$227M	+6.35 % 	

If the dimension column is bound to a data source containing images, it can display images.

# Hyperlink Column

A *hyperlink* column allows you to display hyperlinks in the Grid dashboard item.

GDP by Country	
Name	GDP (billions of \$)
France	2.47M
Germany	3.48M
United States	18.6M

You can provide hyperlinks as a separate data column, or they can be automatically created at run-time from any column using the specified **URI pattern**.

In this document, the sample data source contains four fields: country name, official country name, Wikipedia country page's URI and the GDP value.

Name	OfficialName	Link	GDP
United States	United States of America	<a href="https://en.wikipedia.org/wiki/United_States">https://en.wikipedia.org/wiki/United_States</a>	18,624,450
Germany	Federal Republic of Germany	<a href="https://en.wikipedia.org/wiki/Germany">https://en.wikipedia.org/wiki/Germany</a>	3,479,232
France	French Republic	<a href="https://en.wikipedia.org/wiki/France">https://en.wikipedia.org/wiki/France</a>	2,466,472

The following sections describe how to create hyperlink columns in more detail:

- [Data Field Containing Uri Values](#)
- [Uri Pattern](#)

## Data Field Containing Uri Values

Drag the *Name* data field from the Data Source tree view to the column's [data item container](#). The data field is automatically processed as [dimension](#). Drag and drop the *GDP* data field to another column's data item container. The data field is recognized as [measure](#) and summarized.

The screenshot shows the Data Items panel on the left and a Dashboard grid on the right. In the Data Items panel, there are three data items: 'Name', 'GDP (Sum)', and 'New Column'. The 'Name' item is currently selected. In the Dashboard grid, there is a single column labeled 'GDP by Country' with three rows: France (2.47M), Germany (3.48M), and United States (18.6M). The 'GDP (Sum)' data item is listed under the 'GDP by Country' column header.

Drop the *Link* field between the *Name* and the *GDP (Sum)* data items. The Grid recognizes this field as [dimension](#) and displays links as plain text.

The screenshot shows the Data Items panel on the left and a Dashboard grid on the right. In the Data Items panel, the 'Link' data item has been moved between the 'Name' and 'GDP (Sum)' items, creating a new column 'Link' in the Data Items list. In the Dashboard grid, the 'GDP by Country' column now includes a 'Link' column with the corresponding Wikipedia URLs for each country: France (<https://en.wikipedia.org/wiki/France>), Germany (<https://en.wikipedia.org/wiki/Germany>), and United States ([https://en.wikipedia.org/wiki/United_States](https://en.wikipedia.org/wiki/United_States)). The 'GDP (Sum)' data item remains in the grid.

Click the **Column Type Indicator** button next to the *Name* data item and change its type to **Hyperlink**.

The screenshot shows the Data Items panel on the left and a dashboard grid on the right. In the Data Items panel, the 'Link' column is selected. A 'Column Options' dialog box is open over the grid, with the 'Hyperlink' radio button selected under 'Column type'. The 'URI Pattern' field contains the placeholder 'Insert Placeholder'. At the bottom of the dialog are 'OK', 'Cancel', and 'Apply' buttons.

GDP by Country		
Name	Link	GDP (Sum)
France	<a href="https://en.wikipedia.org/wiki/France">https://en.wikipedia.org/wiki/France</a>	2.47M
Germany	<a href="https://en.wikipedia.org/wiki/Germany">https://en.wikipedia.org/wiki/Germany</a>	3.48M
United States	<a href="https://en.wikipedia.org/wiki/United_States">https://en.wikipedia.org/wiki/United_States</a>	18.6M

The Grid displays column values as clickable hyperlinks allowing you to navigate to the Wiki's pages.

The screenshot shows the Data Items panel on the left and a dashboard grid on the right. The 'Link' column now displays actual hyperlinks: 'https://en.wikipedia.org/wiki/France', 'https://en.wikipedia.org/wiki/Germany', and 'https://en.wikipedia.org/wiki/United_States'. The grid also includes columns for 'Name', 'Link', and 'GDP (Sum)'.

GDP by Country		
Name	Link	GDP (Sum)
France	<a href="https://en.wikipedia.org/wiki/France">https://en.wikipedia.org/wiki/France</a>	2.47M
Germany	<a href="https://en.wikipedia.org/wiki/Germany">https://en.wikipedia.org/wiki/Germany</a>	3.48M
United States	<a href="https://en.wikipedia.org/wiki/United_States">https://en.wikipedia.org/wiki/United_States</a>	18.6M

You can bind the Display value and URI value to different data fields. Click the *New Column* data item placeholder and change its type to **Hyperlink**.

The screenshot shows the Data Items panel on the left and a dashboard grid on the right. New columns 'Display Value' and 'Uri' have been added to the grid. The 'Display Value' column shows the official country names ('France', 'Germany', 'United States'), and the 'Uri' column shows the corresponding hyperlinks ('https://en.wikipedia.org/wiki/France', 'https://en.wikipedia.org/wiki/Germany', 'https://en.wikipedia.org/wiki/United_States'). The grid also includes columns for 'Name' and 'GDP (Sum)'.

GDP by Country		
Name	Display Value	GDP (Sum)
France	France	2.47M
Germany	Germany	3.48M
United States	United States	18.6M

Drag and drop the *OfficialName* field to the *Display Value* data item placeholder to display official country names. Drag and drop

the *Link* field to the *Uri* data item placeholder to specify URIs.

The grid displays official country names with links obtained from the *Link* data source field.

The screenshot shows a dashboard interface with a sidebar labeled "DATA ITEMS" containing "Columns": Name, GDP (Sum), OfficialName, and Link. The main area is titled "Dashboard" and contains a grid titled "GDP by Country". The grid has columns "Name", "GDP (Sum)", and "OfficialName". The "OfficialName" column contains hyperlinks: "French Republic" for France, "Federal Republic of Germany" for Germany, and "United States of America" for the United States.

Name	GDP (Sum)	OfficialName
France	2.47M	<a href="#">French Republic</a>
Germany	3.48M	<a href="#">Federal Republic of Germany</a>
United States	18.6M	<a href="#">United States of America</a>

## Uri Pattern

In this case, a specified URI pattern is used to generate links.

Drag the *Name* data field from the Data Source tree view to the column's **data item container**. The data field is automatically processed as **dimension**. Drag and drop the *GDP* data field to another column's data item container. The data field is recognized as **measure** and summarized.

The screenshot shows a dashboard interface with a sidebar labeled "DATA ITEMS" containing "Columns": Name, GDP (Sum), and New Column. The main area is titled "Dashboard" and contains a grid titled "GDP by Country". The grid has columns "Name" and "GDP (Sum)". The "Name" column contains hyperlinks: "2.47M" for France, "3.48M" for Germany, and "18.6M" for the United States.

Name	GDP (Sum)
France	2.47M
Germany	3.48M
United States	18.6M

Click the **Column Type Indicator** button next to the *Name* data item and change its type to **Hyperlink**. Specify the **URI Pattern** option as follows:

The screenshot shows the "Column Options" dialog box. On the left, under "Column type:", the "Hyperlink" option is selected. On the right, the "URI Pattern" field contains the value "https://en.wikipedia.org/wiki/{0}" and there is a "Insert Placeholder" button. At the bottom are "OK", "Cancel", and "Apply" buttons.

Column Options

Column type:

Dimension

Measure

Delta

Sparkline

Hyperlink

URI Pattern: https://en.wikipedia.org/wiki/{0}

Insert Placeholder

OK Cancel Apply

The `{0}` placeholder is replaced with the *Name* data item value. The links are generated for country names and displayed in the grid as illustrated in the following picture.

DATA ITEMS

Columns

Name	↑
Uri	ABC
GDP (Sum)	Σ
New Column	A

Dashboard

GDP by Country

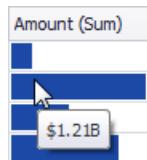
Name	GDP (Sum)
France	2.47M
Germany	3.48M
United States	18.6M

# Measure Column

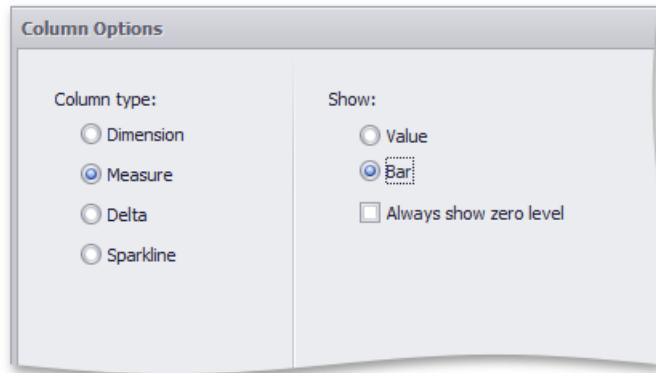
A **measure column** displays summaries calculated against data in a bound data item.

Dimension column	Hyperlink column	Measure column	Delta column	Sparkline column
State	State	Sales	Sales vs Target	Sales (Sum)
Indiana	<a href="#">Indiana</a>	\$296M	+0.80 % <span style="color: green;">▲</span>	
California	<a href="#">California</a>	\$271M	-0.20 % <span style="color: grey;">▼</span>	
Michigan	<a href="#">Michigan</a>	\$245M	-3.68 % <span style="color: red;">▼</span>	
New York	<a href="#">New York</a>	\$227M	+6.35 % <span style="color: green;">▲</span>	

Values in the measure column can be displayed as text or represented by bars.



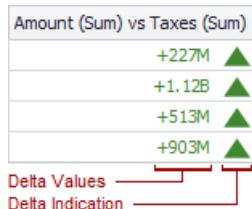
To select between these modes, invoke the **Column Options** window (see [Column Type Overview](#) to learn how to do this) and select **Value** or **Bar**.



If bars are displayed, use the **Always show zero level** check box to specify whether the bar's zero level is always visible.

# Delta Column

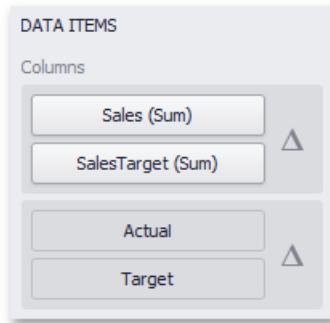
A **delta column** calculates summaries against two measures, and displays the difference between these summaries. This difference can be indicated with a numeric value displayed within the delta element and an additional delta indication.



## Data Binding Specifics

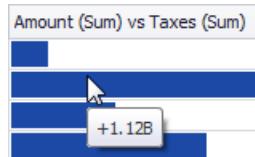
Delta columns are bound to two measures that provide two values: the **Actual** value and the **Target** value. The difference between these values is displayed in the column.

When you switch the column type to **Delta**, the data item container is changed, to accept the Actual and Target measures.

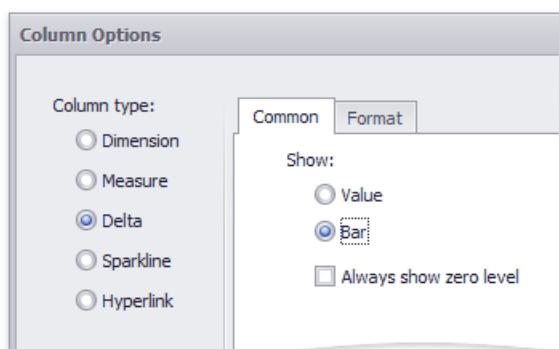


## Display Mode

Values in the delta column can be displayed as text, or represented by bars.



To select between these modes, invoke the **Column Options** window (see the [Column Type Overview](#) topic to learn how to do this) and select **Value** or **Bar**.

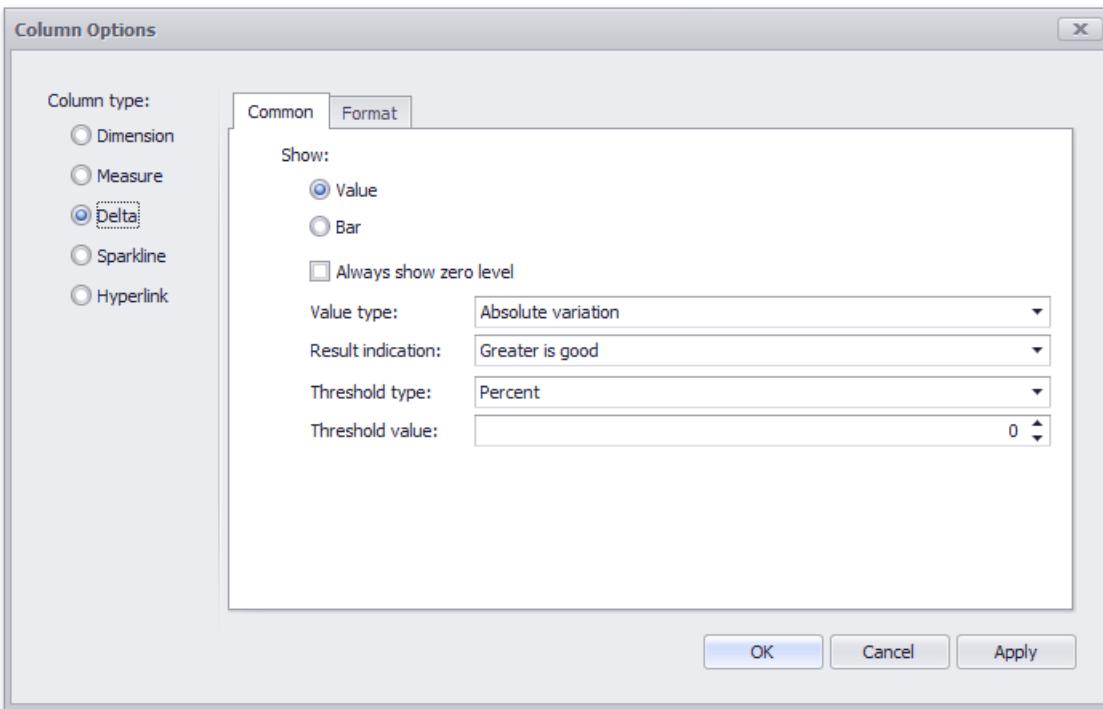


If bars are displayed, use the **Always show zero level** check box to specify whether the bar's minimum value is zero (checked) or an automatically selected value that ensures that the difference between bars is clearly displayed (unchecked).

AlwaysShowZeroLevel == true		AlwaysShowZeroLevel == false	
Sales	Sales	Sales	Sales
\$79.5M	\$79.5M	\$79.5M	\$79.5M
\$80.3M	\$80.3M	\$80.3M	\$80.3M
\$85.6M	\$85.6M	\$85.6M	\$85.6M
\$86.6M	\$86.6M	\$86.6M	\$86.6M
\$87.3M	\$87.3M	\$87.3M	\$87.3M

## Delta Values and Indication

If the display type is set to **Value**, the **Column Options** window displays options that allow you to configure delta values and indication.



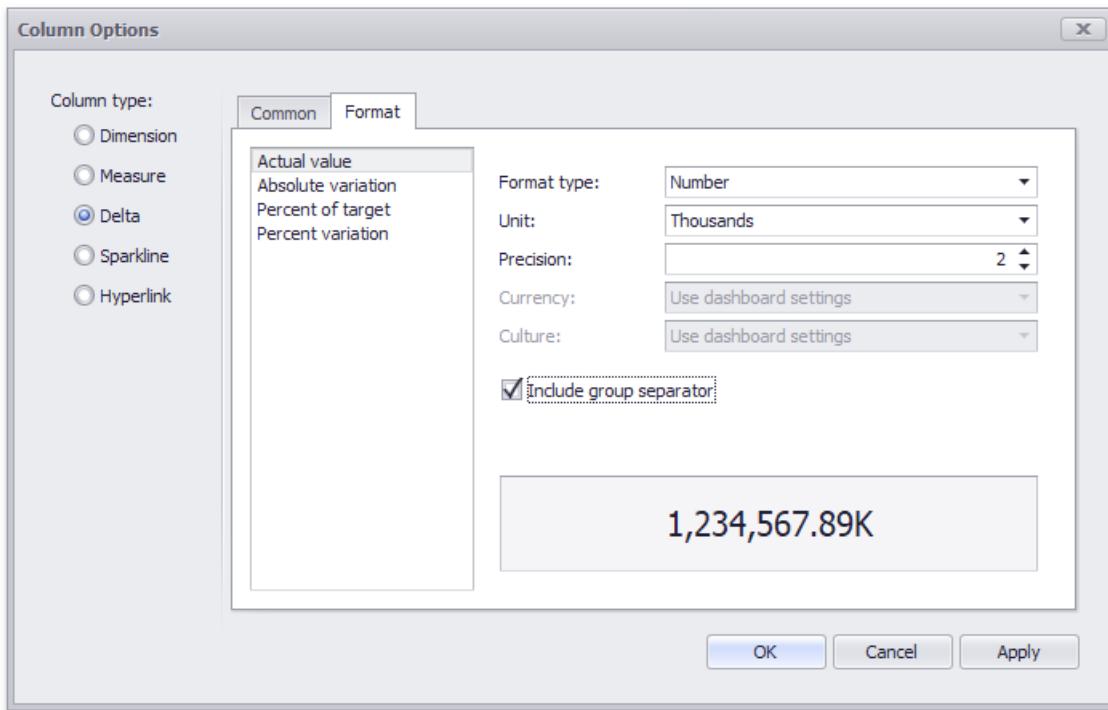
You can specify which values should be displayed in the delta column. To do this, use the **Value type** combo box in the **Column Options** window.

ACTUAL VALUE	ABSOLUTE VARIATION	PERCENT VARIATION	PERCENT OF TARGET																				
<table border="1"> <thead> <tr> <th>Sales vs Target</th> </tr> </thead> <tbody> <tr> <td>\$113M <span style="color: green;">▲</span></td> </tr> <tr> <td>\$106M <span style="color: red;">▼</span></td> </tr> <tr> <td>\$104M <span style="color: green;">▲</span></td> </tr> <tr> <td>\$90.3M <span style="color: red;">▼</span></td> </tr> </tbody> </table>	Sales vs Target	\$113M <span style="color: green;">▲</span>	\$106M <span style="color: red;">▼</span>	\$104M <span style="color: green;">▲</span>	\$90.3M <span style="color: red;">▼</span>	<table border="1"> <thead> <tr> <th>Sales vs Target</th> </tr> </thead> <tbody> <tr> <td>+5.7M <span style="color: green;">▲</span></td> </tr> <tr> <td>-1.02M <span style="color: red;">▼</span></td> </tr> <tr> <td>+7.72M <span style="color: green;">▲</span></td> </tr> <tr> <td>-1.38M <span style="color: red;">▼</span></td> </tr> </tbody> </table>	Sales vs Target	+5.7M <span style="color: green;">▲</span>	-1.02M <span style="color: red;">▼</span>	+7.72M <span style="color: green;">▲</span>	-1.38M <span style="color: red;">▼</span>	<table border="1"> <thead> <tr> <th>Sales vs Target</th> </tr> </thead> <tbody> <tr> <td>+5.32 % <span style="color: green;">▲</span></td> </tr> <tr> <td>-0.95 % <span style="color: red;">▼</span></td> </tr> <tr> <td>+8.02 % <span style="color: green;">▲</span></td> </tr> <tr> <td>-1.51 % <span style="color: red;">▼</span></td> </tr> </tbody> </table>	Sales vs Target	+5.32 % <span style="color: green;">▲</span>	-0.95 % <span style="color: red;">▼</span>	+8.02 % <span style="color: green;">▲</span>	-1.51 % <span style="color: red;">▼</span>	<table border="1"> <thead> <tr> <th>Sales vs Target</th> </tr> </thead> <tbody> <tr> <td>105.32 % <span style="color: green;">▲</span></td> </tr> <tr> <td>99.05 % <span style="color: red;">▼</span></td> </tr> <tr> <td>108.02 % <span style="color: green;">▲</span></td> </tr> <tr> <td>98.49 % <span style="color: red;">▼</span></td> </tr> </tbody> </table>	Sales vs Target	105.32 % <span style="color: green;">▲</span>	99.05 % <span style="color: red;">▼</span>	108.02 % <span style="color: green;">▲</span>	98.49 % <span style="color: red;">▼</span>
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To specify the condition for displaying delta indication, use the **Result indication** combo box in the **Column Options** window.

GREATER IS GOOD	LESS IS GOOD	WARNING IF GREATER	WARNING IF LESS	NO INDICATION																					
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The **Format** tab allows you to specify the numeric display format for different value types, as described in the [Formatting Data](#) document.



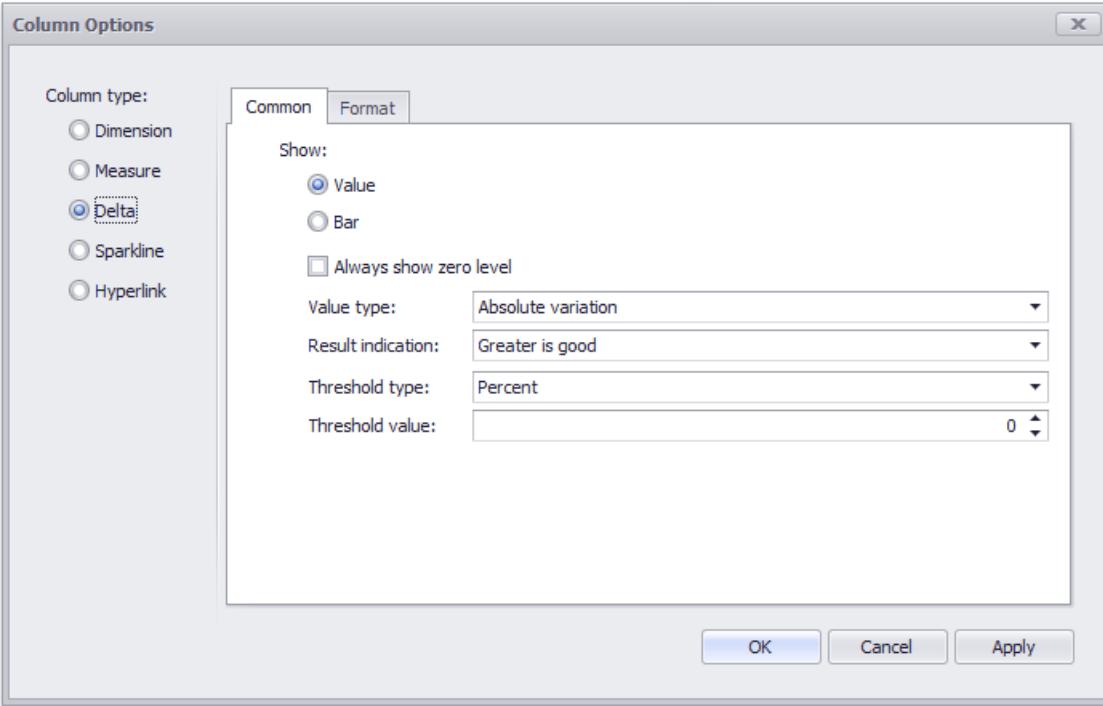
The tab contains the following settings.

- **Format type** - Specifies format types for numeric values.
- **Unit** - Specifies the unit to convert the numeric values.
- **Precision** - Specifies the number of fractional digits to display.
- **Currency** - Specifies the currency symbol and format provided by the current culture settings.
- **Culture** - Specifies the name of a culture that defines the currency symbol and format.
- **Include group separator** - Specifies whether separators should be inserted between digit groups.

## Comparison Tolerance

The comparison tolerance allows you to specify more advanced conditions for displaying delta indication. For instance, you can set a specific indication to be displayed when the actual value exceeds the target value *by 10%* or *by \$2K*.

Use the **Threshold type** combo box to select whether you wish to specify the comparison tolerance in percentage values or in absolute values. Then use the **Threshold value** box to specify the comparison tolerance.



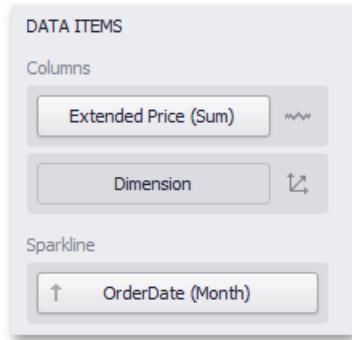
# Sparkline Column

A **sparkline column** visualizes the variation in summary values over time.

Sparkline column	
CategoryName	Extended Price
Beverages	\$49.1K
Condiments	\$9.99K
Produce	\$4.23K
	\$20.3K
	\$7.32K
	\$15.3K

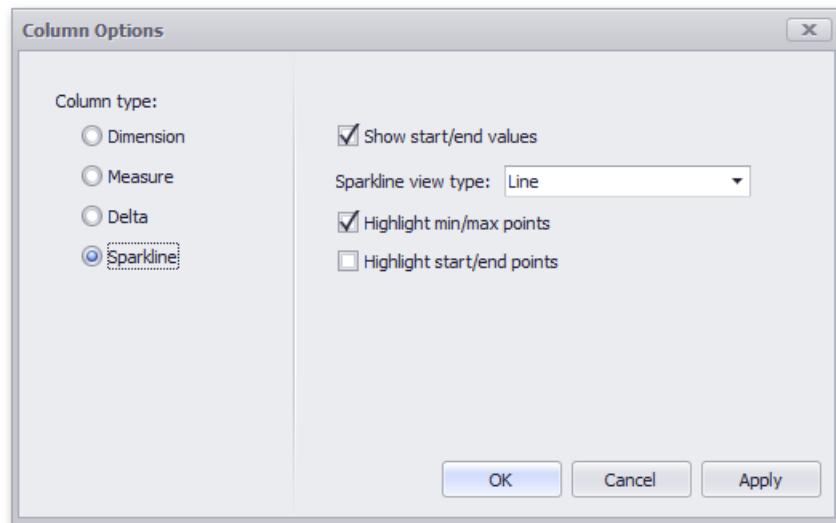
## Data Binding Specifics

The sparkline column is bound to a measure providing sparkline values and to a dimension providing a date-time interval.

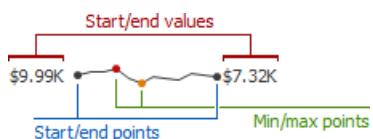


## Sparkline Options

You can control sparkline appearance settings using the **Column Options** dialog. To invoke this dialog, click the column type indicator (☰).



In this dialog, you can control various settings that affect how the sparkline is displayed within a grid cell.



SPARKLINE OPTIONS	DESCRIPTION
Show start/end values	Specifies whether or not to display sparkline start/end values within a grid cell.

SPARKLINE OPTIONS	DESCRIPTION
Sparkline view type	Defines the view type of a sparkline. Sparkline view types include <b>Line</b> , <b>Area</b> , <b>Bar</b> , and <b>Win/Loss</b> .
Highlight min/max points	Specifies whether or not to highlight the minimum/maximum points of a sparkline.
Highlight start/end points	Specifies whether or not to highlight the start/end points of a sparkline.

# Interactivity

This section describes features that enable interaction between the **Grid** and other dashboard items. These features include **Master Filtering** and **Drill-Down**.

The section consists of the following topics.

- [Master Filtering](#)
- [Drill-Down](#)

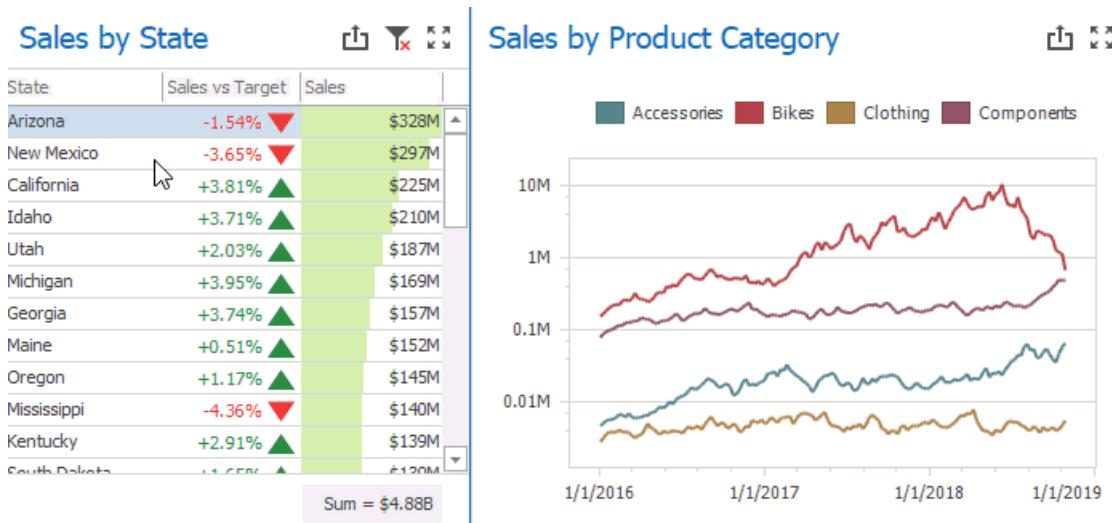
# Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more, see the [Master Filtering](#) topic, which describes filtering concepts common to all dashboard items.

## Configure Master Filters in the Designer

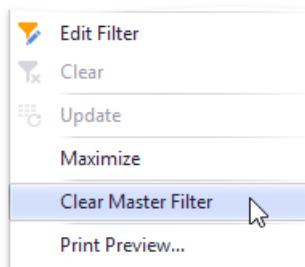
The **Grid** dashboard item supports filtering by rows.

When Master Filtering is enabled, you can click a grid row (or multiple rows by holding down the **CTRL** key) to make other dashboard items only display data related to the selected record(s).



To learn how to enable Master Filtering in the Designer, see the [Master Filtering](#) topic.

To reset filtering, use the **Clear Master Filter** button (the icon) in the grid's **caption** area, or the **Clear Master Filter** command in the grid's context menu.



# Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more about drill-down concepts common to all dashboard items, see the [Drill-Down](#) topic.

The **Grid** dashboard item supports drill-down for rows.

When drill-down is enabled, you can click a grid row to view the details.

Category	Amount (Sum)
Accessories	\$247M
Bikes	\$1.21B
Clothing	\$558M
Components	\$981M



## NOTE

When [Master Filtering](#) is enabled, you can view the details by double-clicking a grid row.

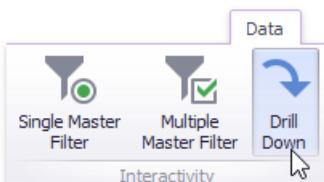
Drill-down requires that the **Columns** section contains several dimensions at the top, from the least detailed to the most detailed dimension.

The screenshot shows the 'DATA ITEMS' configuration pane. On the left, under 'Columns', there is a list of dimensions arranged vertically: 'Category', 'Subcategory', 'Product', 'Amount (Sum)', and 'Dimension'. Each dimension has a small icon and a 't' symbol next to it. On the right, a preview grid displays four rows of data corresponding to the selected dimensions: 'Accessories' (\$247M), 'Bikes' (\$1.21B), 'Clothing' (\$558M), and 'Components' (\$981M).

## NOTE

In OLAP mode, you can perform drill-down for either a hierarchy data item or several dimension attributes.

To enable drill-down, click the **Drill Down** button in the **Data** Ribbon tab (or the button if you are using the toolbar menu).



To return to the previous detail level (drill up), use the **Drill Up** button (the icon) within the grid's [caption](#) area, or the **Drill Up** command in the grid's context menu.

Drill Up

Print Preview...

# Conditional Formatting

A Grid dashboard item applies conditional formatting to data items that supply data to the [dimension](#) and [measure](#) column types.

Sales Performance				
Product	Category	Revenue ...	Revenue YTD vs Tar...	
All-Purpose Bike Stand	Accessories	\$632K	+12.97% <span style="color: green;">▲</span>	
Bike Wash	Accessories	\$28.8K	+12.68% <span style="color: green;">▲</span>	
Cable Lock	Accessories	\$94.4K	+3.51% <span style="color: green;">▲</span>	
Chain	Components	\$72.5K	-1.65% <span style="color: red;">▼</span>	
Classic Vest	Clothing	\$223K	+3.50% <span style="color: green;">▲</span>	
Cycling Cap	Clothing	\$33.8K	+1.59% <span style="color: green;">▲</span>	
Fender Set - Mountain	Accessories	\$92.4K	+1.23% <span style="color: green;">▲</span>	
Front Brakes	Components	\$364K	+8.57% <span style="color: green;">▲</span>	
Front Derailleur	Components	\$342K	+1.82% <span style="color: green;">▲</span>	
Full-Finger Gloves	Clothing	\$182K	+6.48% <span style="color: green;">▲</span>	

You can use [hidden measures](#) to specify a condition used to apply formatting to visible values.

## Supported Format Rules

The following list contains available format rules and corresponding data types:

- numeric
  - [Value](#)
  - [Top-Bottom](#)
  - [Average](#)
  - [Expression](#)
  - [Icon Ranges](#)
  - [Color Ranges](#)
  - [Gradient Ranges](#)
  - [Bar](#)
  - [Bar Color Ranges](#)
  - [Bar Gradient Ranges](#)
- string
  - [Value](#) (with a condition type set to *Equal To*, *Not Equal To* or *Text that Contains*)
  - [Expression](#)
- date-time
  - [Value](#)
  - [A Date Occurring](#) (for dimensions with a continuous date-time group interval)
  - [Expression](#)
  - [Icon Ranges](#)
  - [Color Ranges](#)
  - [Gradient Ranges](#)
  - [Bar](#)
  - [Bar Color Ranges](#)
  - [Bar Gradient Ranges](#)

## Create and Edit a Format Rule

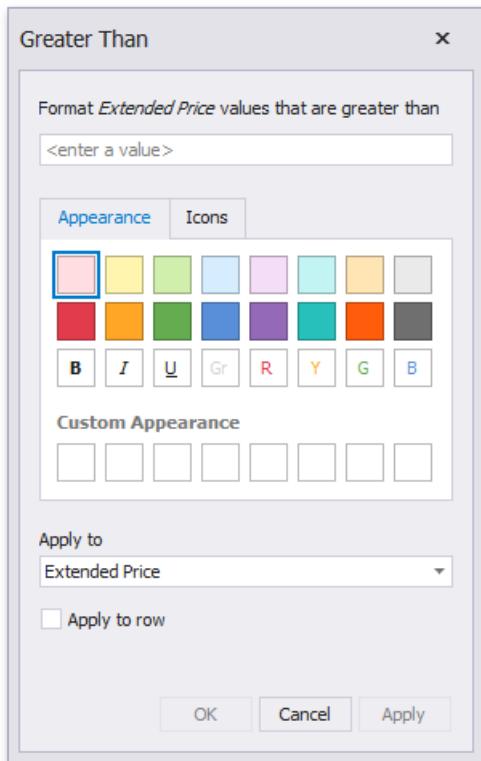
You can create and edit format rules in the following ways:

- Click the **Edit Rules** button on the **Home** ribbon tab.
- Click the measure/dimension menu button in the Data Item's pane and select **Add Format Rule/Edit Rules**.

Refer to the following topic for information on how to create and edit format rules: [Conditional Formatting Common](#).

## Grid-Specific Format Condition Settings

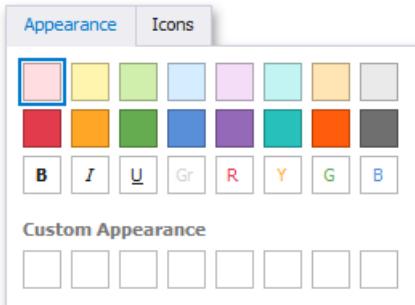
Specify appearance settings and set the condition's value for the format rule. Available settings depend on the selected format rule. The image below displays the **Greater Than** dialog, which corresponds to the **Value** format condition for a Grid dashboard item. The format condition applies to the *ExtendedPrice* data item in the **Apply to** drop-down list.



The **Apply to row** check box allows you to specify whether to apply the formatting to the entire grid row.

You can configure and customize current format condition appearance settings.

- Choose a predefined background color/font or click an empty square to add a new preset in the **Appearance** tab.



- Add a predefined icon in the **Icons** tab.

# Totals

The Grid dashboard item enables you to add a summary value (a **total**) calculated against displayed values of an individual column, and show the result under this column. Note that you can add any number of totals for each column. For example, you can obtain the number of column records, average or maximum value, etc.

Category	Extended Price (Sum)	Discount (Average)
Beverages	\$268K	6.19 %
Condiments	\$106K	5.26 %
Confections	\$167K	5.69 %
Dairy Products	\$235K	5.34 %
Grains/Cereals	\$95.7K	4.53 %
Meat/Poultry	\$163K	6.45 %
Produce	\$100K	4.54 %
Seafood	\$131K	6.02 %
Count = 8	Max = \$268K	Avg = 5.50 %
	Sum = \$1.27M	

Totals

This topic describes how to create, edit or clear totals.

The topic consists of the following sections.

- [Totals Overview](#)
- [Create and Edit Totals](#)
- [Clear Totals](#)

## Totals Overview

You can use the following summary functions when creating totals.

- **Count** - The number of records.
  - **Sum** - The sum of the values.
- $$Sum = \sum_i v_i$$
- **Min** - The smallest value.
  - **Max** - The largest value.
- **Average** - The average of the values.

$$\bar{v} = \frac{1}{n} \cdot \sum_i v_i$$

- **Auto** - The total is calculated using the type of [summary function](#) specified for the measure corresponding to the current Grid column. Note that in this case, the total is calculated based on values of the corresponding data field from the underlying data source. Note that the **Auto** type is not supported when the Grid is bound to the [OLAP](#) data source.

You can create totals using different sets of summary functions. This depends on the type of the data source field providing data for the target column.

ICON	DATA SOURCE FIELD TYPE	SUPPORTED TOTALS
	Boolean	Count
	Byte	Count

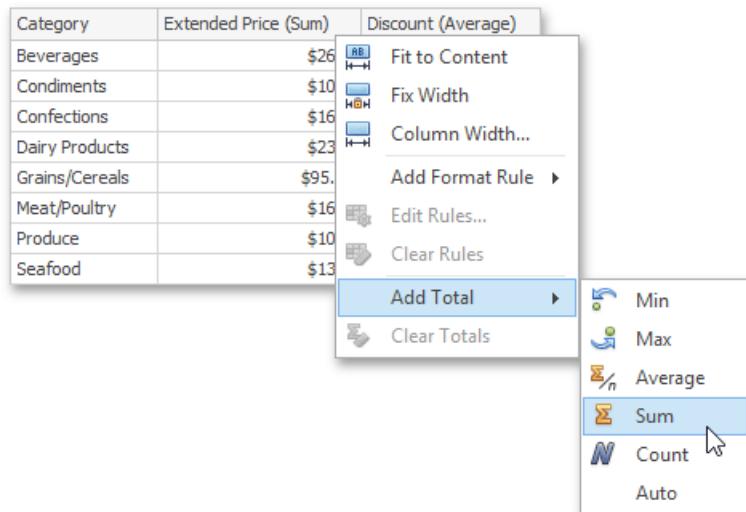
ICON	DATA SOURCE FIELD TYPE	SUPPORTED TOTALS
	Date-time	Min, Max, Count
	Numeric	All available types
	String	Min, Max, Count

### **IMPORTANT**

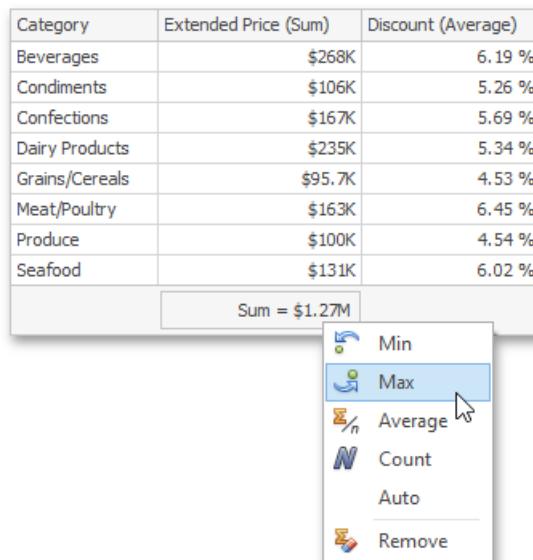
Note that the **Auto** type is available only for the **Measure** column.

## Create and Edit Totals

To create a total, use the context menu of the column header. Right-click the required column header, select **Add Total** and specify the type of summary function used to calculate a total.



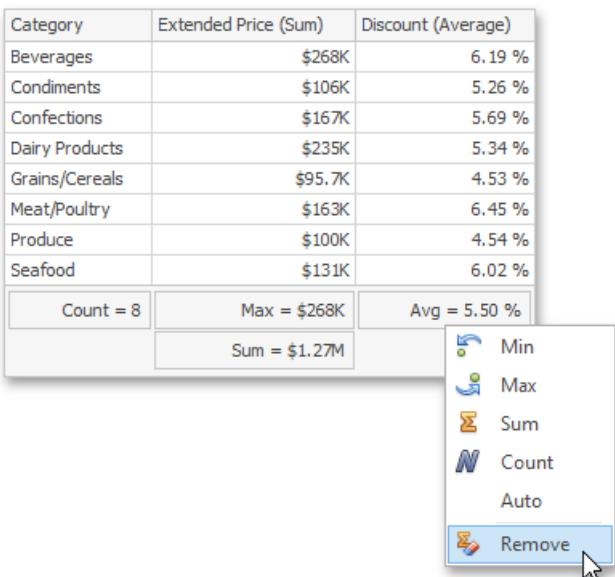
To change the total type, right-click the required total and select a new total type.



## Clear Totals

You can delete one total or all the totals in a particular column.

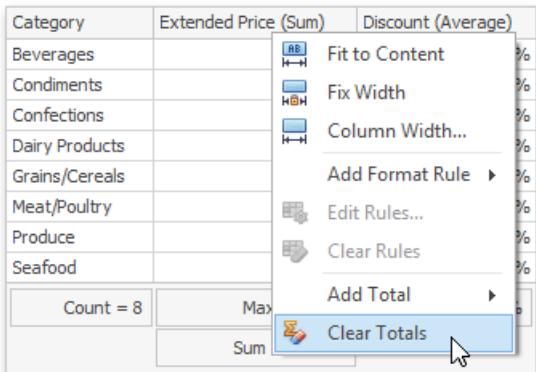
- To delete a single total, right-click a total and select **Remove**.



A screenshot of a Microsoft Excel-like application showing a table of product categories and their statistics. The table has columns for Category, Extended Price (Sum), and Discount (Average). At the bottom, there are summary rows for Count = 8, Max = \$268K, Avg = 5.50 %, and Sum = \$1.27M. A context menu is open over the 'Sum' row, with the 'Remove' option highlighted.

Category	Extended Price (Sum)	Discount (Average)
Beverages	\$268K	6.19 %
Condiments	\$106K	5.26 %
Confections	\$167K	5.69 %
Dairy Products	\$235K	5.34 %
Grains/Cereals	\$95.7K	4.53 %
Meat/Poultry	\$163K	6.45 %
Produce	\$100K	4.54 %
Seafood	\$131K	6.02 %
Count = 8	Max = \$268K	Avg = 5.50 %
	Sum = \$1.27M	

- To delete all column totals, right-click the column header and select **Clear Totals** in the invoked context menu.



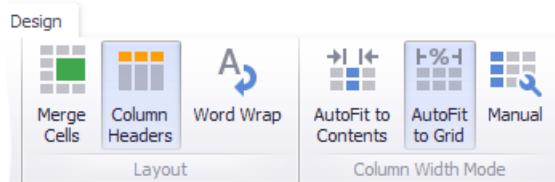
A screenshot of a Microsoft Excel-like application showing a table of product categories. A context menu is open over the 'Sum' column header, with the 'Clear Totals' option highlighted.

Category	Extended Price (Sum)	Discount (Average)
Beverages		%
Condiments		%
Confections		%
Dairy Products		%
Grains/Cereals		%
Meat/Poultry		%
Produce		%
Seafood		%
Count = 8	Max	Add Format Rule >
	Sum	Edit Rules...

# Layout

The Grid dashboard item allows you to customize its layout in various ways. You can manage the width of grid columns, specify the visibility of column headers, enable cell merging, etc.

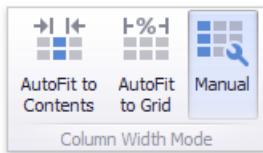
To do this, use the **Layout** and **Column Width Mode** groups in the **Design** Ribbon tab.



- [Column Width Modes](#)
- [Column Header](#)
- [Cell Merging](#)
- [Word Wrapping](#)

## Column Width Modes

The Grid dashboard item allows you to manage column widths using different modes. Use buttons in the **Column Width Mode** group to manage the column width modes.



The following modes are available.

### AutoFit to Contents

The grid adjusts columns to the minimum width required to completely display their content automatically. If the entire content cannot be displayed within the dashboard item, horizontal scrolling is enabled..

### AutoFit to Grid

The grid adjusts the width of all columns to fit their content in an optimal way. If you are changing the size of the dashboard item, the width of columns is changed proportionally..

### Manual

The grid allows you to adjust column widths manually.

In this mode, you can adjust the width of individual columns in the following ways.

- Specify the width of the required column by dragging the right edge of the column header.

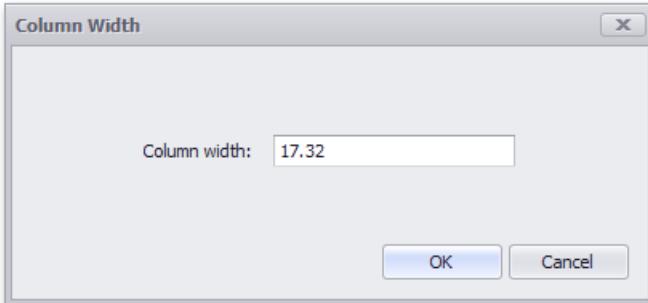
Category	Product	Extended Price (Sum)
Beverages	Côte de Blaye	\$141K
Beverages	Ipo Coffee	\$23.5K

In this case, all columns preserve their relative size when the grid width is changed.

- Specify the column width and fix it by right-clicking the required column header and selecting **Fix Width**.

Category	Product	Extended Price (Sum)
Beverages	Fit to Content	\$141K
Beverages	Fix Width	\$23.5K

You can also specify the fixed column width by selecting **Column Width...** This invokes the **Column Width** window that allows you to specify the width of the column in characters.



- Fit the column width to its content and fix it by right-clicking the required column header and selecting **Fit to Content**.

## Column Header

Use the **Column Headers** button to toggle column header visibility.

Category	Amount (Sum)
Accessories	\$247M
Bikes	\$1.21B
Clothing	\$558M
Components	\$981M



Accessories	\$247M
Bikes	\$1.21B
Clothing	\$558M
Components	\$981M

## Cell Merging

The Grid allows you to merge neighboring cells with identical values . To do this, use the **Merge Cells** button.

Category	Product	Extended Price (Sum)
Beverages	Côte de Blaye	\$141K
Beverages	Ipoх Coffee	\$23.5K
Confections	Tarte au sucre	\$47.2K
Confections	Sir Rodney's Marmalade	\$22.6K
Confections	Gumbär Gummibärchen	\$19.8K

Category	Product	Extended Price (Sum)
Beverages	Côte de Blaye	\$141K
	Ipoх Coffee	\$23.5K
Confections	Tarte au sucre	\$47.2K
	Sir Rodney's Marmalade	\$22.6K
	Gumbär Gummibärchen	\$19.8K

### NOTE

Note that **banded rows** are not available when cell merging is enabled.

## Word Wrapping

The word wrapping feature enables the capability to display cell content on multiple lines if the size of a dashboard item is

insufficient to completely display the cell content on a single line.

Category	Product	Extended Price (Sum)
Beverages	Côte de Blaye	\$141K
Beverages	Ipoh Coffee	\$23.5K

Category	Product	Extended Price (Sum)
Beverages	Côte de Blaye	\$141K
Beverages	Ipoh Coffee	\$23.5K

**NOTE**

The word wrapping feature is not in effect when the **AutoFit to Contents** column width mode is enabled.

# Style

The Grid dashboard item allows you to specify various style settings.

To do this, use the **Style** group in the **Design** Ribbon tab.



- [Grid Lines](#)
- [Banded Rows](#)

## Grid Lines

The **Horizontal Lines** and **Vertical Lines** buttons control grid line visibility.

A screenshot of a table with horizontal grid lines. The table has two columns: 'Category' and 'Amount (Sum)'. The data rows are: Accessories (\$247M), Bikes (\$1.21B), Clothing (\$558M), and Components (\$981M). A blue arrow points from the 'Horizontal Lines' button in the ribbon to the table, indicating its function.

Category	Amount (Sum)
Accessories	\$247M
Bikes	\$1.21B
Clothing	\$558M
Components	\$981M

## Banded Rows

To paint the background of odd and even rows differently, use the **Banded Rows** button.

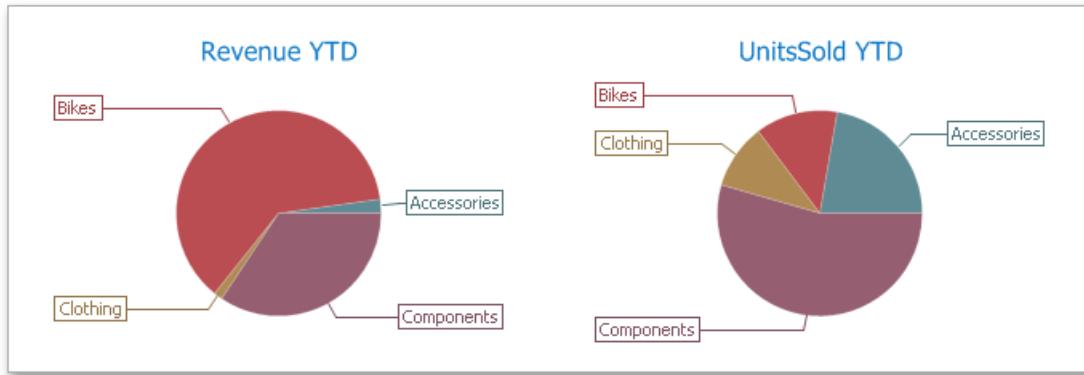
Category	Product	Extended Price (Sum)
Beverages	Côte de Blaye	\$141K
Beverages	Ipoh Coffee	\$23.5K
Confections	Tarte au sucre	\$47.2K
Confections	Sir Rodney's Marmalade	\$22.6K
Confections	Gumbär Gummibärchen	\$19.8K

### NOTE

Note that banded rows are not available when [cell merging](#) is enabled.

# Pies

The **Pie** dashboard item displays a series of pies or donuts that represent the contribution of each value to a total.



This section consists of the following subsections:

- [Providing Data](#)

Describes how to supply the Pie dashboard item with data.

- [Interactivity](#)

Describes features that enable interaction between the Pie dashboard item and other items.

- [Coloring](#)

Describes coloring capabilities of the Pie dashboard item.

- [Layout](#)

Describes layout options of the Pie dashboard item.

- [Labels](#)

Explains how to customize data labels and tooltips.

- [Style](#)

Describes how to select the style of pie charts.

# Providing Data

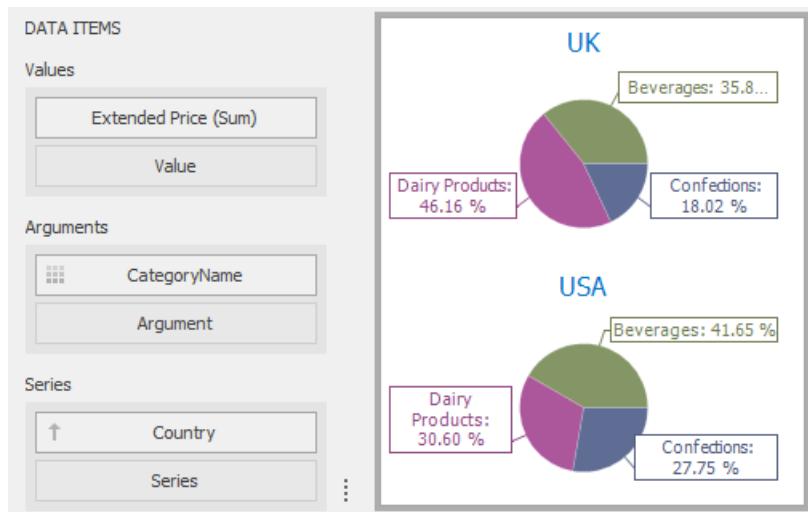
The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner. To learn more, see the [Bind Dashboard Items to Data](#) topic.

The only difference is in the data sections that the required dashboard item has. This topic describes how to bind a **Pie** dashboard item to data in the Designer.

- [Binding to Data in the Designer](#)
- [Transposing Arguments and Series](#)

## Binding to Data in the Designer

The image below shows a sample Pie dashboard item that is bound to data.

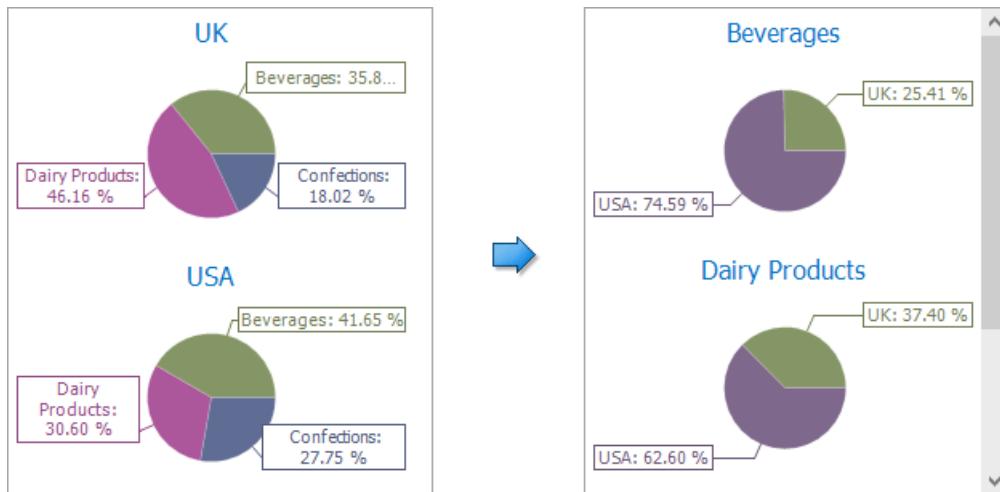


To bind the Pie dashboard item to data, drag and drop a data source field to a placeholder contained in one of the available data sections. A table below lists and describes Pie's data sections.

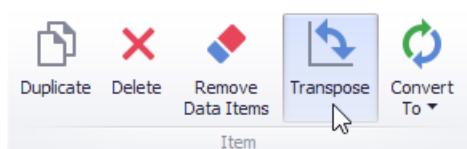
SECTION	DESCRIPTION
<b>Values</b>	Contains data items that define the share of pie segments. In case of negative measure values, Pie uses their absolute values.
<b>Arguments</b>	Contains data items that provide values used to label pie segments.
<b>Series</b>	Contains data items whose values are used to label pie charts.

## Transposing Arguments and Series

The Pie dashboard item provides the capability to transpose pie arguments and series. In this case, data items contained in the **Arguments** section are moved to the **Series** section, and vice versa.



To transpose the selected Pie dashboard item, use the **Transpose** button in the **Home** ribbon tab.



# Interactivity

This section describes features that enable interaction between the **Pie** dashboard item and other items. These features include **Master Filtering** and **Drill-Down**.

The section contains the following topics.

- [Master Filtering](#)
- [Drill-Down](#)

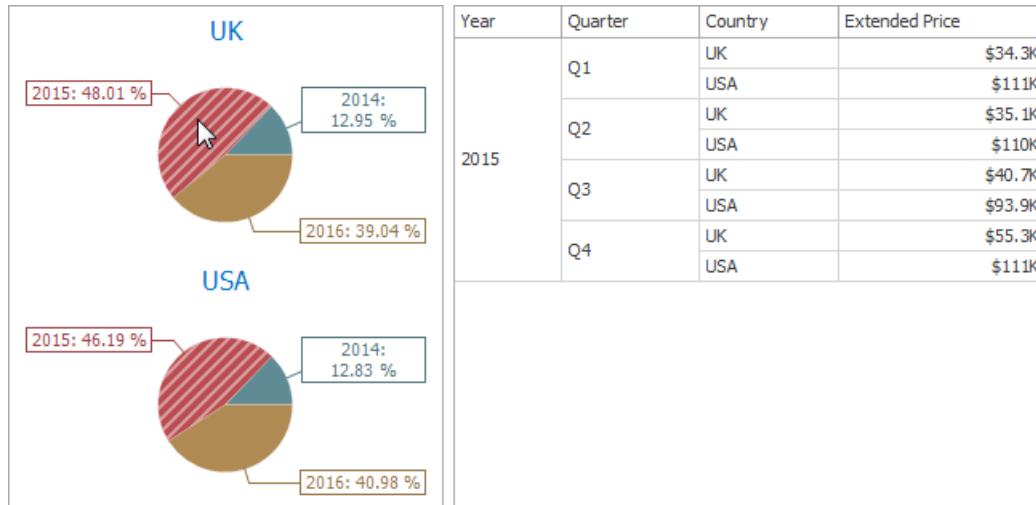
# Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

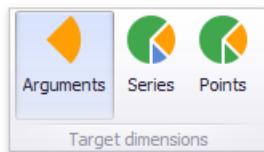
The **Pie** dashboard item supports filtering by **argument** or **series** values.

## Filtering by Arguments

When filtering by arguments is enabled, you can click a pie segment to make other dashboard items only display data related to the selected argument value.

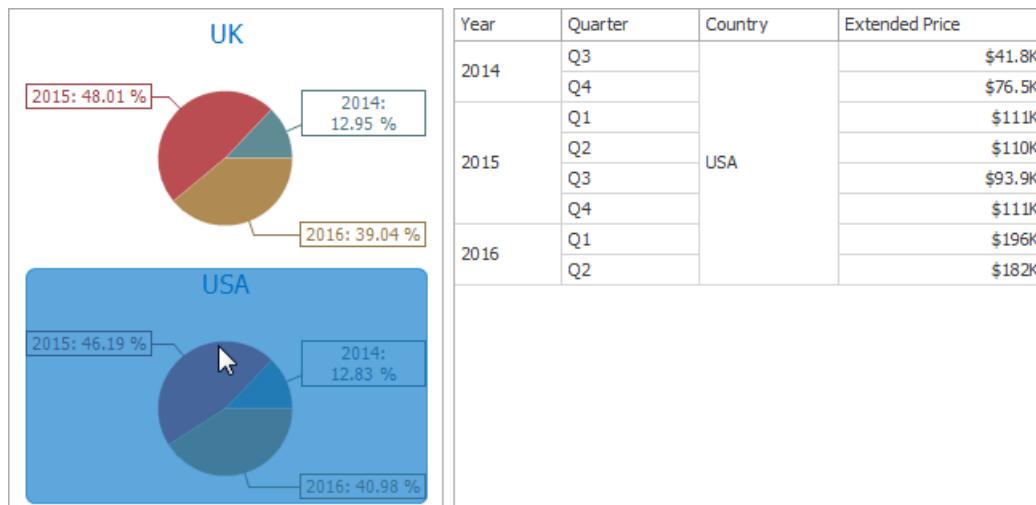


To enable filtering by arguments in the Designer, set the required [Master Filter mode](#) and click the **Arguments** button in the **Data** Ribbon tab (or the button if you are using the toolbar menu).



## Filtering by Series

When filtering by series is enabled, you can click a pie to make other dashboard items display only data related to the selected pie.

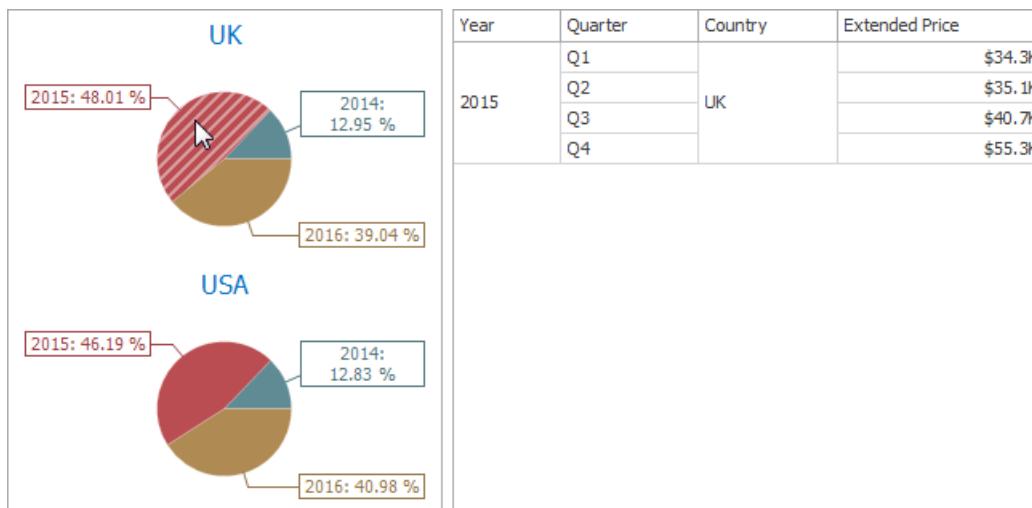


To enable filtering by series in the Designer, set the required [Master Filter mode](#) and click the **Series** button in the **Data** Ribbon tab (or the button if you are using the toolbar menu).

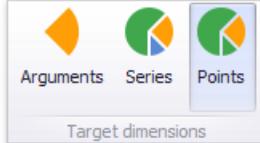


## Filtering by Points

When filtering by points is enabled, you can click a single pie segment to make other dashboard items display only data related to the selected segment.



To enable filtering by points in the Designer, set the required [Master Filter mode](#) and click the **Points** button in the **Data** Ribbon tab.



## Reset Filtering

To reset filtering, use the **Clear Master Filter** button (the icon) in the [caption](#) area of the Pie dashboard item, or the **Clear Master Filter** command in the Pie's context menu.

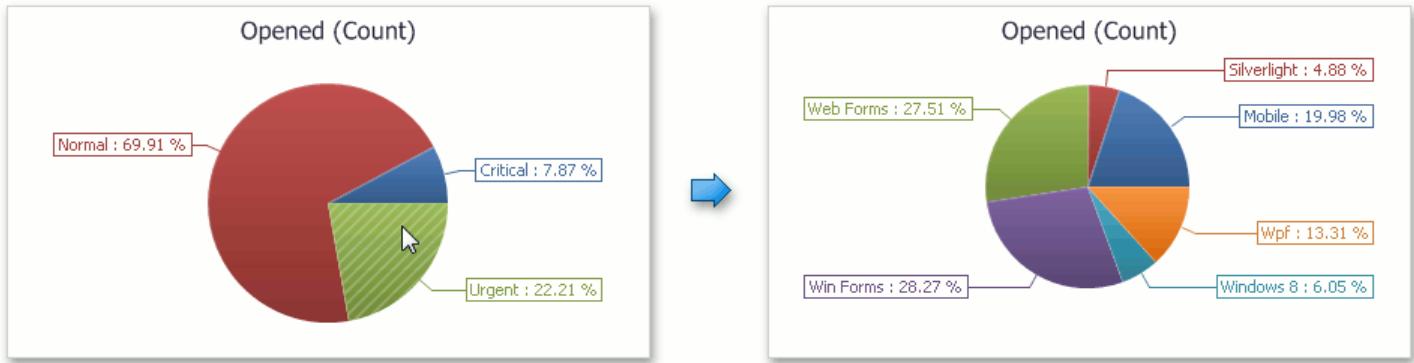
# Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more about drill-down concepts common to all dashboard items, see the [Drill-Down](#) topic.

The **Pie** dashboard item supports drill-down on **argument** or **series** values.

## Drill Down on an Argument

When drill down on an argument is enabled, you can click a pie segment to view a detail diagram for the corresponding argument value.



### **NOTE**

When [Filtering by Arguments](#) is enabled, you can view the details by double-clicking a pie segment.

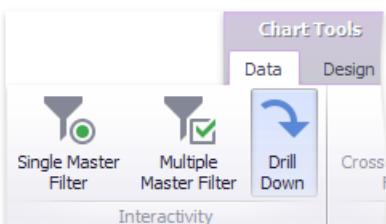
Drill down on an argument requires that the Arguments section contains several data items, from the least detailed to the most detailed item.



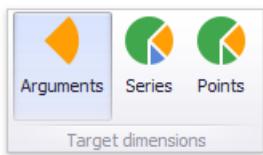
### **NOTE**

In OLAP mode, you can perform drill-down for either a hierarchy data item or several dimension attributes.

To enable drill down on an argument, click the **Drill Down** button in the **Data** Ribbon tab (or the button if you are using the toolbar menu)...

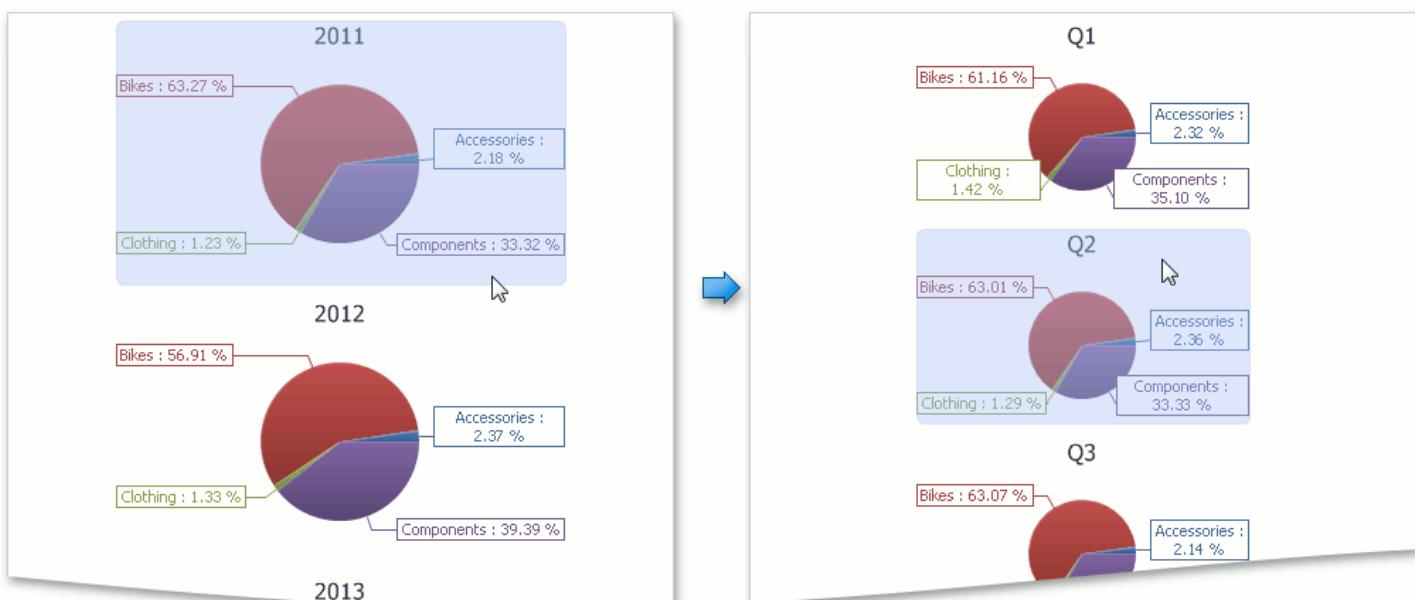


...and the **Arguments** button (or the button if you are using the toolbar menu).



## Drill Down on a Series

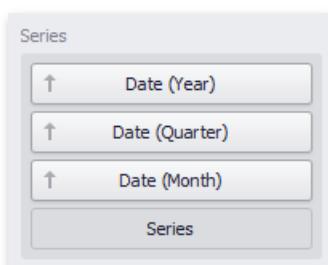
When drill down on a series is enabled, you can click a pie chart to view a detail diagram for the corresponding series value.



### **i** NOTE

When **Filtering by Series** is enabled, you can view the details by double-clicking a pie chart.

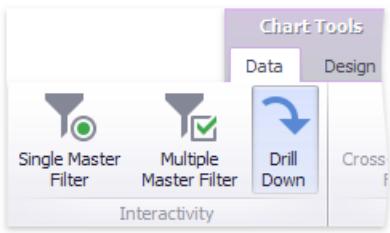
Drill down on a series requires that the Series section contains several data items, from the least detailed to the most detailed item.



### **i** NOTE

In **OLAP** mode, you can perform drill-down for either a hierarchy data item or several dimension attributes.

To enable drill down on a series, click the **Drill Down** button in the **Data** Ribbon tab (or the button if you are using the toolbar menu)...



...and the **Series** button (or the button if you are using the toolbar menu).



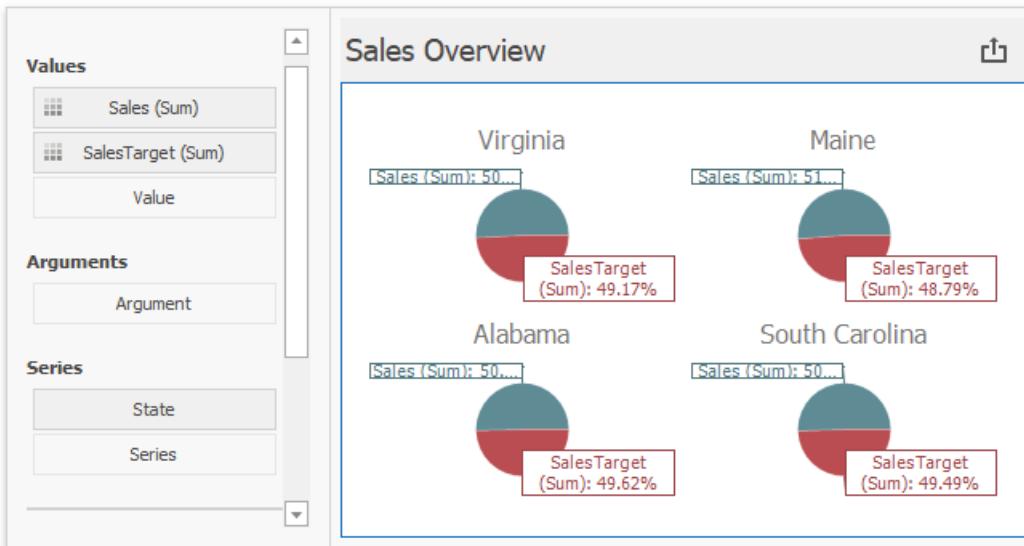
## Drill Up

To return to the previous detail level (drill up), use the **Drill Up** button (the icon) in the [caption](#) area of the Pie dashboard item, or the **Drill Up** command in the context menu.

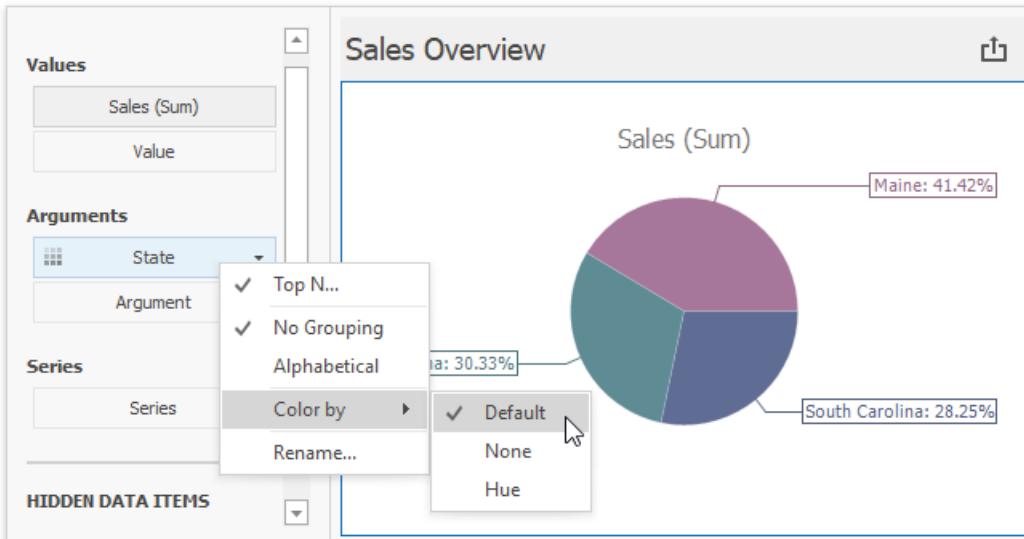
# Coloring

In **Default** color mode, the Pie dashboard item colors its segments in the following way:

- If the Pie dashboard item contains measures (the **Values** section) and series dimensions (the **Series** section), only values corresponding to different measures are colored by **hue**.



- If the Pie dashboard item contains arguments (the **Arguments** section), different argument values are colored by hue.



## i TIP

### Documentation:

- [Coloring Basics](#)

# Layout

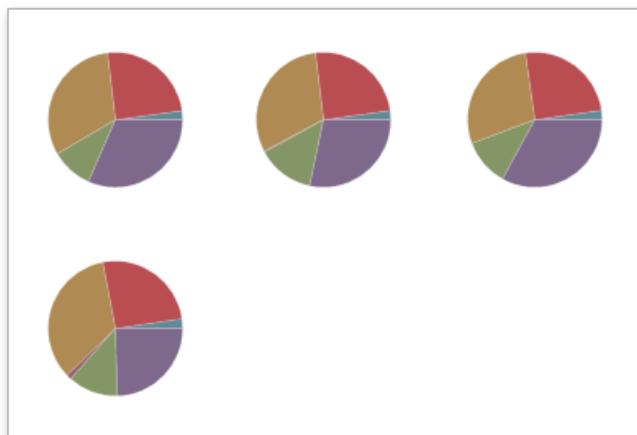
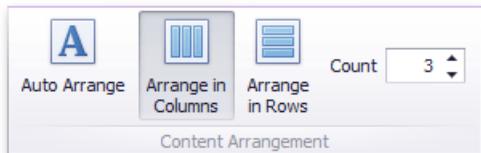
The **Pie** dashboard item allows you to specify the number of columns or rows in which individual diagrams are arranged.

To control how pies are arranged, use the buttons in the **Content Arrangement** group of the **Design** Ribbon tab.

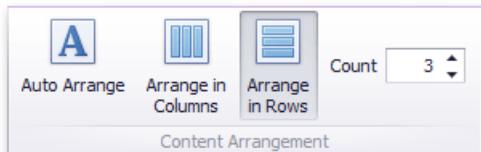
By default, the **Auto Arrange** option is enabled, which automatically resizes pies to fit within the dashboard item.



You can also specify the number of columns in which pies are arranged. Click the **Arrange in Columns** button and specify the appropriate number in the **Count** field.

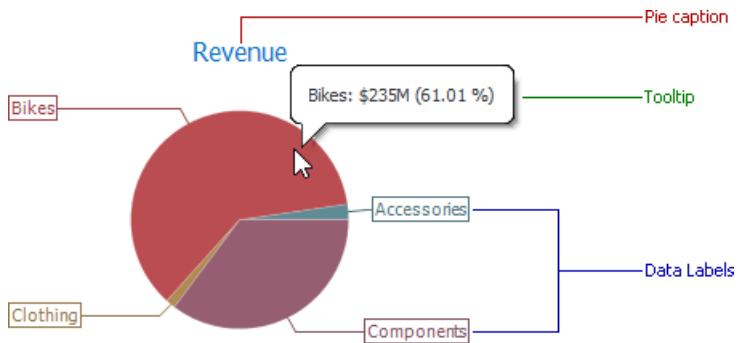


Similarly, you can arrange pies in a specific number of rows.

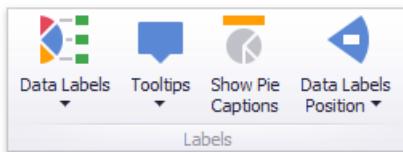




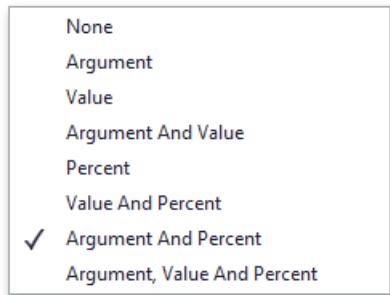
# Labels



You can specify which information should be displayed within data labels and tooltips. To do this, use the **Data Labels** and **Tooltips** buttons in the **Labels** group of the **Design** Ribbon tab.

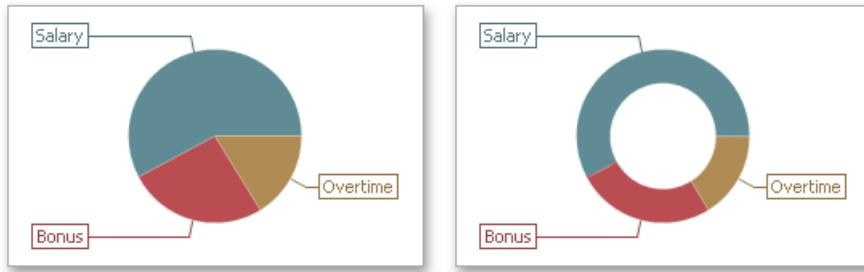


These buttons invoke a drop-down menu that is similar for both buttons. This menu allows you to specify which values are displayed within data labels or tooltips.



# Style

The **Pie** dashboard item allows you to select whether diagrams should be painted as **pies** or **donuts**.

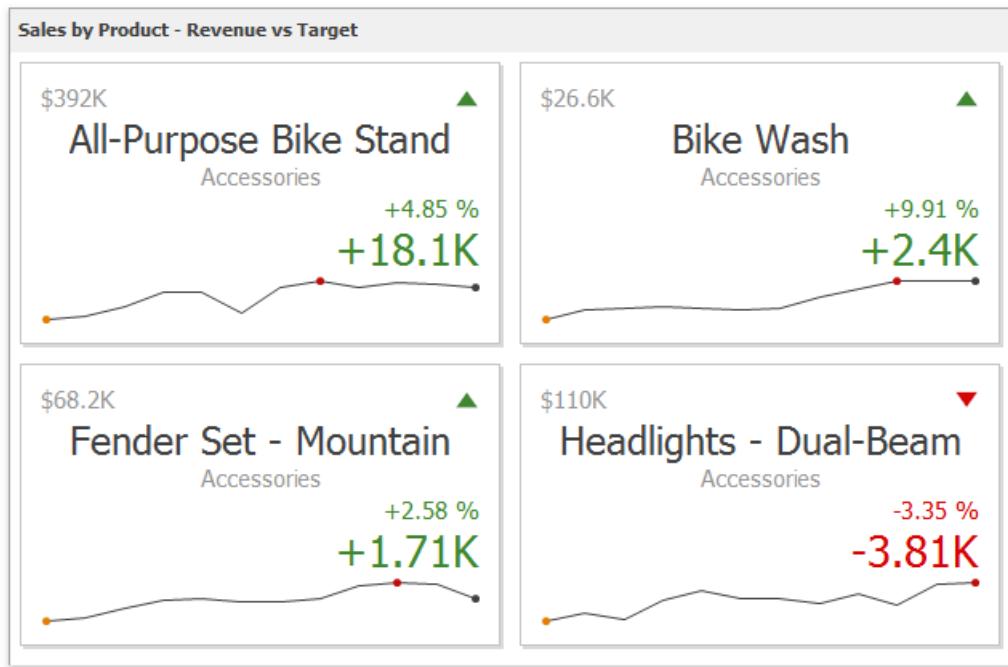


To select the diagram style, use the **Pie** and **Donut** buttons in the **Style** section of the **Design** Ribbon tab.



# Cards

The **Card** dashboard item displays a series of cards. Each card illustrates the difference between two values. This difference can be expressed as an absolute value, an absolute variation or a percentage variation.



This section consists of the following subsections:

- [Providing Data](#)  
Provides information about how to supply the Card dashboard item with data.
- [Layout](#)  
Describes how to manage the position and visibility of elements within a card.
- [Delta](#)  
Provides an overview of the Card dashboard item's capability to display the difference between two parameters.
- [Sparkline](#)  
Provides an overview of the Card dashboard item's capability to visualize data using sparklines.
- [Formatting](#)  
Shows how to format values displayed within a card.
- [Interactivity](#)  
Describes features that enable interaction between a Card dashboard item and other items.
- [Cards Arrangement](#)  
Describes how to arrange cards within a Card dashboard item.
- [Conditional Formatting](#)  
Describes how to format a Card dashboard item's elements when its values meet a specified condition.

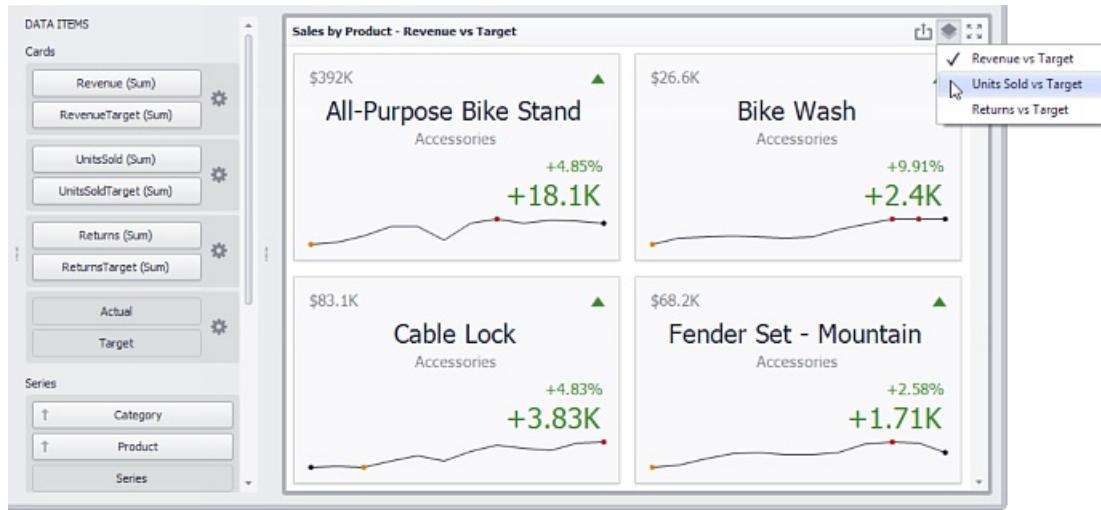
# Providing Data

The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner. To learn more, see the [Bind Dashboard Items to Data](#) topic.

The only difference is in the data sections that the required dashboard item has. This topic describes how to bind a **Card** dashboard item to data in the Designer.

## Binding to Data in the Designer

The image below shows a sample Card dashboard item that is bound to data.



To bind the Card dashboard item to data, drag and drop a data source field to a placeholder contained in one of the available data sections. A table below lists and describes Card data sections.

SECTION	DESCRIPTION
Cards	Contains data items used to calculate values displayed within cards. Data items are arranged in containers. Each <a href="#">data item container</a> can hold two data items. The first item contains <i>actual</i> data and the second item (optional) contains <i>target</i> data. If both items are provided, cards show the difference between actual and target values. You can fill several data item containers in the Cards section and use the <b>Values</b> drop-down menu to switch between the provided values. To invoke the <b>Values</b> menu, click the  icon in the dashboard item <a href="#">caption</a> or use its context menu. This drop-down menu is available if the Series section is not empty. Otherwise, a separate card is created for each data item container, and all cards are displayed simultaneously.
Series	Contains data items whose values are used to label cards.
Sparkline	Provide a dimension whose data will be used to visualize values using sparklines.

# Layout

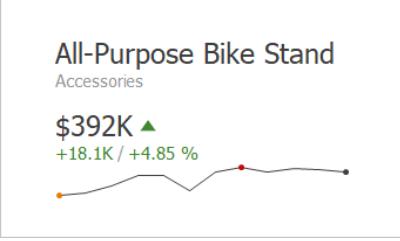
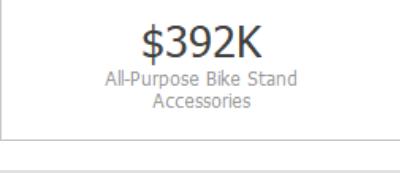
The Card dashboard item allows you to manage the position and visibility of elements displayed on cards. These elements include actual and target values, a [delta indicator](#) and [corresponding delta values](#), a [sparkline](#), etc.

To manage the position and visibility of card elements, choose a predefined layout template and customize its settings.

- [Available Layout Templates](#)
- [Default Layout](#)
- [Change Layout](#)

## Available Layout Templates

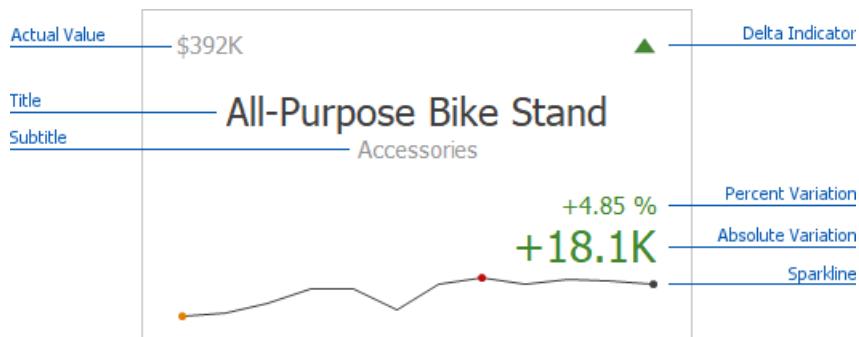
The table below contains information about the available layout templates:

LAYOUT TYPE	EXAMPLE	DESCRIPTION
Stretched		The <i>Stretched</i> layout template arranges card elements so that they occupy an entire card area.
Centered		The <i>Centered</i> layout template is used to center card elements so that they occupy a specified width/height.
Compact		The <i>Compact</i> layout template is used to arrange card elements so that they occupy the minimum area.
Lightweight		The <i>Lightweight</i> layout template displays the minimum set of elements within a card.

For all layout types, you can change the visibility of its elements, or you can specify the display value type for data-bound elements. To learn more, see the [Change Layout](#) paragraph below.

## Default Layout

The Card dashboard item uses the [Stretched](#) layout template that arranges card visual elements in the following way by default:



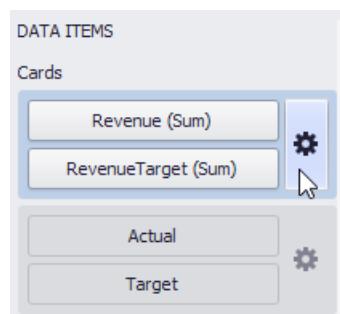
To learn more about the available value types and visual elements, see [Change Layout](#).

#### **NOTE**

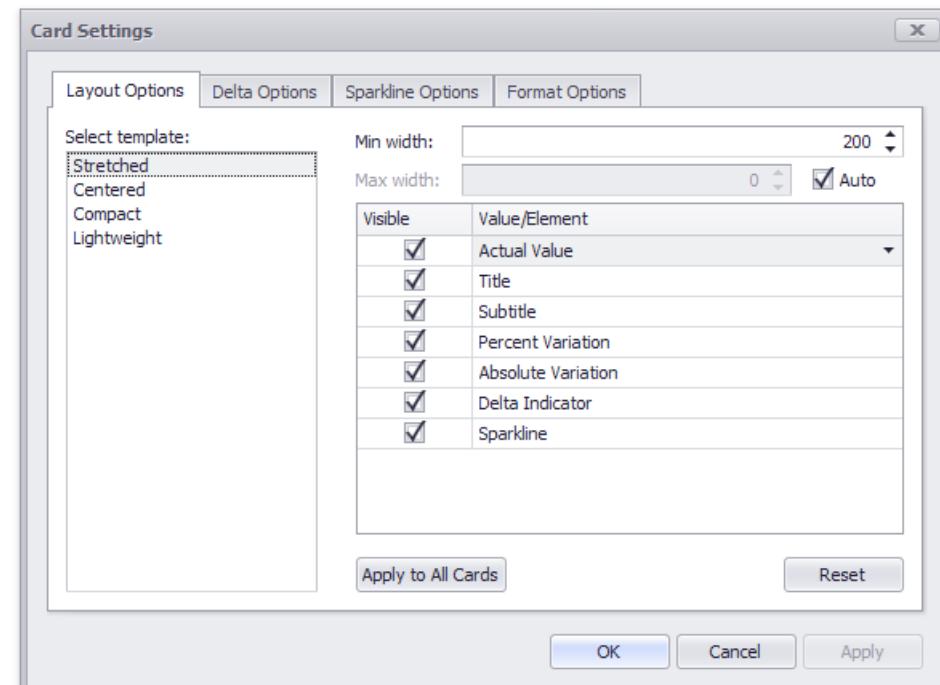
**Delta Indicator** and delta values (such as **Percent Variation** or **Absolute Variation**) are colored depending on delta settings. To learn how to manage delta settings, see [Delta](#).

## Change Layout

To change a card's layout in the Dashboard Designer, click the Options button (the icon) displayed next to the data item container in the **Cards** section.



This invokes the **Card Settings** dialog.



On the **Layout Options** tab, select the required layout type in the **Select template** list and specify its settings:

- **Min width** - Specifies the minimum width of the card content.
- **Max width** - Specifies the maximum width of the card content. Use the **Auto** option to determine the maximum width automatically.

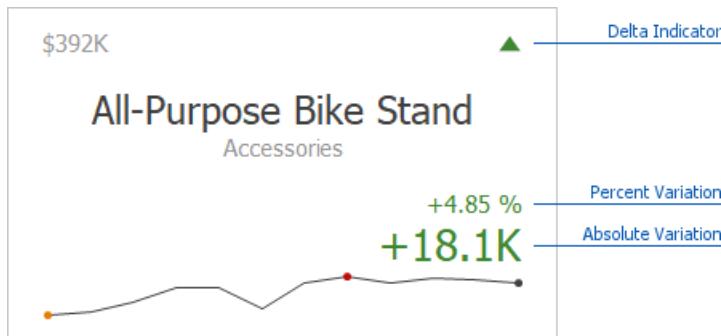
You can show/hide the following values and visual elements within the card:

Value	Description	Example
<b>Title</b>	Displays values of the last (bottommost) dimension placed in the <a href="#">Series</a> section.	<i>Microsoft Office Keyboard</i>
<b>Subtitle</b>	Displays combined values of all dimensions except the last (bottommost) dimension.	<i>Technology - Computer Peripherals</i>
<b>Absolute Variation</b>	An absolute difference between the actual and target value (see <a href="#">Delta</a> ).	+ 18.1K
<b>Actual Value</b>	A summary value for a measure placed in the <a href="#">Actual</a> placeholder.	\$392K
<b>Card Name</b>	A card name.	<i>Revenue vs. Target</i>
<b>Percent of Target</b>	A percent of a target value (see <a href="#">Delta</a> ).	104.85 %
<b>Percent Variation</b>	A percent difference between the actual and target value (see <a href="#">Delta</a> ).	4.85 %
<b>Target Value</b>	A summary value for a measure placed in the <a href="#">Target</a> placeholder.	\$374K
<b>Dimension {Name}</b>	Allows you to display values of a specific dimension placed in the <a href="#">Series</a> section.	<i>Technology</i>
Element	Description	Example
<b>Delta Indicator</b>	Indicates whether the actual value is less or greater than the target value (see <a href="#">Delta</a> ).	▲
<b>Sparkline</b>	Visualizes the variation of actual or target values. To learn more, see <a href="#">Sparkline</a> .	

Use the **Apply to All Cards** button to propagate the specified layout settings to all cards corresponding to [Actual-Target](#) pairs. The **Reset** button resets all setting to their default values.

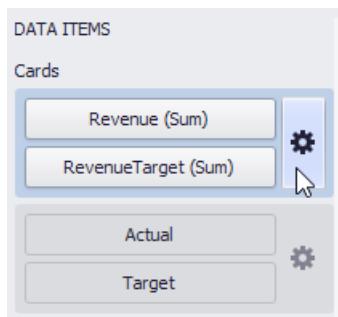
# Delta

Cards allow you to visualize the difference between the [actual and target](#) values using special delta values and a delta indicator. If the default layout is used ([Stretched layout type](#)), the card displays the following delta values/elements:

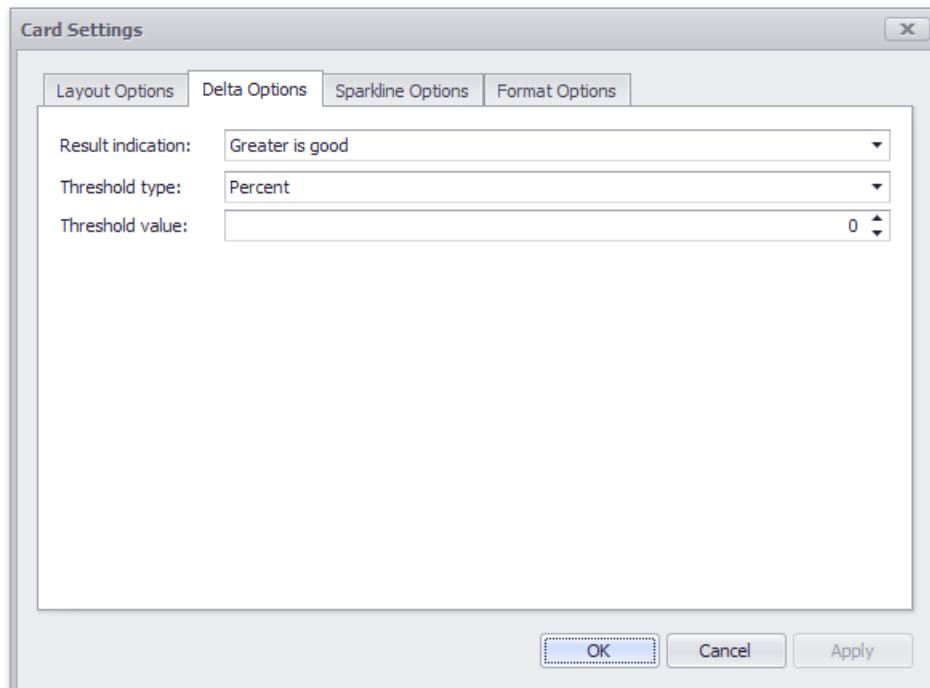


- **Delta Indicator** - Indicates whether the actual value is less or greater than the target value.
- **Percent Variation** and **Absolute Variation** - delta values that show a difference between the actual and target value. You can also display the **Percent of Target** value. To do this, customize the [card's layout](#).

To customize settings that relate to the calculation and display of delta values/elements, use the Options button (the icon) displayed next to the data item container in the [Cards](#) section.



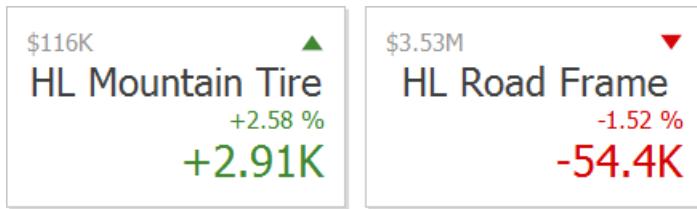
In the invoked **Card Settings** dialog, go to the **Delta Options** tab:



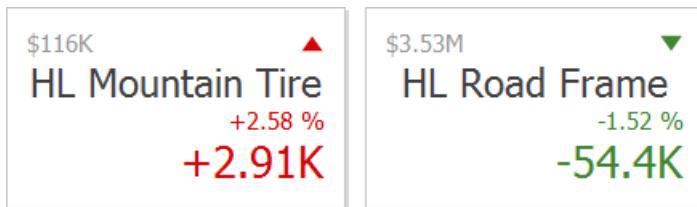
Then, specify the following settings:

- **Result Indication** - You can specify the condition for displaying delta indication.

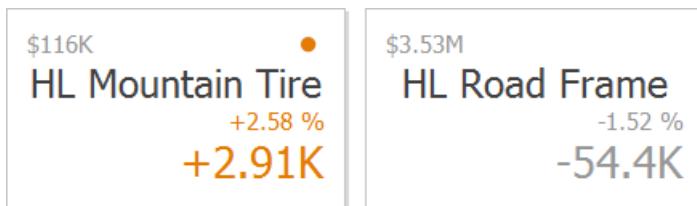
- **Greater is Good** - The 'good' indication is displayed if the actual value exceeds the target value; if the target value exceeds the actual value, the 'bad' indication displays.



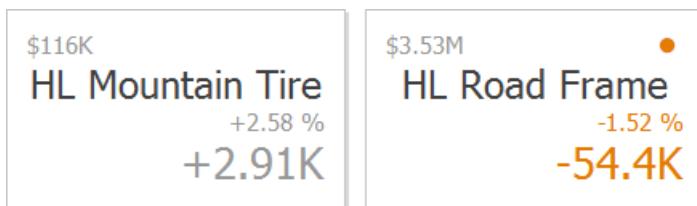
- **Less is Good** - The 'bad' indication displays if the actual value exceeds the target value; if the target value exceeds the actual value, the 'good' indication displays.



- **Warning if Greater** - A warning is displays only if the actual value exceeds the target value.



- **Warning if Less** - A warning is displays only if the target value exceeds the actual value.



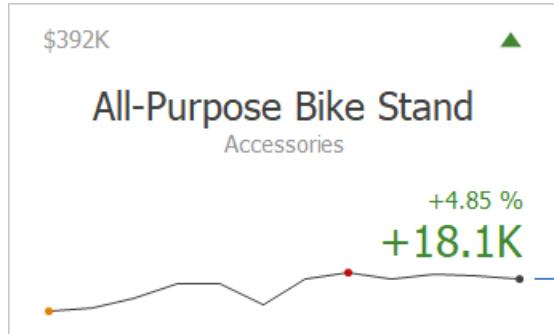
- **No Indication** - Indication does not display.



- **Threshold type / Threshold value** - For instance, you can specify that a specific indication should display when the actual value exceeds the target value by 10% or by \$2K. Use the **Threshold type** combo box to select whether you wish to specify the comparison tolerance in percentage values or absolute values. Then use the **Threshold value** box to specify the comparison tolerance.

# Sparkline

Sparklines can be used to visualize the variation of [actual or target](#) values (for instance, over time).

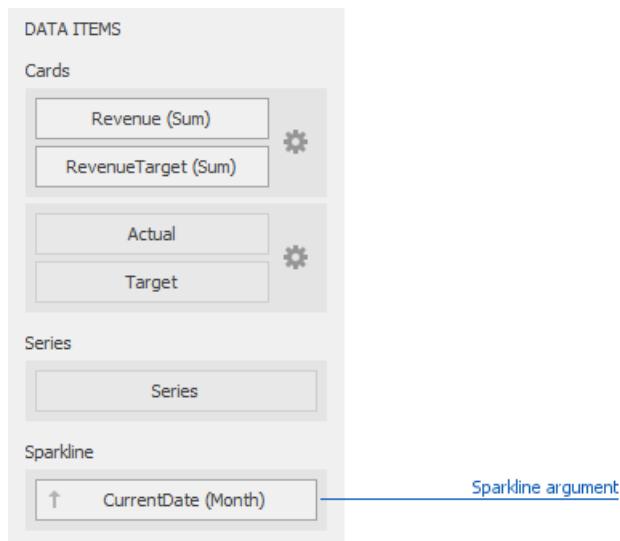


To learn how to display the sparkline for different layout types, see [Layout](#).

- [Data Binding Specifics](#)
- [Change Sparkline Options](#)

## Data Binding Specifics

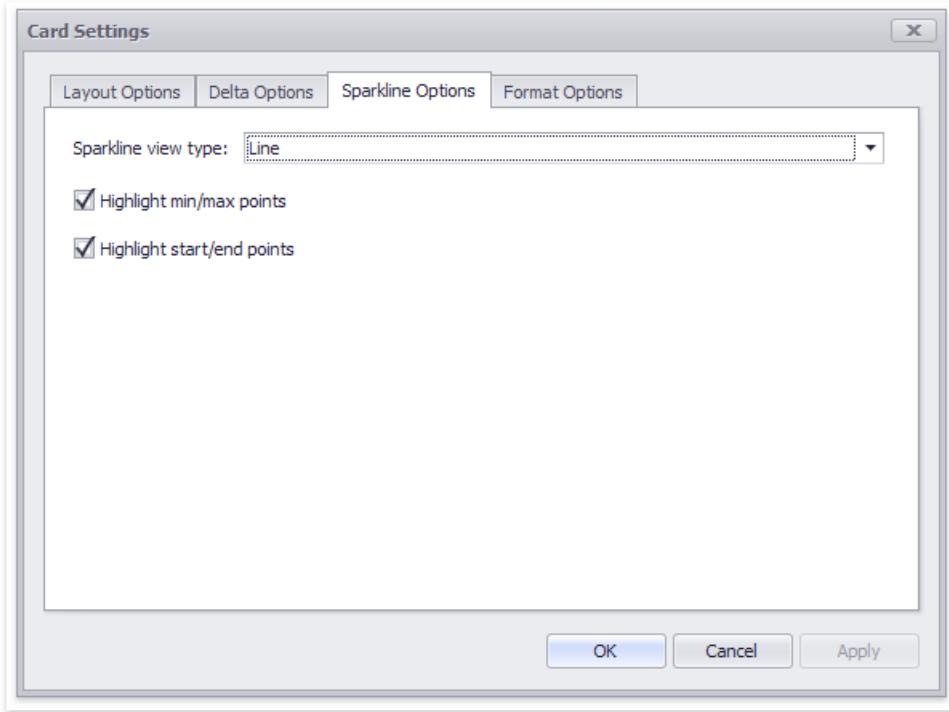
You need to provide a date-time or numeric dimension whose data is used as argument values to display a sparkline within the card.



If you have provided both actual and target values, a sparkline visualizes the actual value's variation.

## Change Sparkline Options

To manage sparkline settings, click the Options button (the gear icon) displayed next to the data item container. In the invoked **Card Settings** dialog, go to the **Sparkline Options** tab:

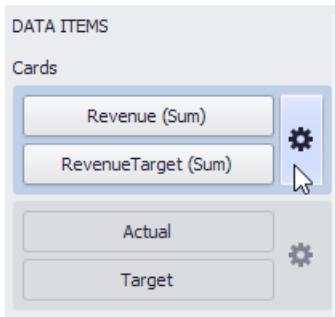


The following options are available:

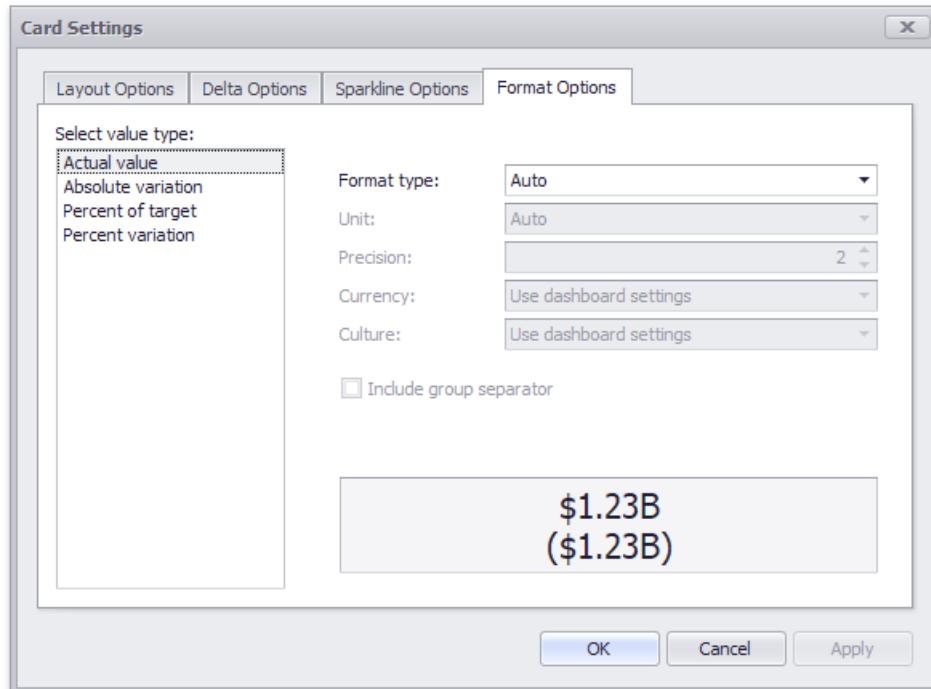
SPARKLINE OPTIONS	DESCRIPTION
Sparkline view type	Defines the sparkline's view type. Sparkline data points can be represented as <b>area</b> , <b>line</b> , <b>bars</b> , or <b>win</b> and <b>loss</b> squares.
Highlight min/max points	Specifies whether to highlight the minimum/maximum points of a sparkline.
Highlight start/end points	Specifies whether to highlight the start/end points of a sparkline.

# Formatting

The Card dashboard item formats the **actual** and **target** values displayed within cards using **format settings** specified for data items. Click the options buttons (the icon) displayed next to the data item container in the **Cards** section to change format settings for other values.



In the invoked **Card Settings** dialog, go to the **Format Options** tab and use the **Select value type** option to specify which values' format settings should change.



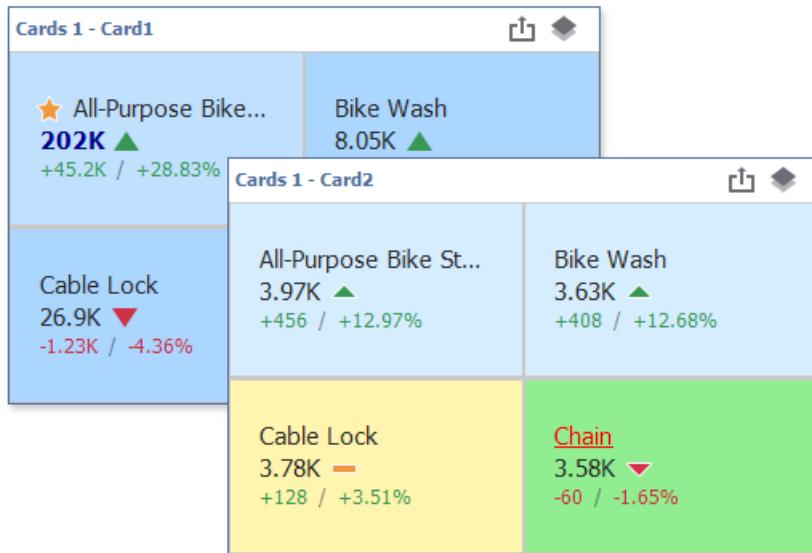
You can change format settings for the following **value types**:

- **Actual Value**
- **Target Value**
- **Absolute Variation**
- **Percent of Target**
- **Percent Variation**

To learn more about format settings, see **Formatting Numeric Values** in the [Formatting Data](#) topic.

# Conditional Formatting

For a Card dashboard item, you can apply conditional formatting to the card's visual elements (e.g., Title, Subtitle, various values) and change the card's background.



## NOTE

Cards that use a legacy layout do not support conditional formatting.

## Supported Format Rules

You can use [measure or dimension](#) values to calculate a format rule. You can also use [delta](#) values to calculate a Card dashboard item's format rules.

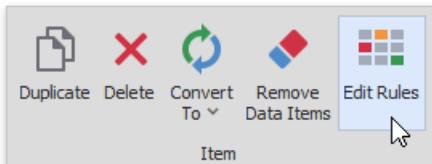
The following list contains available format rules and corresponding data types:

- numeric
  - [Value](#)
  - [Top-Bottom](#)
  - [Average](#)
  - [Expression](#)
  - [Icon Ranges](#)
  - [Color Ranges](#)
  - [Gradient Ranges](#)
- string
  - [Value](#) (with a condition type set to *Equal To*, *Not Equal To* or *Text that Contains*)
  - [Expression](#)
- date-time
  - [Value](#)
  - [A Date Occurring](#) (for dimensions with a continuous date-time group interval)
  - [Expression](#)
  - [Icon Ranges](#)
  - [Color Ranges](#)
  - [Gradient Ranges](#)

# Create a Format Rule

You can create format rules in the following ways:

- Click the **Edit Rules** button in the **Home** ribbon tab.



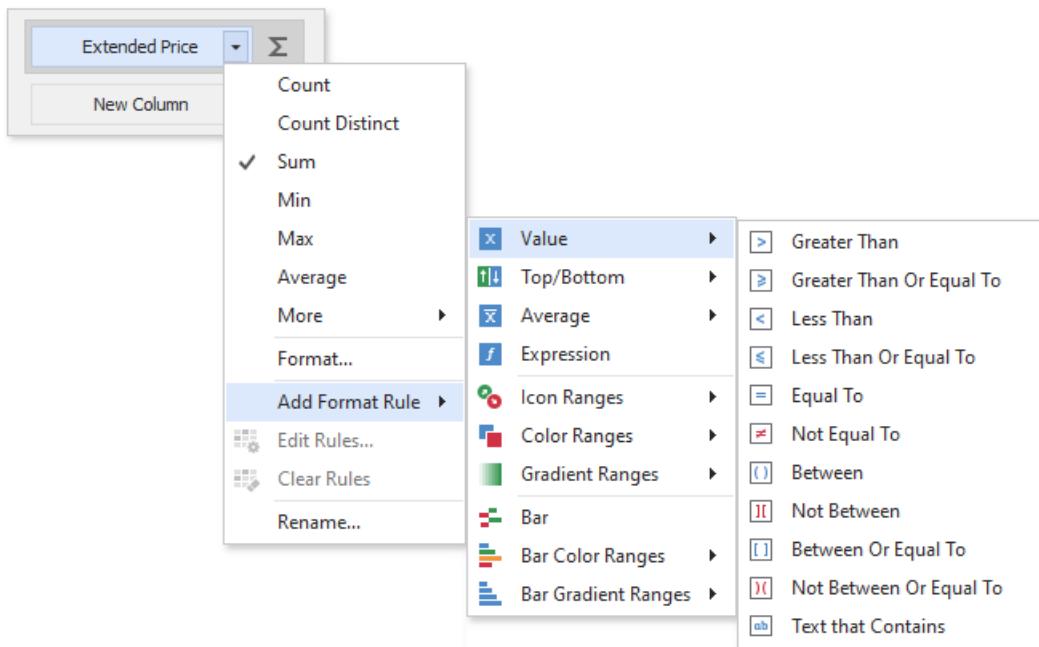
The invoked dialog contains the **calculated by** combo box, where you can select the item whose values are used to calculate the format rule.

- To apply a format rule to a specific card, use delta values to calculate the rule. The [expression](#) format condition is an exception to this rule and applies to all cards.
- To apply a format rule to all cards in a Card item, use hidden measures and series dimensions to calculate the rule.

For a Card item, the Edit Rules dialog has a **using** combo box. If you use a delta calculation, specify the delta type in this box. Click the **Add** button, select the format rule from the pop-up menu, and specify the rule's condition:

A screenshot of the 'Edit Rules' dialog box. The dialog has a header 'Edit Rules' and a close button 'X'. Below the header are buttons for 'Edit', 'Delete', and sorting arrows. A 'Filter by' dropdown is set to '[All]'. The main area is a table with columns 'Caption', 'Calculated By', and 'Applies To'. One row is selected, showing 'Greater Than (&gt;100000)' in the 'Caption' column, 'RevenueQTD' in the 'Calculated By' column, and 'Title' in the 'Applies To' column. Below the table is an 'Add' button with a dropdown arrow. The dropdown menu is open, showing various options under 'calculated by': Value, Top/Bottom, Average, Expression, Icon Ranges, Color Ranges, and Gradient Ranges. Under 'using', it shows 'RevenueQTD' and 'Absolute variation'. A list of conditions is shown below, including Greater Than, Greater Than Or Equal To, Less Than, Less Than Or Equal To, Equal To, Not Equal To, Between, Not Between, Between Or Equal To, Not Between Or Equal To, and Text that Contains.

- click the series dimension/hidden measure menu button.



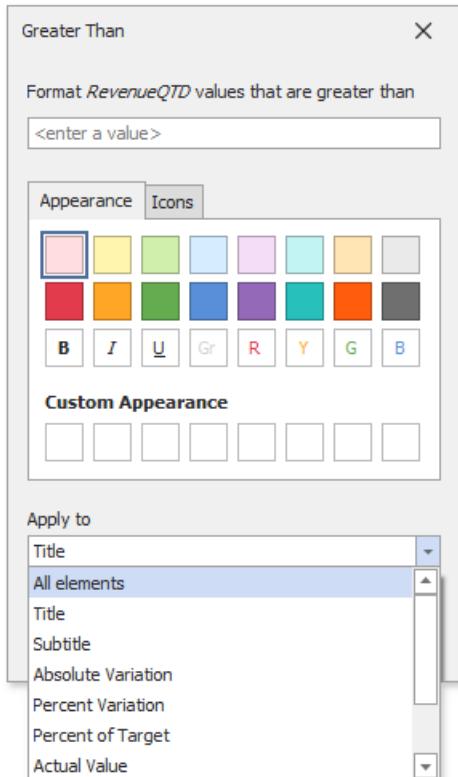
Refer to the following topic for information on how to create and edit format rules: [Conditional Formatting Common](#).

## Card-Specific Format Condition Settings

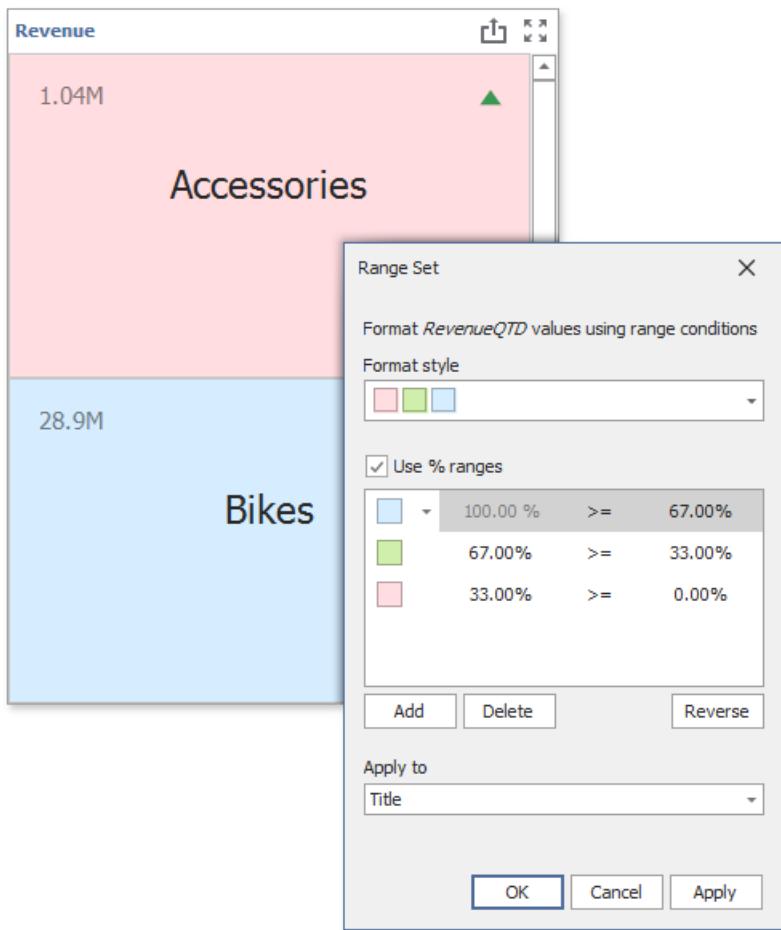
Specify appearance settings and set the condition's value for the format rule. Available settings depend on the selected format rule.

The appearance settings dialog contains the **Apply to** drop-down list. Select a [layout element](#) to which you want to apply a format rule. Select *All elements* to apply the format rule to all card elements.

The image below displays the Greater Than dialog that corresponds to the Value format condition.



The background color applies to the entire card. Note that the **Apply to** drop-down list is not in effect.



Some predefined background styles contain a font color. This font color applies to all card elements regardless of drop-down list settings (for any card layout element).

## Edit a Format Rule

To edit format rules for the current Card dashboard item, use the following options.

- Click the **Edit Rules** button in the **Home** ribbon tab or use a corresponding item in the Card context menu.
- Click the [menu button](#) for the required data item and select **Edit Rules**.

All of these actions invoke the **Edit Rules** dialog that contains existing format rules. For more information, see [Conditional Formatting](#).

# Interactivity

This section describes features that enable interaction between the **Card** dashboard item and other items. These features include **Master Filtering** and **Drill-Down**.

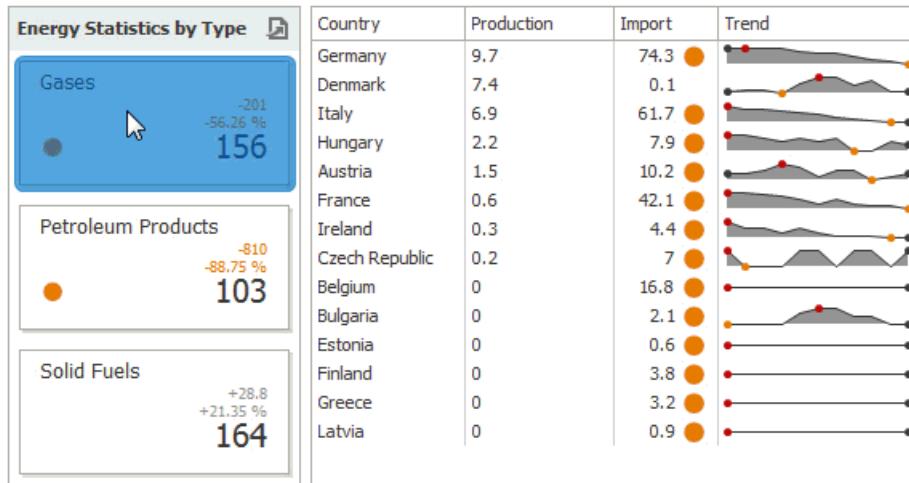
The section contains the following topics.

- [Master Filtering](#)
- [Drill-Down](#)

# Master Filtering

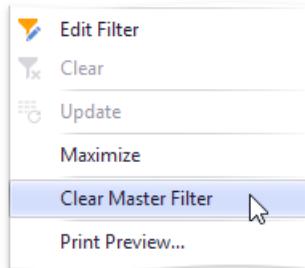
The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

When Master Filtering is enabled, you can click a card (or multiple cards by holding down the **CTRL** key) to make other dashboard items only display data related to the selected card(s).



To learn how to enable Master Filtering in the Designer, see the [Master Filtering](#) topic.

To reset filtering, use the **Clear Master Filter** button (the icon) in the **caption** of the Card dashboard item, or the **Clear Master Filter** command in the Card's context menu.



# Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more about drill-down concepts common to all dashboard items, see the [Drill-Down](#) topic.

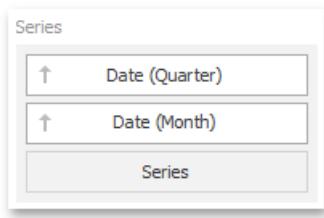
When drill-down is enabled, you can click a card to view the details.



## NOTE

When **Master Filtering** is enabled, you can view the details by double-clicking a card.

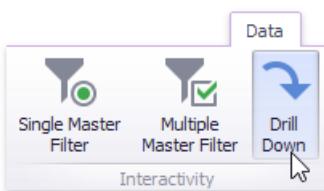
Drill-down requires that the **Series** section contains several dimensions, from the least to the most detailed dimension.



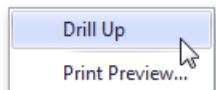
## NOTE

In **OLAP** mode, you can perform drill-down for either a hierarchy data item or several dimension attributes.

To enable drill-down, click the **Drill Down** button in the **Data** Ribbon tab (or the button if you are using the toolbar menu).



To return to the previous detail level (drill up), use the **Drill Up** button (the icon) in the **caption** of the Card dashboard item, or the **Drill Up** command in the Card's context menu.

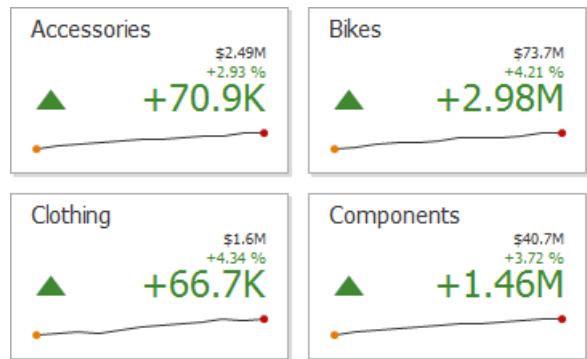


# Cards Arrangement

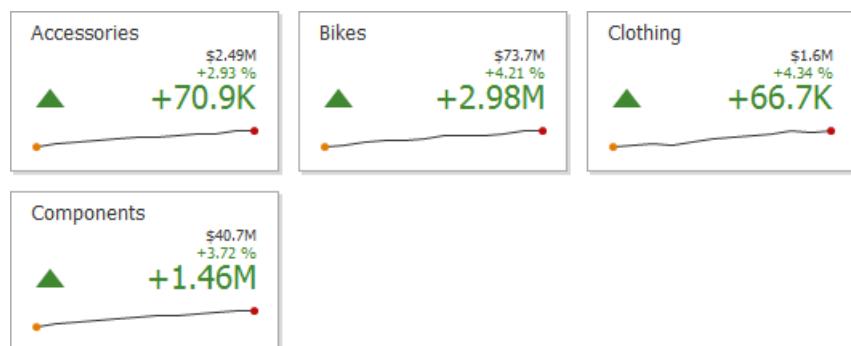
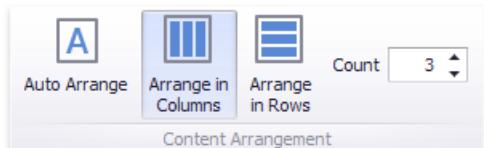
The **Card** dashboard item allows you to specify the number of columns or rows in which individual cards are arranged.

Use the buttons in the **Content Arrangement** group of the **Design** Ribbon tab to control how cards are arranged.

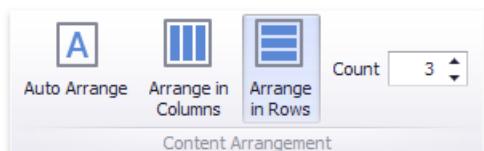
The **Auto Arrange** option is enabled by default, which automatically resizes cards to fit within the dashboard item.



You can also specify the number of columns in which cards are arranged. Click the **Arrange in Columns** button and specify the appropriate number in the **Count** field.



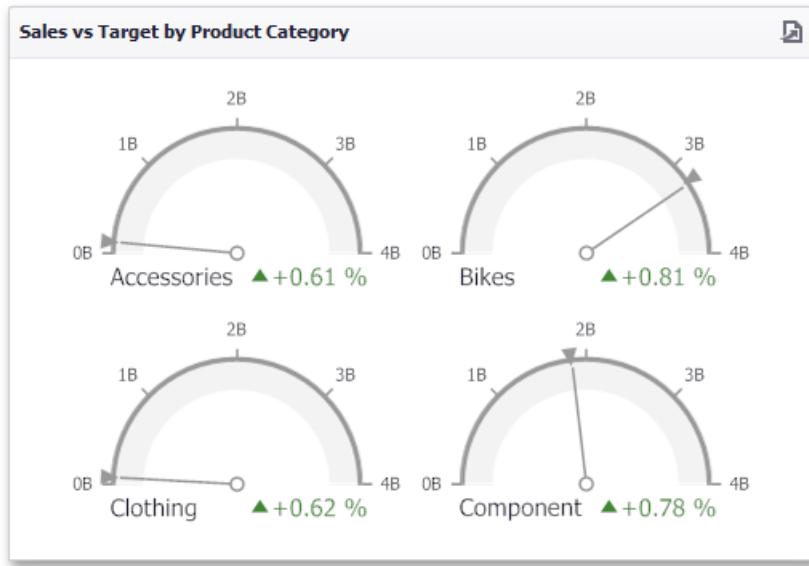
Similarly, you can arrange cards in a specific number of rows.





# Gauges

The **Gauge** dashboard item displays a series of gauges. Each gauge can communicate two values - one with a needle and the other with a marker on the scale.



This section consists of the following subsections:

- [Providing Data](#)

Provides information about how to supply the Gauge dashboard item with data.

- [Delta](#)

Provides an overview of the Gauge dashboard item's capability to display the difference between two parameters.

- [Gauge Scale](#)

Describes options that relate to the gauge scales.

- [Interactivity](#)

Describes features that enable interaction between the Gauge dashboard item and other items.

- [Layout](#)

Describes layout options of the Gauge dashboard item.

- [Style](#)

Provides information about how to specify the gauge style.

# Providing Data

The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner. To learn more, see the [Bind Dashboard Items to Data](#) topic.

The only difference is in the data sections that the required dashboard item has. This topic describes how to bind a **Gauge** dashboard item to data in the Designer.

The image below shows a sample Gauge dashboard item that is bound to data.



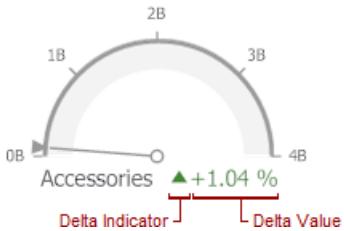
To bind the Gauge dashboard item to data, drag and drop a data source field to a placeholder contained in one of the available data sections. A table below lists and describes Gauge's data sections.

SECTION	DESCRIPTION
Gauges	Contains data items used to calculate values displayed by gauges. Data items are arranged in containers. Each <i>data item container</i> can hold two data items. The first item contains <i>actual</i> data and the second item (optional) contains <i>target</i> data. If both items are provided, gauges show the difference between actual and target values. You can fill several data item containers in the Gauges section and use the <b>Values</b> drop-down menu to switch between the provided values. To invoke the <b>Values</b> menu, click the  icon in the dashboard item caption. This drop-down menu is available if the Series section is not empty. Otherwise, a separate gauge is created for each data item container, and all gauges are displayed simultaneously.
Series	Contains data items whose values are used to label gauges.

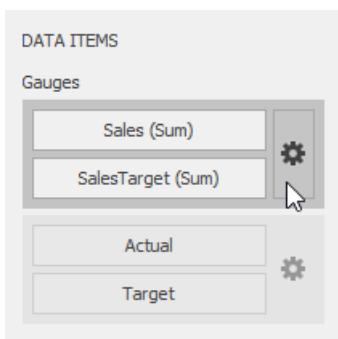
# Delta

Gauges allow you to display the difference between the *actual* and *target* values of a particular parameter. This difference is called **delta**.

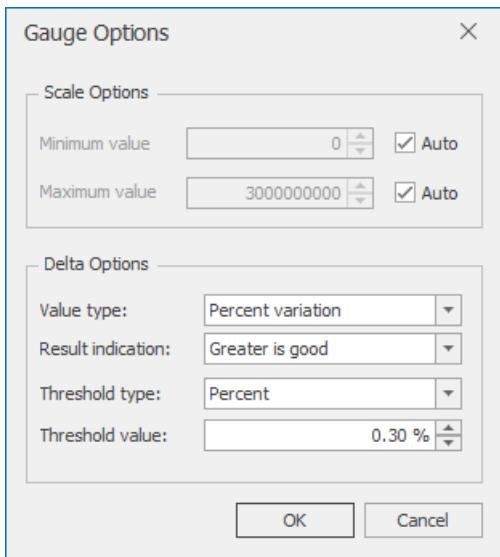
Delta is shown with a *delta indicator* (indicating whether the actual value is less than or greater than the target value) and *delta values* (representing this difference as an absolute value or a variation).



To customize settings that relate to the calculation and display of deltas, use the options buttons (the icon) displayed next to the data item container in the Gauges section of the DATA ITEMS pane.



These buttons invoke the **Gauge Options** dialog.



Use it to define the condition for displaying delta indication, specify which delta values should be displayed, and introduce the comparison tolerance.

- [Delta Values](#)
- [Delta Indication](#)
- [Comparison Tolerance](#)

## Delta Values

You can specify which values should be displayed within gauges. Use the **Value type** combo box in the **Gauge Options** window

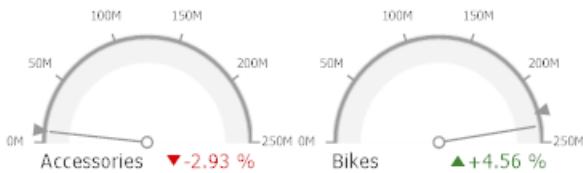
to select the value that will be displayed as the delta value.

Value Type	Result
Actual Value	<p>A gauge chart for 'Clothing' with a scale from 0M to 500M. The needle points to 21M, indicated by a green triangle and the text '\$21M'.</p>
Absolute Variation	<p>A gauge chart for 'Clothing' with a scale from 0M to 500M. The needle points to 435K, indicated by a green triangle and the text '+435K'.</p>
Percentage Variation	<p>A gauge chart for 'Clothing' with a scale from 0M to 500M. The needle points to 2.12%, indicated by a green triangle and the text '+2.12 %'.</p>
Percentage of Target	<p>A gauge chart for 'Clothing' with a scale from 0M to 500M. The needle points to 102.12%, indicated by a green triangle and the text '102.12 %'.</p>

## Delta Indication

You can specify the condition for displaying delta indication. To do this, use the **Result indication** combo box in the **Gauge Options** window.

- Greater is Good - The 'good' indication is displayed if the actual value exceeds the target value; if the target value exceeds the actual value, the 'bad' indication is displayed.



- Less is Good - The 'bad' indication is displayed if the actual value exceeds the target value; if the target value exceeds the actual value, the 'good' indication is displayed.



- No Indication - Indication is not displayed.



- Warning if Greater - A warning is displayed if the actual value exceeds the target value; otherwise, no indication is displayed.



- Warning if Less - A warning is displayed if the target value exceeds the actual value; otherwise, no indication is displayed.



## Comparison Tolerance

The comparison tolerance allows you to create more advanced conditions for displaying delta indication. For instance, you can specify that a specific indication should be displayed when the actual value exceeds the target value *by 10%* or *by \$2K*.

Use the **Threshold type** combo box to select whether you wish to specify the comparison tolerance in percentage values or in absolute values. Then use the **Threshold value** box to specify the comparison tolerance.

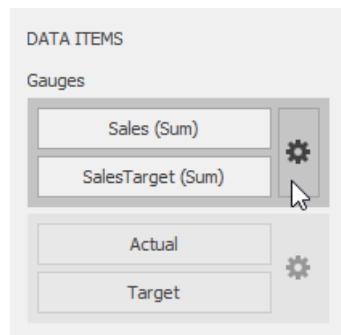
# Gauge Scale

By default, the Gauge dashboard item automatically determines the range of the gauge scales based on the values they display.

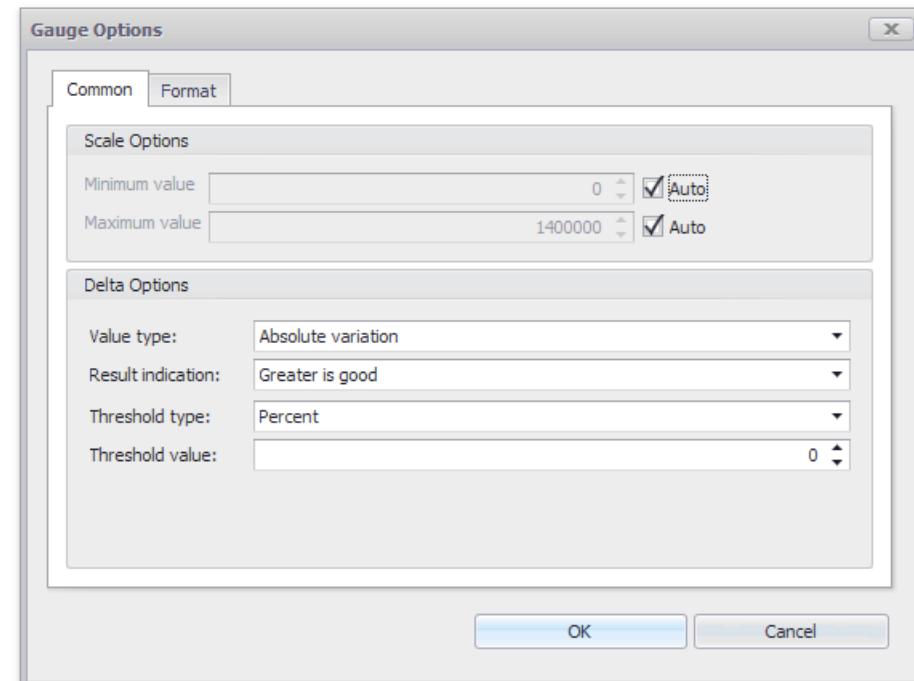


You can override this behavior and specify the maximum and minimum values on the scale.

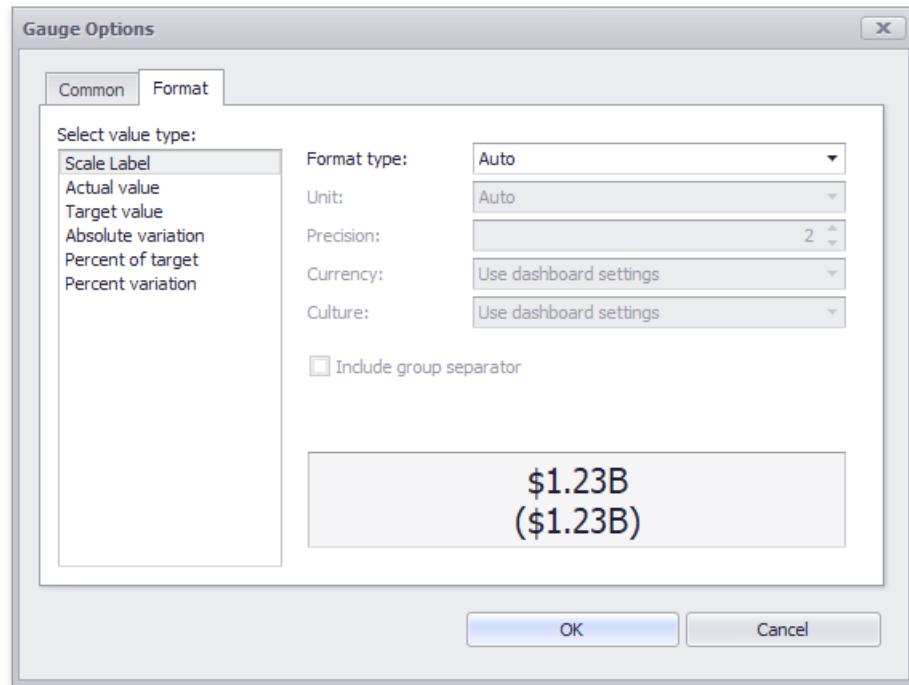
To do this, invoke the **Gauge Options** window using the **Options** button displayed in the data item container in the Gauges section of the DATA ITEMS pane.



In the **Gauge Options** window, uncheck the **Auto** check box for the maximum or minimum value, and specify this value in the corresponding field.



The **Format** tab allows you to specify the numeric display formats for different value types, as described in the [Formatting Data](#) document.



The tab contains the following settings.

- **Format type** - Specifies format types for numeric values.
- **Unit** - Specifies the unit to convert the numeric values.
- **Precision** - Specifies the number of fractional digits to display.
- **Currency** - Specifies the currency symbol and format provided by the current culture settings.
- **Culture** - Specifies the name of a culture that defines the currency symbol and format.
- **Include group separator** - Specifies whether separators should be inserted between digit groups.

# Interactivity

This section describes features that enable interaction between the **Gauge** dashboard item and other items. These features include **Master Filtering** and **Drill-Down**.

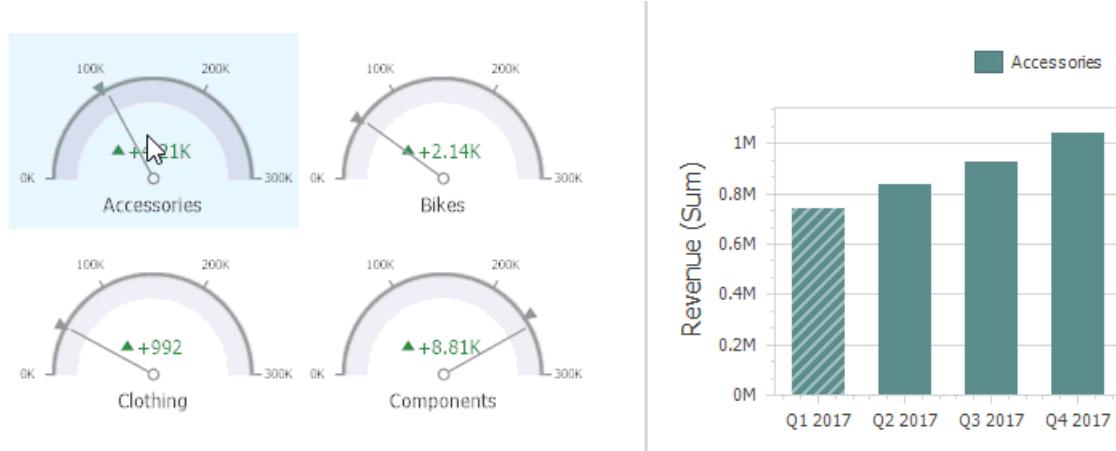
The section contains the following topics.

- [Master Filtering](#)
- [Drill-Down](#)

# Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

When master filtering is enabled, you can click a gauge (or multiple gauges by holding down the **CTRL** key) to make other dashboard items only display data related to the selected gauge(s).



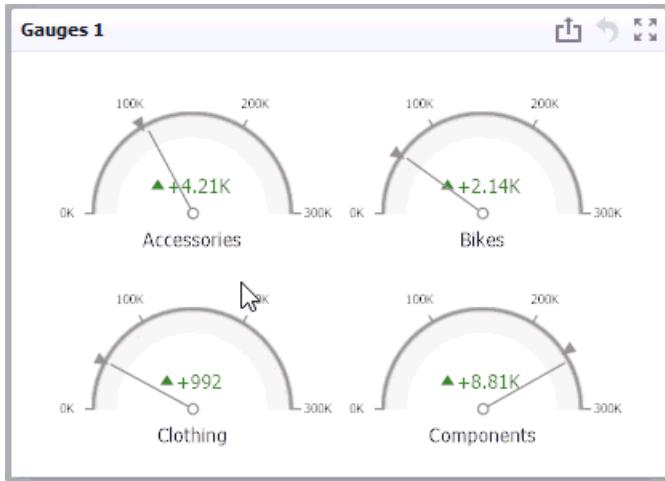
To learn how to enable master filtering in the Designer, see the [Master Filtering](#) topic.

To reset filtering, use the **Clear Master Filter** button (the icon) in the [caption](#) of the Gauge dashboard item, or the **Clear Master Filter** command in the Gauge's context menu.

# Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more about drill-down concepts common to all dashboard items, see the [Drill-Down](#) topic.

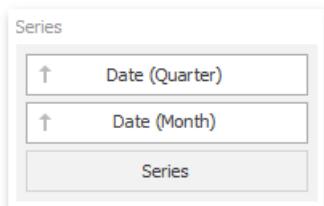
When drill-down is enabled, you can click a gauge to view the details.



## NOTE

When [Master Filtering](#) is enabled, you can view the details by double-clicking a gauge.

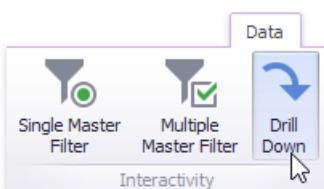
Drill-down requires that the **Series** section contains several dimensions, from the least detailed to the most detailed dimension.



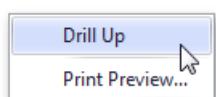
## NOTE

In **OLAP** mode, you can perform drill-down for either a hierarchy data item or several dimension attributes.

To enable drill-down, click the **Drill Down** button in the **Data** Ribbon tab (or the  button if you are using the toolbar menu).



To return to the previous detail level (drill up), use the **Drill Up** button (the  icon) in the [caption](#) of the Gauge dashboard item, or the **Drill Up** command in the Gauge's context menu.



# Layout

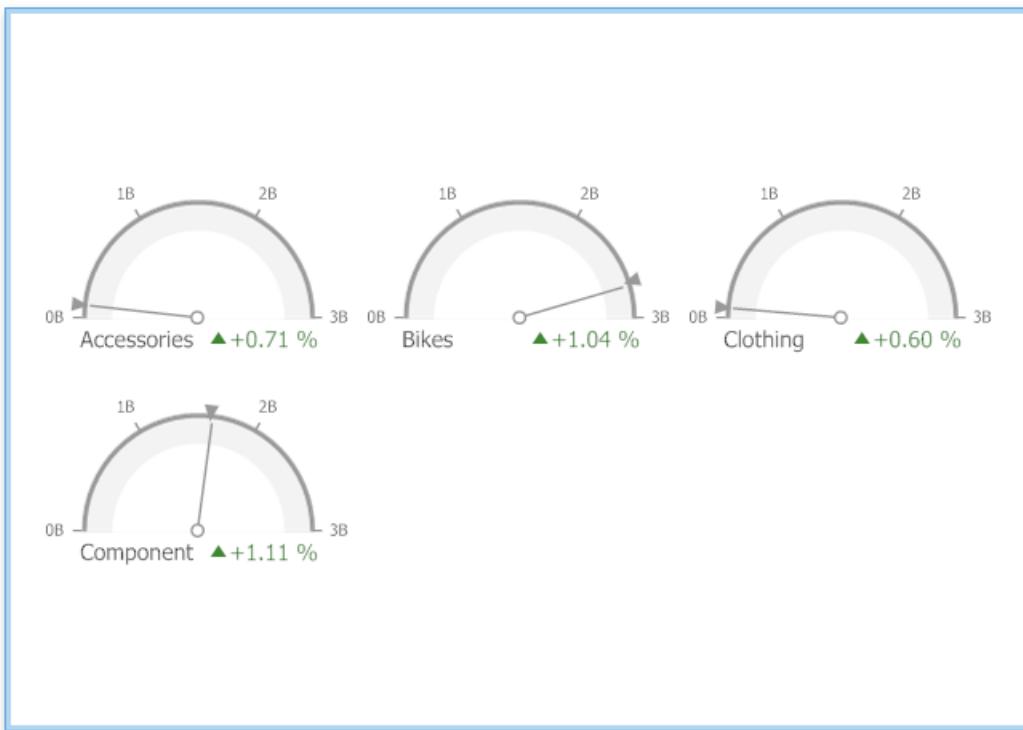
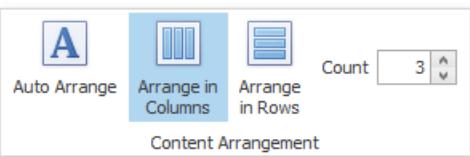
The **Gauge** dashboard item allows you to specify the number of columns or rows in which individual gauges are arranged.

To control how gauges are arranged, use the buttons in the **Content Arrangement** group of the **Design** Ribbon tab.

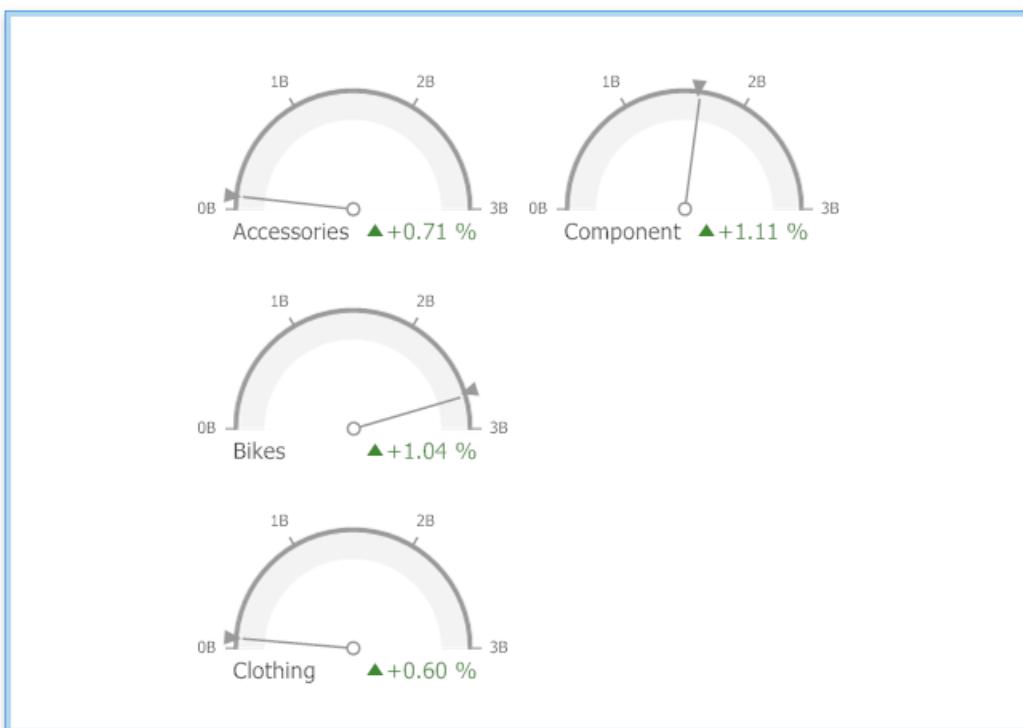
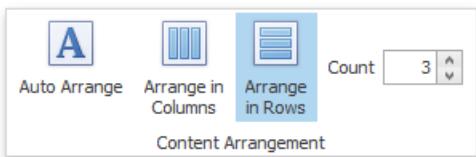
By default, the **Auto Arrange** option is enabled, which automatically resizes gauges to fit within the dashboard item.



You can also specify the number of columns in which gauges are arranged. Click the **Arrange in Columns** button and specify the appropriate number in the **Count** field.



Similarly, you can arrange pies in a specific number of rows by clicking the **Arrange in Rows** button.

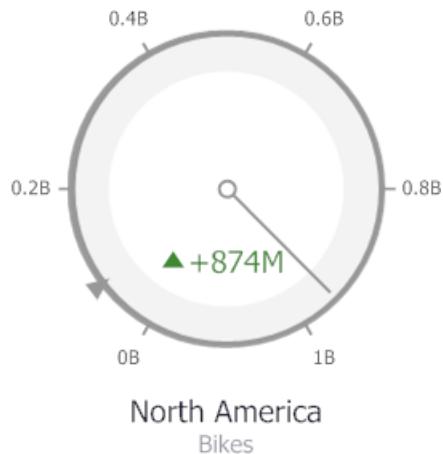


# Style

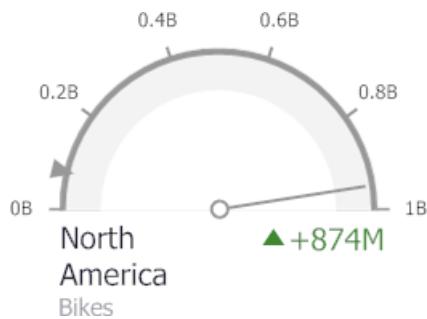
The **Gauge** dashboard item allows you to select the gauge type.

The following types are supported.

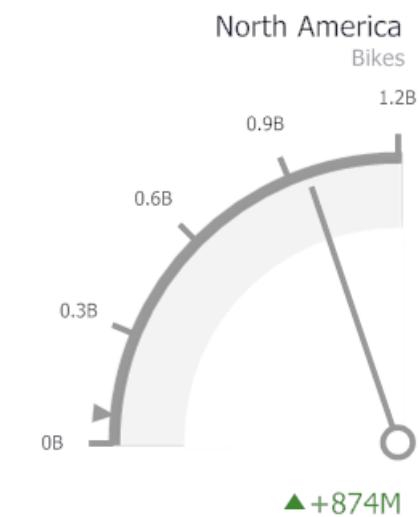
## Full Circular:



## Half Circular:

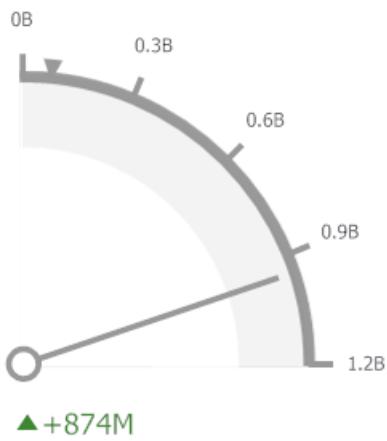


## Left-Quarter Circular:

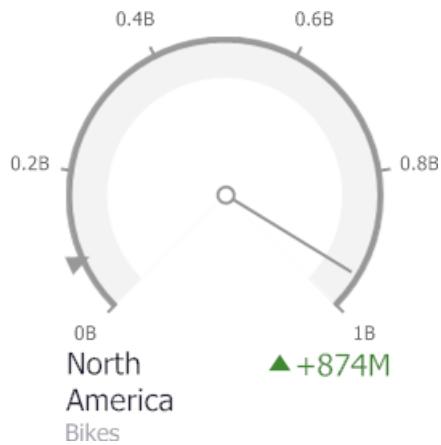


## Right-Quarter Circular:

## North America Bikes



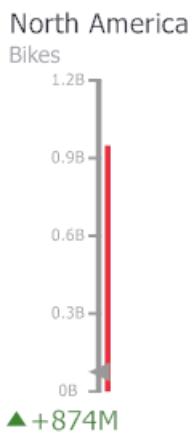
## Three-Fourths Circular



## Linear Horizontal:



## Linear Vertical:



To select the gauge type, use the buttons in the **Style** group of the **Design** Ribbon tab.



Full Circular



Half-Circular

Left-Quarter  
CircularRight-Quarter  
CircularThree-Quarter  
CircularLinear  
HorizontalLinear  
Vertical

Style

# Pivot

The **Pivot** dashboard item displays a cross-tabular report that presents multi-dimensional data in an easy-to-read format.

	Sales by State							
	Accessories		Bikes		Components		Grand Total	
	Units Sold	Revenue	Units Sold	Revenue	Units Sold	Revenue	Units Sold	Revenue
California	36.4K	\$1.18M	12K	\$18.9M	77.8K	\$15.6M	126K	\$35.7M
Washington	20.6K	\$622K	7.6K	\$11.1M	43K	\$8.64M	71.2K	\$20.3M
Texas	19.1K	\$655K	6.29K	\$9.53M	44.3K	\$8.92M	69.6K	\$19.1M
Florida	12.1K	\$383K	4.4K	\$6.86M	25.8K	\$5M	42.3K	\$12.2M
Oregon	8.51K	\$279K	3.89K	\$6.47M	19.7K	\$3.92M	32.1K	\$10.7M
Tennessee	7.9K	\$253K	3.82K	\$6.25M	19.2K	\$3.7M	30.9K	\$10.2M
Mississippi	5.46K	\$186K	3.78K	\$6.48M	13.6K	\$3.08M	22.9K	\$9.75M

This section consists of the following subsections:

- [Providing Data](#)

Explains how to supply the Pivot dashboard item with data.

- [Interactivity](#)

Describes features that enable interaction between the Pivot and other dashboard items.

- [Conditional Formatting](#)

Describes the conditional formatting feature that provides the capability to apply formatting to cells whose values meet the specified condition.

- [Layout](#)

Describes the Pivot dashboard item's layout options.

- [Expanded State](#)

Describes how to specify whether to expand column/row groups by default.

# Providing Data

The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner. To learn more, see the [Bind Dashboard Items to Data](#) topic.

The only difference is in the data sections that the required dashboard item has. This topic describes how to bind a **Pivot** dashboard item to data in the Designer.

- [Binding to Data in the Designer](#)
- [Transposing Columns and Rows](#)

## Binding to Data in the Designer

The image below shows a sample Pivot dashboard item that is bound to data.

Sales by State						
	California		Washington		Grand Total	
	Units Sold	Revenue	Units Sold	Revenue	Units Sold	Revenue
▷ Accessories	36.4K	\$1.18M	20.6K	\$622K	57K	\$1.8M
◀ Bikes Total	12K	\$18.9M	7.6K	\$11.1M	19.6K	\$29.9M
Mountain-100	1.07K	\$3.62M	600	\$2.03M	1.67K	\$5.65M
Mountain-200	1.3K	\$2.99M	672	\$1.55M	1.97K	\$4.54M
Road-150	780	\$2.79M	324	\$1.16M	1.1K	\$3.95M
Road-350-W	720	\$1.22M	348	\$592K	1.07K	\$1.82M
Road-250	396	\$968K	312	\$762K	708	\$1.73M
Mountain-300	888	\$959K	648	\$700K	1.54K	\$1.66M
Road-550-W	852	\$955K	588	\$659K	1.44K	\$1.61M
Touring-1000	420	\$1M	252	\$601K	672	\$1.6M
Mountain-500	1.37K	\$758K	1.09K	\$603K	2.46K	\$1.36M
Road-450	552	\$805K	336	\$490K	888	\$1.29M
Others	3.65K	\$2.8M	2.42K	\$1.93M	6.07K	\$4.73M
▷ Clothing	15.9K	\$763K	9.04K	\$409K	24.9K	\$1.17M
▷ Components	77.8K	\$15.6M	43K	\$8.64M	121K	\$24.2M
Grand Total	142K	\$36.4M	80.2K	\$20.7M	222K	\$57.2M

To bind the Pivot dashboard item to data, drag and drop a data source field to a placeholder contained in one of the available data sections. A table below lists and describes a Pivot's data sections.

SECTION	DESCRIPTION
Values	Contains data items used to calculate values displayed in the pivot table.
Columns	Contains data items whose values are used to label columns.
Rows	Contains data items whose values are used to label rows.

## Transposing Columns and Rows

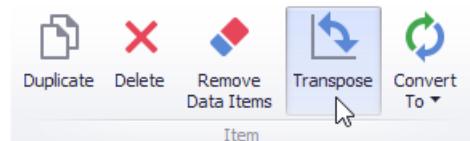
The **Pivot** dashboard item provides the capability to transpose pivot columns and rows. In this case, data items contained in the Columns section are moved to the Rows section and vice versa.

	2013	2014	2015	Grand Total
Bikes	\$72.2M	\$79.3M	\$83.6M	\$235M
Components	\$42.2M	\$45.3M	\$48.2M	\$136M
Accessories	\$2.77M	\$2.99M	\$3.15M	\$8.91M
Grand Total	\$117M	\$128M	\$135M	\$380M



	Bikes	Components	Accessories	Grand Total
2013	\$72.2M	\$42.2M	\$2.77M	\$117M
2014	\$79.3M	\$45.3M	\$2.99M	\$128M
2015	\$83.6M	\$48.2M	\$3.15M	\$135M
Grand Total	\$235M	\$136M	\$8.91M	\$380M

To transpose the selected Pivot dashboard item, use the **Transpose** button in the **Home** ribbon tab.



# Interactivity

This document describes the features that enable interaction between the **Pivot** and other dashboard items. These features include **Master Filtering**.

## Master Filtering

The Dashboard allows you to use any data-aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more, see the [Master Filtering](#) topic, which describes filtering concepts common to all dashboard items.

Data displayed in the Pivot dashboard item can be filtered by other master filter items. You can prevent the pivot from being affected by other master filter items using the **Ignore Master Filters** button on the **Data** Ribbon tab.



Interactivity s...

# Conditional Formatting

A Pivot dashboard item applies conditional formatting to cell values. You can calculate a format rule by measures placed in the **Values** section and dimensions placed in the **Columns** or **Rows** section.

## NOTE

Note that you can use [hidden measures](#) to specify a condition used to apply formatting to visible values.

Sales by State				
	> Accessories	> Bikes 	> Clothing	Grand Total
Alabama	\$192K	\$6.29M	\$111K	\$6.59M
Arizona	\$189K	\$6.11M	\$112K	\$6.41M
California 	\$1.18M	\$18.9M	\$763K	\$20.8M
Colorado	\$192K	\$6.14M	\$107K	\$6.43M
Connecticut	\$187K	\$6.07M	\$119K	\$6.38M
Florida 	\$383K	\$6.86M	\$206K	\$7.44M
Georgia	\$189K	\$6M	\$106K	\$6.3M
Idaho	\$193K	\$6.05M	\$111K	\$6.35M
Illinois	\$196K	\$5.77M	\$123K	\$6.09M

## Supported Format Rules

The following list contains available format rules and corresponding data types:

- numeric
  - [Value](#)
  - [Top-Bottom](#)
  - [Average](#)
  - [Expression](#)
  - [Icon Ranges](#)
  - [Color Ranges](#)
  - [Gradient Ranges](#)
  - [Bar](#)
  - [Bar Color Ranges](#)
  - [Bar Gradient Ranges](#)
- string
  - [Value](#) (with a condition type set to *Equal To*, *Not Equal To* or *Text that Contains*)
  - [Expression](#)
- date-time
  - [Value](#)
  - [A Date Occurring](#) (for dimensions with a continuous date-time group interval)
  - [Expression](#)
  - [Icon Ranges](#)
  - [Color Ranges](#)
  - [Gradient Ranges](#)
  - [Bar](#)
  - [Bar Color Ranges](#)
  - [Bar Gradient Ranges](#)

# Create and Edit a Format Rule

You can create and edit format rules in the following ways:

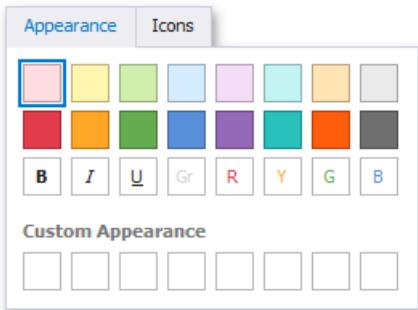
- Click the **Edit Rules** button on the **Home** ribbon tab.
- Click the measure/dimension menu button in the Data Item's pane and select **Add Format Rule/Edit Rules**.

Refer to the following topic for information on how to create and edit format rules: [Conditional Formatting Common](#).

## Pivot-Specific Format Condition Settings

You can configure and customize current format condition appearance settings.

- Choose a predefined background color/font or click an empty square to add a new preset in the **Appearance** tab.



- Add a predefined icon in the **Icons** tab.

The **Appearance** tab contains the following Pivot-specific settings:

OPTION	DESCRIPTION
<b>Enabled</b>	Enables/disables the current format rule.
<b>Intersection Mode</b>	Specifies the level at which to apply conditional formatting to pivot cells.
<b>Intersection Row/Column Dimension</b>	Applies the format rule to the specified row/column dimension, if you select the <i>Specific Level</i> as the intersection mode.
<b>Apply to Row/Column</b>	Specifies whether to apply the formatting to the Pivot item's entire row/column.

A Pivot item allows you to specify the field intersection to which a format rule is applied.

INTERSECTION LEVEL MODE	DESCRIPTION
<i>Auto</i>	Identifies the default level. For the Pivot dashboard item, <i>Auto</i> identifies the First Level.
<i>First Level</i>	The first level values are used to apply conditional formatting.
<i>Last Level</i>	The last level values are used to apply conditional formatting.
<i>All Levels</i>	All pivot data cells are used to apply conditional formatting.
<i>Specific Level</i>	The specified measures/dimensions are used to apply conditional formatting.

The image below displays different intersection levels with the applied conditional format rule:

Sales by State		Bikes			Clothing			
		2016	2017	2018	Mountain-100 Total	Mountain-200	Bikes Total	Clothing
Alabama		406K	569K	691K	1.67M	831K	2.5M	13.5K
Arizona		406K	488K	610K	1.51M	914K	2.42M	13.5K
California		1.22M	1.14M	1.26M	3.62M	2.99M	6.61M	104K
Colorado		406K	488K	488K	1.38M	886K	2.27M	15.3K
Connecticut		406K	447K	528K	1.38M	969K	2.35M	18.9K
Illinois		406K	406K	406K	1.22M	886K	2.11M	16.2K
Indiana		406K	488K	447K	1.34M	886K	2.23M	26.1K
Kentucky		406K	406K	528K	1.34M	914K	2.26M	14.4K
Maine		406K	487K	447K	1.34M	858K	2.2M	15.3K
Massachusetts		406K	406K	406K	1.22M	831K	2.05M	13.5K
Michigan		406K	447K	488K	1.34M	831K	2.17M	25.2K
<b>Grand Total</b>		<b>5.28M</b>	<b>5.77M</b>	<b>6.3M</b>	<b>17.4M</b>	<b>11.8M</b>	<b>29.2M</b>	<b>276K</b>

█ First level   
 █ Last level   
 █ Specific level: Product / [Grand Total]

To apply a format rule to the row or column Grand Total, change the **Intersection Level Mode** to *Specific level* and set the *[Grand Total]* value as the intersection row/column dimension.

Note the following limitations:

1. The dashboard cannot calculate conditional formatting in a Pivot item for multiple range levels with *percentage* values. In this case, the "All Levels" intersection mode is not available for a conditional formatting rule.
2. The format condition dialog does not contain any Pivot-specific settings for a dimension from **Columns** and **Rows**.

# Layout

This topic describes how to control the Pivot dashboard item layout, the visibility of totals and grand totals, etc.

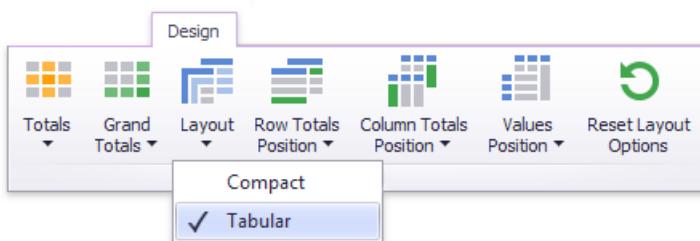
- [Layout Type](#)
- [Totals Visibility](#)
- [Totals Position](#)
- [Values Visibility](#)
- [Values Position](#)
- [Reset Layout Options](#)

## Layout Type

If the Pivot dashboard item contains a hierarchy of dimensions in the [Rows](#) section, you can specify the layout used to arrange values corresponding to individual groups.

LAYOUT TYPE	EXAMPLE	DESCRIPTION																																												
Compact	<table border="1"><thead><tr><th colspan="2"></th><th>Grand Total</th><th></th></tr><tr><th colspan="2"></th><th>Extended Price (Sum)</th><th>Quantity (Sum)</th></tr></thead><tbody><tr><td colspan="2">▲ 2015 Total</td><td>\$617K</td><td>25.5K</td></tr><tr><td colspan="2">Q1</td><td>\$138K</td><td>6.3K</td></tr><tr><td colspan="2">Q2</td><td>\$143K</td><td>5.71K</td></tr><tr><td colspan="2">Q3</td><td>\$154K</td><td>6.26K</td></tr><tr><td colspan="2">Q4</td><td>\$182K</td><td>7.22K</td></tr><tr><td colspan="2">▲ 2016 Total</td><td>\$441K</td><td>16.2K</td></tr><tr><td colspan="2">Q1</td><td>\$298K</td><td>10.6K</td></tr><tr><td colspan="2">Q2</td><td>\$142K</td><td>5.6K</td></tr><tr><td colspan="2">Grand Total</td><td>\$1.06M</td><td>41.7K</td></tr></tbody></table>			Grand Total				Extended Price (Sum)	Quantity (Sum)	▲ 2015 Total		\$617K	25.5K	Q1		\$138K	6.3K	Q2		\$143K	5.71K	Q3		\$154K	6.26K	Q4		\$182K	7.22K	▲ 2016 Total		\$441K	16.2K	Q1		\$298K	10.6K	Q2		\$142K	5.6K	Grand Total		\$1.06M	41.7K	Displays values from different Row dimensions in a single column. Note that in this case totals are shown at the top of a group, and you cannot change <a href="#">totals position</a> .
		Grand Total																																												
		Extended Price (Sum)	Quantity (Sum)																																											
▲ 2015 Total		\$617K	25.5K																																											
Q1		\$138K	6.3K																																											
Q2		\$143K	5.71K																																											
Q3		\$154K	6.26K																																											
Q4		\$182K	7.22K																																											
▲ 2016 Total		\$441K	16.2K																																											
Q1		\$298K	10.6K																																											
Q2		\$142K	5.6K																																											
Grand Total		\$1.06M	41.7K																																											
Tabular	<table border="1"><thead><tr><th colspan="2"></th><th>Grand Total</th><th></th></tr><tr><th colspan="2"></th><th>Extended Price (Sum)</th><th>Quantity (Sum)</th></tr></thead><tbody><tr><td colspan="2">▲ 2015</td><td>Q1</td><td>\$138K 6.3K</td></tr><tr><td colspan="2"></td><td>Q2</td><td>\$143K 5.71K</td></tr><tr><td colspan="2"></td><td>Q3</td><td>\$154K 6.26K</td></tr><tr><td colspan="2"></td><td>Q4</td><td>\$182K 7.22K</td></tr><tr><td colspan="2">2015 Total</td><td></td><td>\$617K 25.5K</td></tr><tr><td colspan="2">▲ 2016</td><td>Q1</td><td>\$298K 10.6K</td></tr><tr><td colspan="2"></td><td>Q2</td><td>\$142K 5.6K</td></tr><tr><td colspan="2">2016 Total</td><td></td><td>\$441K 16.2K</td></tr><tr><td colspan="2">Grand Total</td><td></td><td>\$1.06M 41.7K</td></tr></tbody></table>			Grand Total				Extended Price (Sum)	Quantity (Sum)	▲ 2015		Q1	\$138K 6.3K			Q2	\$143K 5.71K			Q3	\$154K 6.26K			Q4	\$182K 7.22K	2015 Total			\$617K 25.5K	▲ 2016		Q1	\$298K 10.6K			Q2	\$142K 5.6K	2016 Total			\$441K 16.2K	Grand Total			\$1.06M 41.7K	Displays values from different Row dimensions in separate columns.
		Grand Total																																												
		Extended Price (Sum)	Quantity (Sum)																																											
▲ 2015		Q1	\$138K 6.3K																																											
		Q2	\$143K 5.71K																																											
		Q3	\$154K 6.26K																																											
		Q4	\$182K 7.22K																																											
2015 Total			\$617K 25.5K																																											
▲ 2016		Q1	\$298K 10.6K																																											
		Q2	\$142K 5.6K																																											
2016 Total			\$441K 16.2K																																											
Grand Total			\$1.06M 41.7K																																											

Use the **Layout** button in the **Design** ribbon tab to change the Pivot layout.



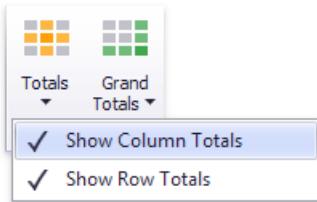
## Totals Visibility

You can control the visibility of totals and grand totals for the entire Pivot dashboard item. For instance, the image below displays the Pivot dashboard item with the disabled row totals.



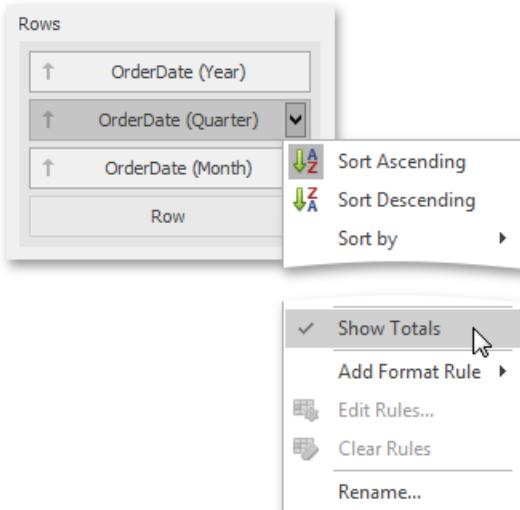
		Grand Total	
		Extended Price (Sum)	Quantity (Sum)
▲ 2015	Q1	\$138K	6.3K
	Q2	\$143K	5.71K
	Q3	\$154K	6.26K
	Q4	\$182K	7.22K
	2015 Total	\$617K	25.5K
▲ 2016	Q1	\$298K	10.6K
	Q2	\$142K	5.6K
	2016 Total	\$441K	16.2K
Grand Total		\$1.06M	41.7K

To manage the visibility of totals and grand totals, use the **Totals** and **Grand Totals** buttons in the **Design** ribbon tab, respectively.



These buttons invoke a popup menu that allows you to manage the visibility of column and row totals/grand totals separately.

Moreover, you can control the visibility of totals for individual dimensions/measures by using the data item's context menu (**Show Totals** and **Show Grand Totals** options).



## Totals Position

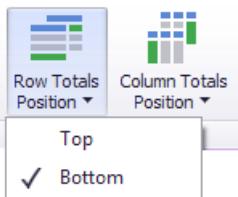
If necessary, you can change the Pivot dashboard item's totals/grand totals position. For instance, in the image below the row totals are moved from the bottom to the top.



		Grand Total	
		Extended Price (Sum)	Quantity (Sum)
▲ 2015	Q1	\$138K	6.3K
	Q2	\$143K	5.71K
	Q3	\$154K	6.26K
	Q4	\$182K	7.22K
	2015 Total	\$617K	25.5K
▲ 2016	Q1	\$298K	10.6K
	Q2	\$142K	5.6K
	2016 Total	\$441K	16.2K
Grand Total		\$1.06M	41.7K

		Grand Total	
		Extended Price (Sum)	Quantity (Sum)
Grand Total		\$1.06M	41.7K
2015 Total		\$617K	25.5K
2015	Q1	\$138K	6.3K
	Q2	\$143K	5.71K
	Q3	\$154K	6.26K
	Q4	\$182K	7.22K
2016 Total		\$441K	16.2K
2016	Q1	\$298K	10.6K
	Q2	\$142K	5.6K

To manage totals position, use the **Row Totals Position** and **Column Totals Position** buttons in the **Design** ribbon tab.



## Values Visibility

The Pivot dashboard item can contain several measures in the **Values** section to hide summary values corresponding to specific measures. For instance, the image below shows the Pivot with hidden *Quantity* values.

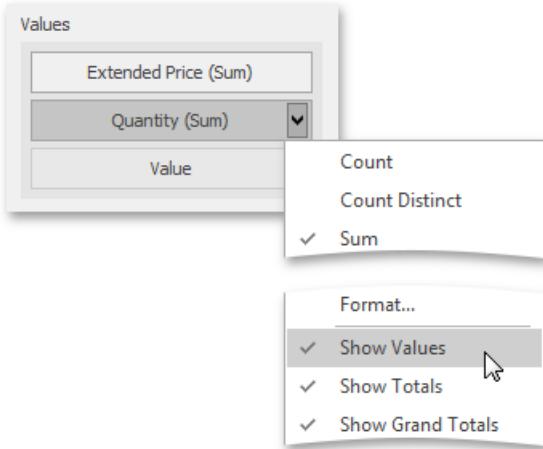


		UK		USA	
		Extended Price (Sum)	Quantity (Sum)	Extended Price (Sum)	Quantity (Sum)
▲ 2015	Q1	\$27.8K	1.24K	\$110K	5.06K
	Q2	\$38.1K	1.65K	\$105K	4.06K
	Q3	\$53.3K	1.86K	\$101K	4.4K
	Q4	\$41.3K	1.71K	\$140K	5.51K
▲ 2016	Q1	\$79.1K	3.04K	\$219K	7.6K
	Q2	\$44.7K	1.59K	\$97.4K	4.01K

		UK	USA
▲ 2015	Q1	\$27.8K	\$110K
	Q2	\$38.1K	\$105K
	Q3	\$53.3K	\$101K
	Q4	\$41.3K	\$140K
▲ 2016	Q1	\$79.1K	\$219K
	Q2	\$44.7K	\$97.4K

To do this, use the **Show Values** command in the measure menu.



## Values Position

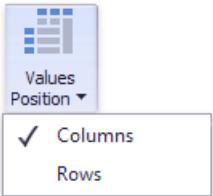
The Pivot dashboard item allows you to control the position of headers used to arrange summary values corresponding to different measures. For instance, you can display values in columns or rows.

		Grand Total	
		Extended Price (Sum)	Quantity (Sum)
▲ 2016	Q1	\$298K	10.6K
	Q2	\$142K	5.6K
2016 Total		\$441K	16.2K
Grand Total		\$441K	16.2K



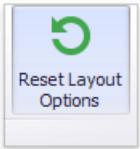
		Grand Total	
		Extended Price (Sum)	\$298K
▲ 2016	Q1	Quantity (Sum)	10.6K
	Q2	Extended Price (Sum)	\$142K
2016 Total		Quantity (Sum)	5.6K
Grand Total		Extended Price (Sum)	\$441K
		Quantity (Sum)	16.2K

To manage this position, use the **Values Position** button in the **Design** ribbon tab.



## Reset Layout Options

To reset layout options, click the **Reset Layout Options** button in the **Design** ribbon tab.

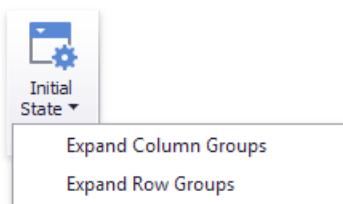


# Expanded State

If the [Columns or Rows](#) section contains several data items, the Pivot column and row headers are arranged in a hierarchy and make up column and row groups.

	UK	USA	Grand Total
▲ 2016 Total	\$124K	\$317K	\$441K
Q1 Total	\$79.1K	\$219K	\$298K
January	\$25.5K	\$68.7K	\$94.2K
February	\$32.9K	\$66.6K	\$99.4K
March	\$20.7K	\$84.2K	\$105K
▶ Q2	\$44.7K	\$97.4K	\$142K
Grand Total	\$124K	\$317K	\$441K

You can collapse and expand row and column groups using the ▼ and ▶ buttons. However, the current expanded state of column and row groups do not save in the dashboard definition. If necessary, you can specify the default expanded state using the **InitialState** button in the **Design** ribbon tab.

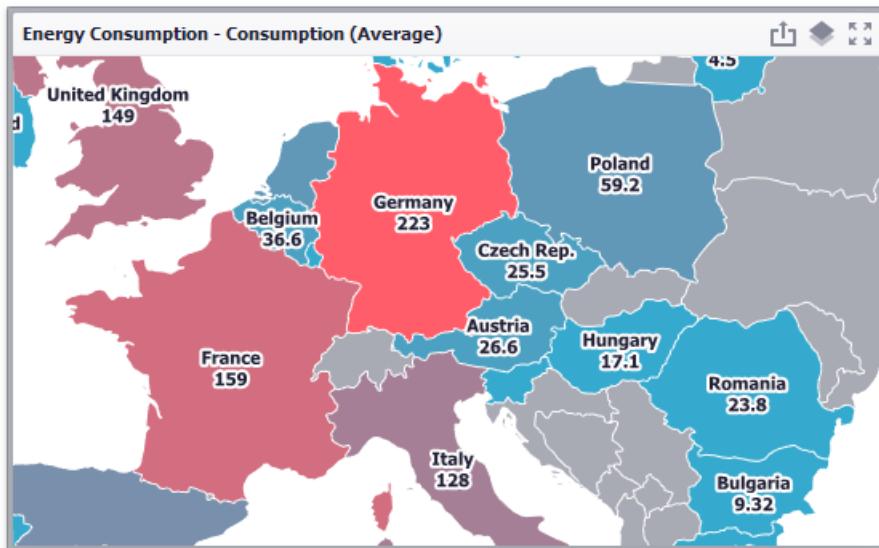


This button invokes the popup menu that allows you to select whether column and row groups should be collapsed or expanded by default.

# Choropleth Map

The topics in this section describe the features available in the **Choropleth Map** dashboard item.

The Choropleth Map dashboard item allows you to colorize the required areas in proportion to the provided values.



This section consists of the following subsections:

- [Providing Maps](#)

Describes how to use default dashboard maps or provide custom maps.

- [Providing Data](#)

Explains how to supply the Choropleth Map dashboard item with data.

- [Map Coloring](#)

Details how to color map shapes based on the values provided.

- [Map Navigation](#)

Explains how to manage map zooming and scrolling.

- [Interactivity](#)

Describes features that enable interaction between the Choropleth Map and other dashboard items.

- [Labels](#)

Describes how to display additional information related to map shapes.

- [Legend](#)

Explains the map legend and its options.

# Providing Maps

This document explains how to use the default **DevExpress Dashboard maps**, or provide custom maps.

## Default Maps

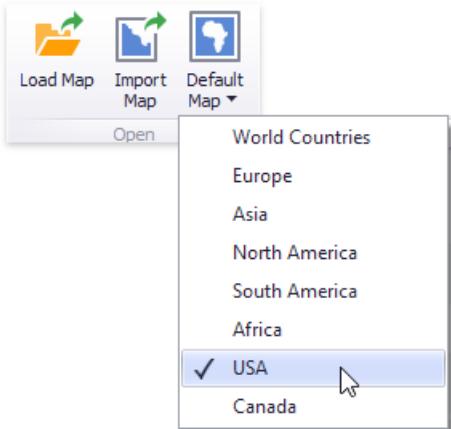
DevExpress Dashboard ships with a set of default maps showing various parts of the world. The following maps are included.

- **World Countries** - a world map.
- **Europe** - a map of Europe.
- **Asia** - a map of Asia.
- **North America** - a map of North America.
- **South America** - a map of South America.
- **Africa** - a map of Africa.
- **USA** - a map of the USA.
- **Canada** - a map of Canada.

### NOTE

Note that the **World Countries** map has a lower level of detail than maps of specific regions and may not contain some countries. As an alternative, you can load a custom map with the required granularity.

To select the required default map, use the **Default Map** button in the **Open** group of the **Design** ribbon tab.



As an alternative, use the corresponding command in the map context menu.

## Custom Maps

DevExpress Dashboard uses a **Shapefile** vector format to provide custom maps. Commonly, this format includes two file types.

- **.shp** file - holds map shapes (points/lines/polygons).
- **.dbf** file - contains attributes for each shape.

To open an existing shapefile, use the **Load Map** or **Import Map** button in the Ribbon, or the command in the context menu (**Load Map...** or **Import Map...**).



In the invoked dialog, locate the required **.shp** file. Note that custom maps created in the Cartesian coordinate system are not

supported.

**NOTE**

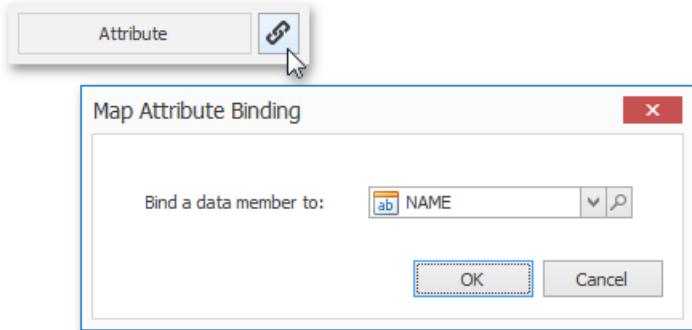
If the map is opened using the **Load Map** button, the dashboard XML definition will contain the path to a map shapefile. If the map is opened using the **Import Map** button, the dashboard XML definition will contain the map itself.

**NOTE**

Attributes from the corresponding **.dbf** file located in the same directory will be included in the map automatically.

## Map Attributes

After you select the default map or a custom map, you can view supplemental information (such as the name of the country, state, etc.). To do this, click the **Options** button next to the **Attribute** placeholder.



In the invoked **Map Attribute Binding** dialog, click **Preview**.

Shapefile Attributes Preview		
NAME	NAME_ALT	ADM1_CODE
Hawaii	HI Hawaii	USA-3517
Alaska	AK Alaska	USA-3563
Alabama	AL Ala.	USA-3541
Arkansas	AR Ark.	USA-3528
Arizona	AZ Ariz.	USA-3520
California	CA Calif.	USA-3521
Colorado	CO Colo.	USA-3522
Connecticut	CT Conn.	USA-3537

This table displays the available attributes for the current map. Each set of attribute values is related to a specific map shape.

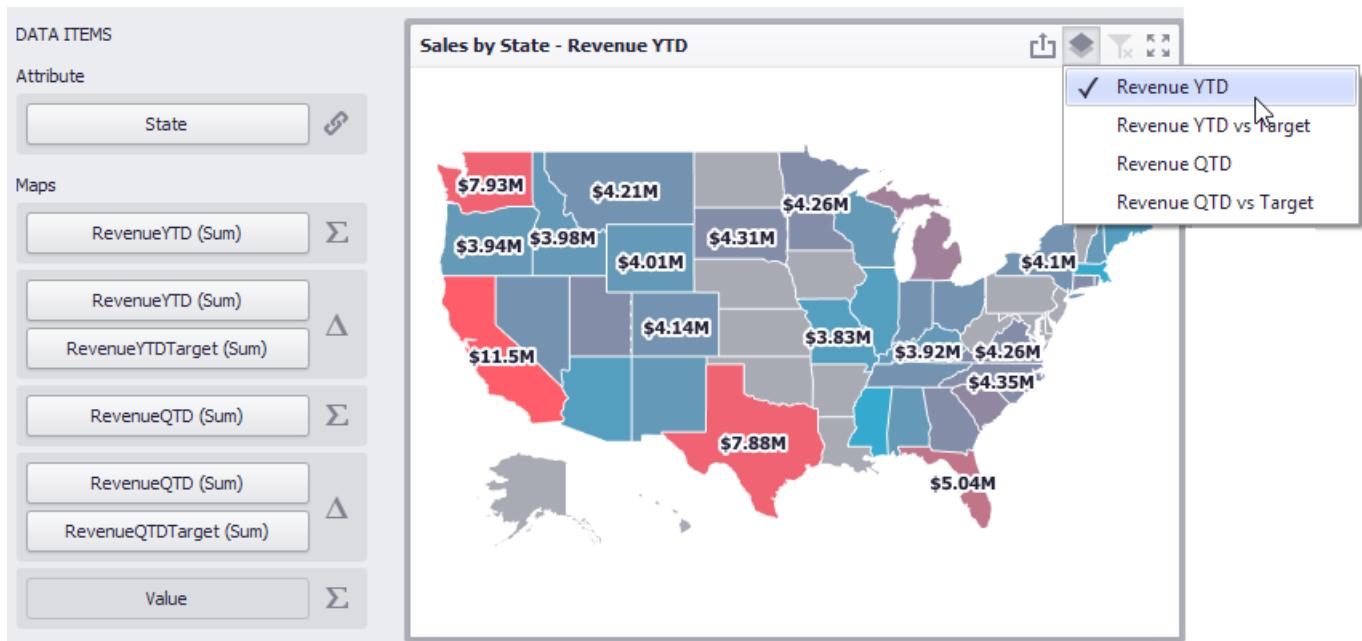
To learn how to bind the map attribute to a data source field, see the [Providing Data](#) topic.

# Providing Data

The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner. To learn more, see the [Bind Dashboard Items to Data](#) topic.

The only difference is in the data sections that the required dashboard item has. This topic describes how to bind a **Choropleth Map** dashboard item to data in the Designer.

The image below shows a sample Choropleth Map dashboard item that is bound to data.

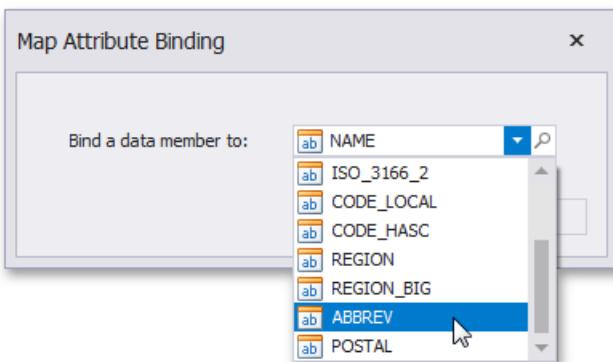


To bind the Choropleth Map dashboard item to data, drag and drop a data source field to a placeholder contained in one of the available data sections. The Choropleth Map provides two data item groups for data binding: DATA ITEMS and TOOLTIP DATA ITEMS. Tables below list the available data sections.

## DATA ITEMS

- **Attribute** - Allows you to associate map shapes with data source field values.

To associate map shapes with data source field values, drag-and-drop the required dimension to the data item's placeholder and select the required attribute in the **Map Attribute Binding** dialog. To invoke this dialog, click the [Options](#) button (the icon) next to the **Attribute** placeholder.



Select the required attribute and click **OK**.

- **Maps** - Contains data items whose values are used to color map shapes. Map shape colors vary based on the map type.

Click the [Options](#) button (the or icon depending on the map type) next to the **Value** placeholder and select the required map type in the invoked **Choropleth Map Options** dialog.

## Choropleth Map Options

Map type:

Value  
 Delta

- If you select **Value**, the Choropleth map colors map shapes depending on the values provided. To learn more, see [Map Coloring](#).
- If you select **Delta**, the Choropleth map colors map shapes depending on the difference between two values. To learn how to specify delta indication settings, see [Delta](#).

### NOTE

You can fill several data item containers in the **Maps** section and use the **Values** drop-down menu to switch between the provided values. To invoke the **Values** menu, click the  icon in the dashboard item caption.

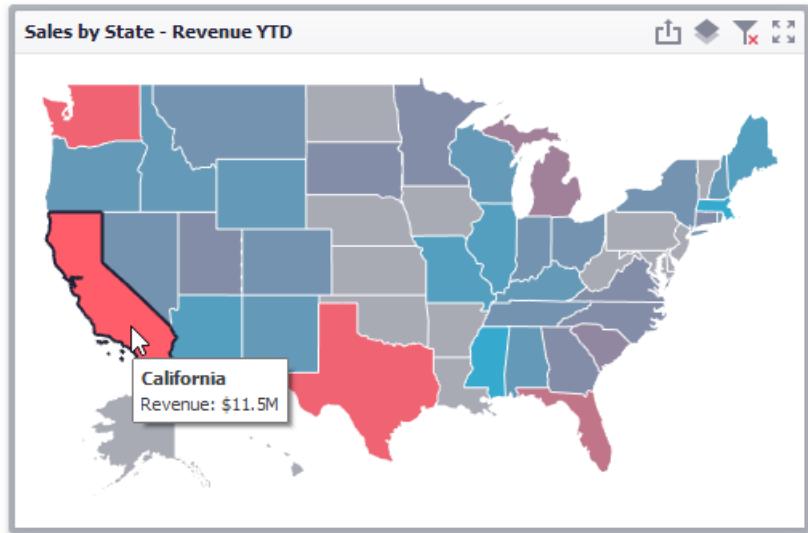
## TOOLTIP DATA ITEMS

- **Measures** - Allows you to add supplementary content to the tooltips. Drag and drop the required measures to provide additional data.

# Map Coloring

The **Choropleth Map** dashboard item colors map shapes depending on the [data provided](#).

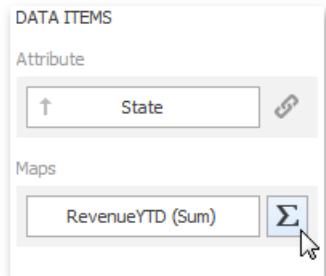
For instance, you can visualize a sales amount or population density.



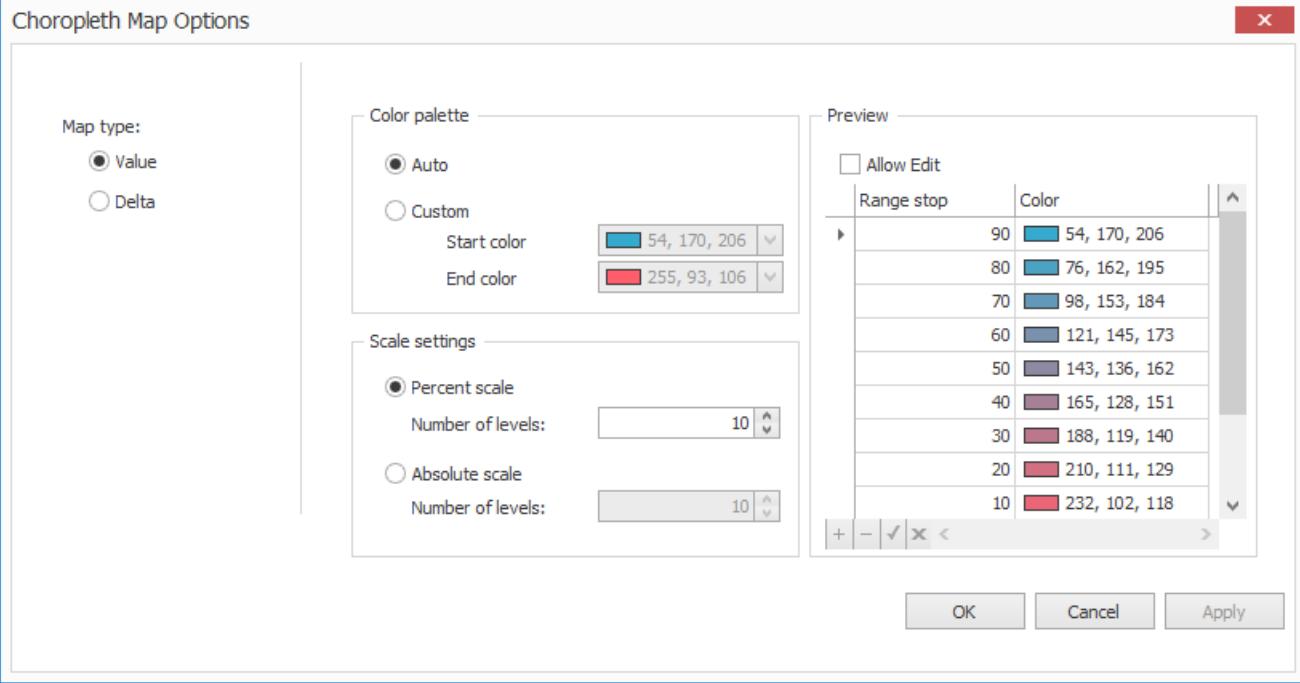
## Palette and Scale Settings

The **Choropleth Map** automatically selects palette and scale settings to color map shapes.

If you need to customize these settings, click the **Options** button next to the data item that contains these values.



This invokes the **Choropleth Map Options** dialog.



You can specify the following settings in this window.

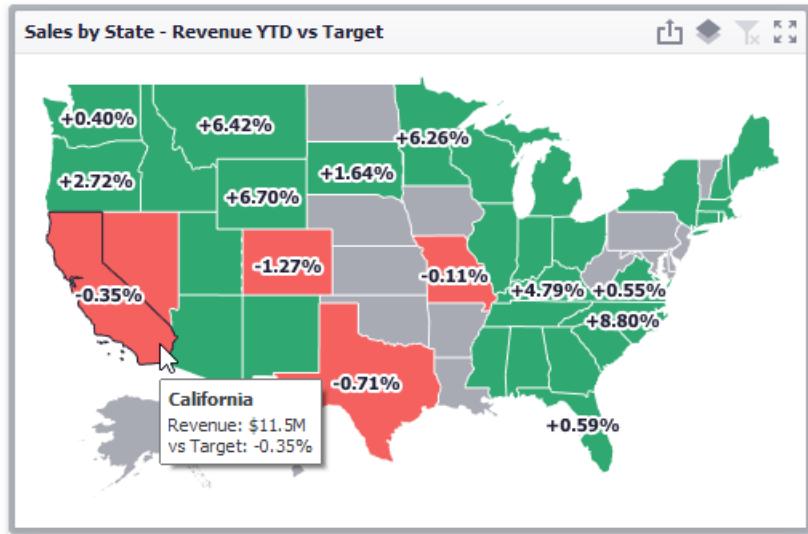
- **Color palette** - allows you to specify the start and end color of the palette.
- **Scale settings** - specifies whether a *percent* scale or an *absolute* scale is used to define a set of colors. You can specify the number of levels that represent the number of colors used to color the map.
- **Preview** is used to display a full set of palette colors generated based on the start/end colors and the number of levels. Use the **Allow Edit** check box to automatically change the generated colors or specify value ranges for each color.

To learn how to display a map legend, see [Legend](#).

Also, the Choropleth Map allows you to visualize the difference between the *actual* and *target* values of a particular parameter. To learn more, see the [Delta](#) topic.

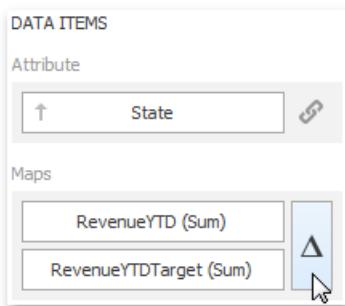
# Delta

The **Choropleth Map** allows you to indicate the difference between the *actual* and *target* values of a particular parameter. This difference is called **delta**.

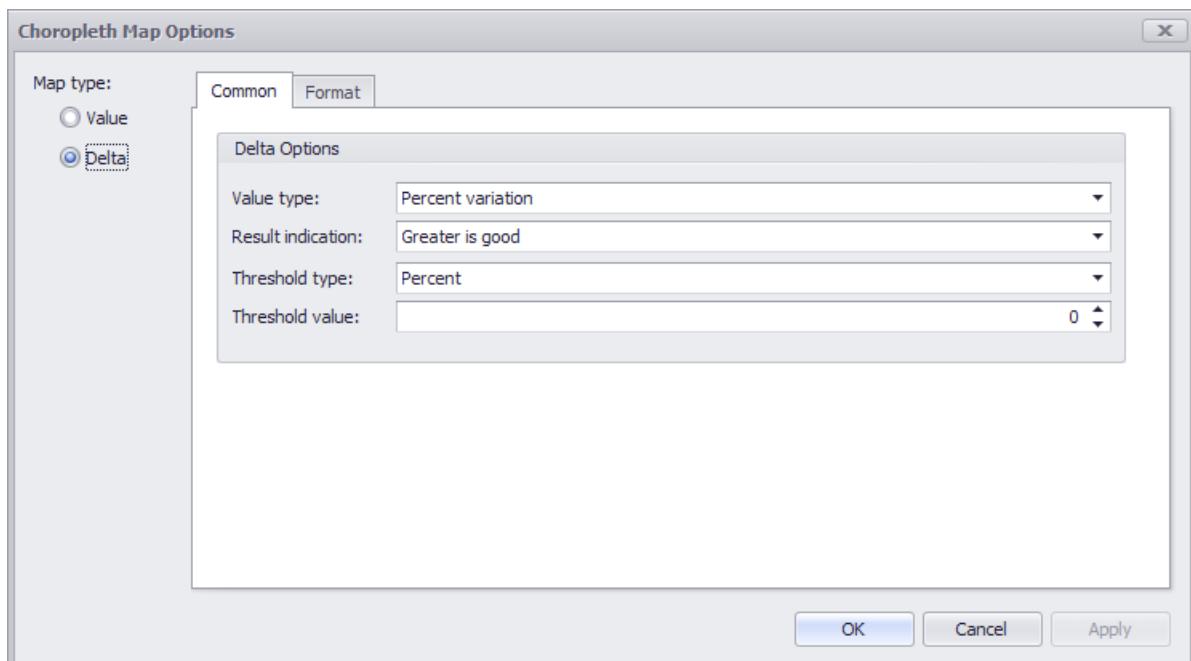


## Delta Options

To specify delta indication settings, click the **Options** button next to the data item container.



This invokes the **Choropleth Map Options** dialog. When the map type is set to **Delta**, this dialog contains the following settings.



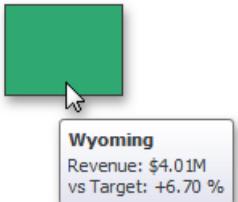
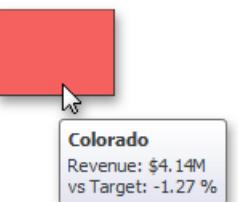
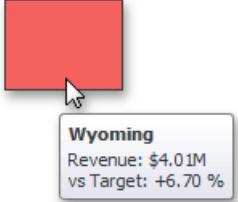
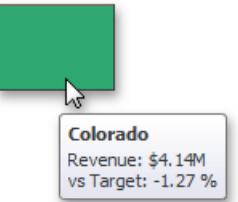
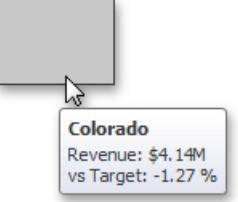
- **Value Type**

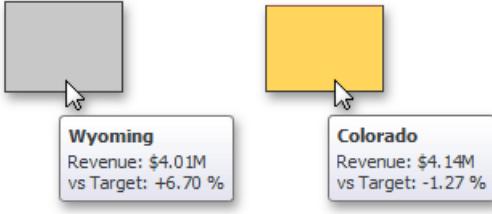
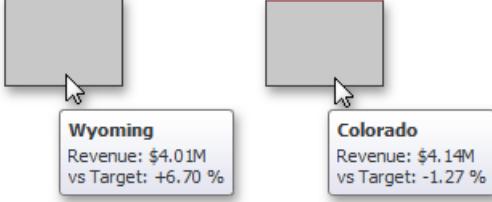
You can specify which values to display within map tooltips. Use the **Value type** combo box to select the value that will be displayed as the delta value.

VALUE TYPE	TOOLTIP
<b>Actual value</b>	
<b>Absolute variation</b>	
<b>Percent variation</b>	
<b>Percent of target</b>	

- **Result Indication**

You can specify the condition that will be used to select the indicator color. To do this, use the **Result indication** combo box.

RESULT INDICATION	AREA COLOR
<b>Greater is good</b>	 
<b>Less is good</b>	 
<b>Warning if greater</b>	 

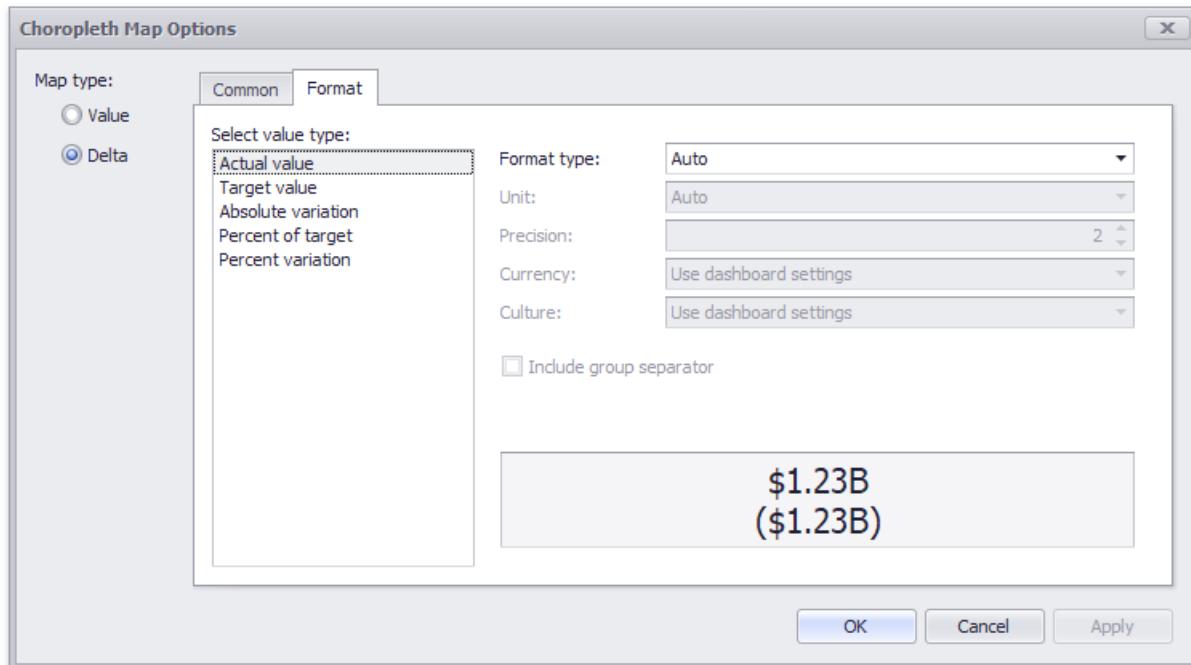
RESULT INDICATION	AREA COLOR
Warning if less	 <p>Wyoming Revenue: \$4.01M vs Target: +6.70 %</p> <p>Colorado Revenue: \$4.14M vs Target: -1.27 %</p>
No indication	 <p>Wyoming Revenue: \$4.01M vs Target: +6.70 %</p> <p>Colorado Revenue: \$4.14M vs Target: -1.27 %</p>

- **Threshold type** and **Threshold value**

You can specify that a required indicator should only be displayed when the difference between the actual and target values exceeds a specified value. For instance, the actual value exceeds the target value by 10%, or by \$2K.

Use the **Threshold type** combo box to select whether you wish to specify the threshold in percentage values or in absolute values. Then use the **Threshold value** box to specify the threshold value.

The **Format** tab allows you to specify the numeric display formats for different value types, as described in the [Formatting Data](#) document.



The tab contains the following settings.

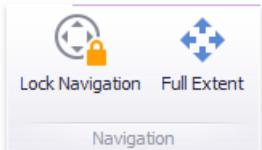
- **Format type** - Specifies format types for numeric values.
- **Unit** - Specifies the unit to convert the numeric values.
- **Precision** - Specifies the number of fractional digits to display.
- **Currency** - Specifies the currency symbol and format provided by the current culture settings.
- **Culture** - Specifies the name of a culture that defines the currency symbol and format.
- **Include group separator** - Specifies whether separators should be inserted between digit groups.

# Map Navigation

The Choropleth Map dashboard item allows you to perform navigation actions such as zooming and scrolling.

The Dashboard Designer allows you to specify the initial zooming/scrolling state for the Choropleth map using the mouse.

You can disable the capability to scroll/zoom the map using the **Lock Navigation** button in the **Design** ribbon tab.



Use the **Full Extent** button to display the entire map within the dashboard item.

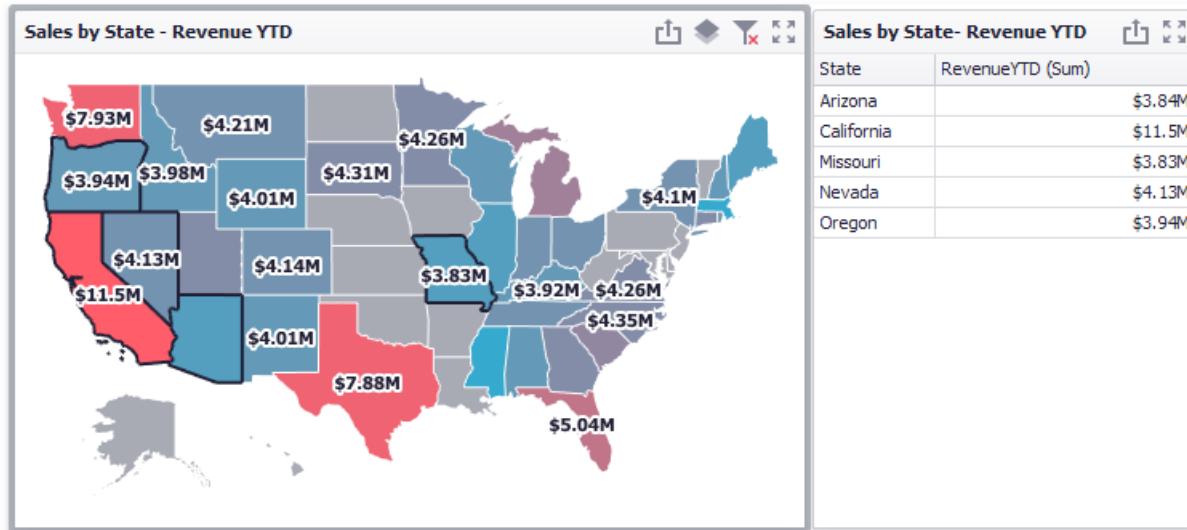
# Interactivity

This document describes the **Master Filtering** feature, which enables interaction between the **Choropleth Map** and other dashboard items.

## Master Filtering

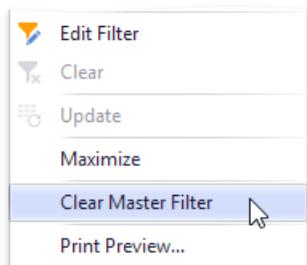
The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about the filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

When Master Filtering is enabled, you can click a shape (or multiple shapes by holding down the **CTRL** key) to make other dashboard items only display data related to the selected shape(s).



To learn how to enable Master Filtering in the Designer, see the [Master Filtering](#) topic.

To reset filtering, use the **Clear Master Filter** button (the icon) in the map's [caption](#), or the **Clear Master Filter** command in the map's context menu.



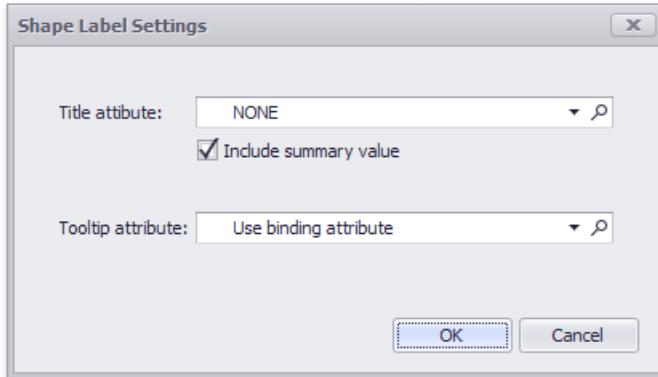
# Labels

A Choropleth map provides the capability to display titles within map shapes and allows you to manage what data to show in the shape tooltips.

To manage map titles and tooltips, click the **Shape Labels** button in the **Design** ribbon tab.



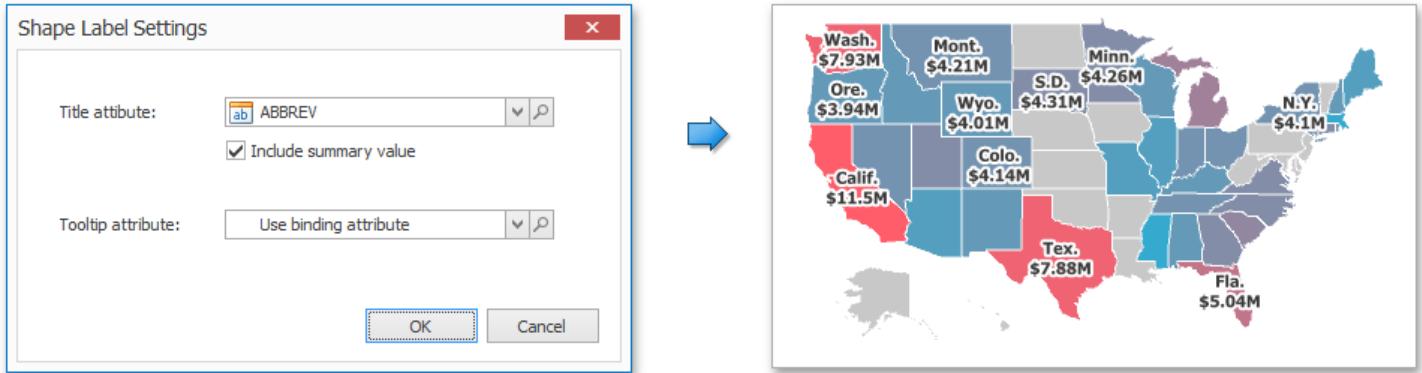
This invokes the **Shape Label Settings** dialog.



In this dialog, you can specify attributes whose values will be displayed within shapes and tooltips. Use the button to preview the available attributes and their values for the current map.

## Shape Titles

The **Title attribute** option allows you to select the attribute whose values are displayed within corresponding map shapes.



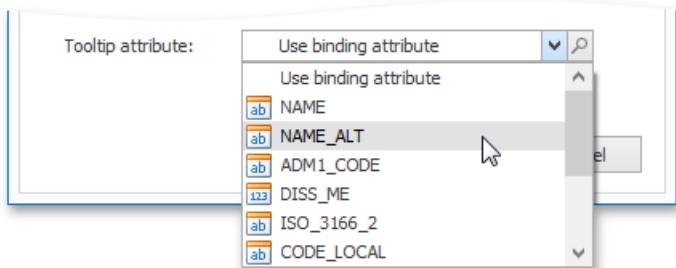
You can also use the **Include summary value** option to add summary values to shape titles.

## Tooltips

The **Choropleth Map** dashboard item displays a tooltip that shows information related to a hovered shape.



You can choose whether to use a **binding attribute** to display as the title of shape tooltips (the **Use binding attribute** option) or specify a custom attribute using the **Tooltip attribute** option.



The Choropleth Map also allows you to add supplementary content to the tooltips using the **TOOLTIP DATA ITEMS** area. To learn more, see the [Providing Data](#) topic.

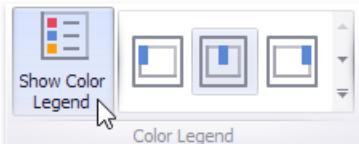
# Legend

A legend is an element of a map that shows values corresponding to each color.



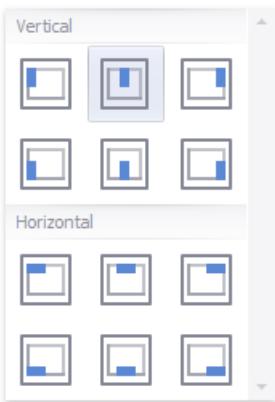
## Visibility

To display a legend within a map, use the **Show Legend** button in the **Legend** group of the **Design** Ribbon tab.



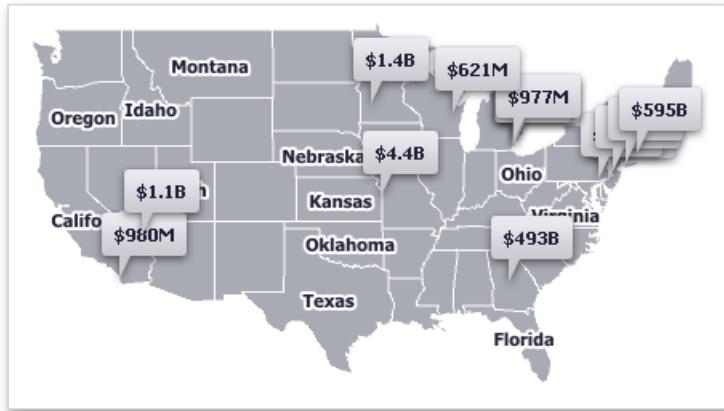
## Position and Orientation

To specify the legend's position and orientation, select one of the predefined options from the gallery in the **Design** Ribbon tab.



# Geo Point Maps

The topics in this section describe various types of **Geo Point Map** dashboard items that allow you to place callouts, bubbles or pies on the map using geographical coordinates.



This section consists of the following subsections.

- [Map Types Overview](#)

Lists the available types of Geo Point maps and their features.

- [Providing Maps](#)

Explains how to use default dashboard maps or provide custom maps.

- [Geo Point Map | Bubble Map | Pie Map](#)

Describe specific capabilities of various Geo Point Map types.

- [Clustering](#)

Describes the feature that enables grouping of neighboring map objects.

- [Interactivity](#)

Describes features that enable interaction between the Geo Point maps and other dashboard items.

- [Labels](#)

Describes how to display additional information related to map shapes.

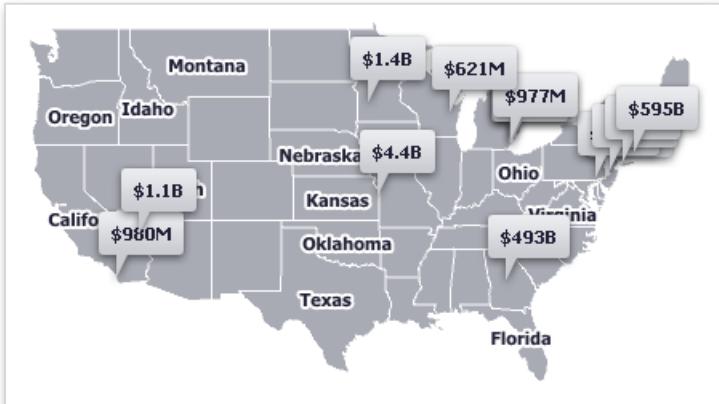
- [Map Navigation](#)

Explains how to manage map zooming and scrolling.

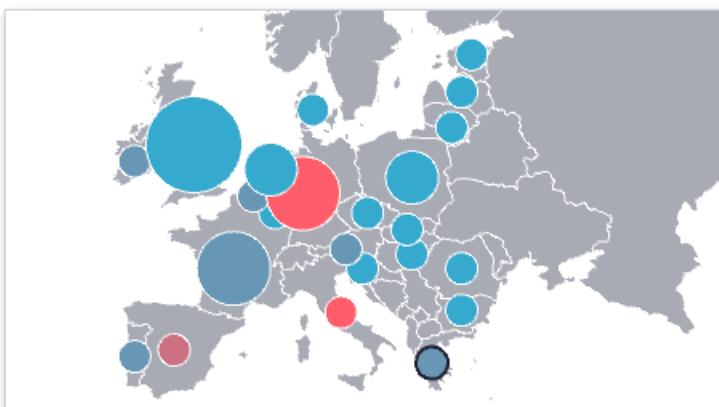
# Map Types Overview

The **Dashboard Designer** allows you to create three types of **Geo Point** maps.

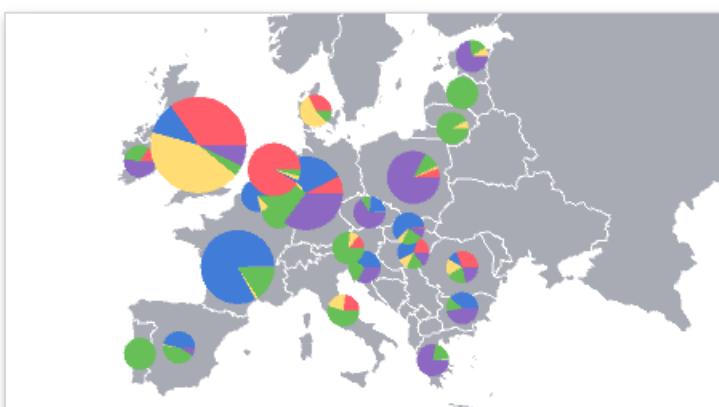
- The **Geo Point Map** dashboard item allows you to place callouts on the map using geographical coordinates.



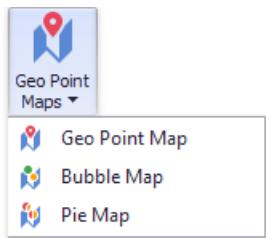
- The **Bubble Map** dashboard item allows you to place bubbles on the map. Each bubble can represent data using its weight and color.



- The **Pie Map** dashboard item allows you to display pies on the map. Each pie visualizes the contribution of each value to the total.



To create the required **Geo Point Map** dashboard item, use the **Geo Point Maps** button in the **Home** ribbon tab.



To learn more about common capabilities of all Geo Point map types, see the following topics.

- [Providing Maps](#)

Explains how to use default dashboard maps or provide custom maps.

- [Clustering](#)

Describes the feature that enables grouping of neighboring map objects.

- [Interactivity](#)

Describes features that enable interaction between the Geo Point maps and other dashboard items.

- [Labels](#)

Describes how to display additional information related to map shapes.

- [Map Navigation](#)

Explains how to manage map zooming and scrolling.

# Providing Maps

This document explains how to use the default **DevExpress Dashboard maps**, or provide custom maps.

## Default Maps

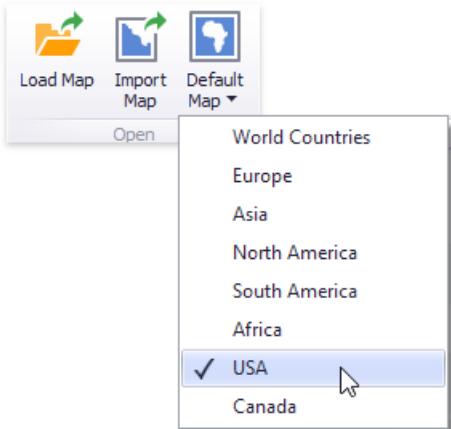
DevExpress Dashboard ships with a set of default maps showing various parts of the world. The following maps are included.

- **World Countries** - a world map.
- **Europe** - a map of Europe.
- **Asia** - a map of Asia.
- **North America** - a map of North America.
- **South America** - a map of South America.
- **Africa** - a map of Africa.
- **USA** - a map of the USA.
- **Canada** - a map of Canada.

### NOTE

Note that the **World Countries** map has a lower level of detail than maps of specific regions and may not contain some countries. As an alternative, you can load a custom map with the required granularity.

To select the default map, use the **Default Map** button in the **Design** ribbon tab.



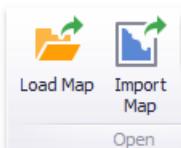
As an alternative, use the corresponding command in the map's context menu.

## Custom Maps

DevExpress Dashboard uses a **Shapefile** vector format to provide custom maps. Commonly, this format includes two file types.

- **.shp** file - holds map shapes (points/lines/polygons).
- **.dbf** file - contains attributes for each shape.

To open an existing shapefile, use the **Load Map** or **Import Map** button in the Ribbon, or the command in the context menu (**Load Map...** or **Import Map...**).



In the invoked dialog, locate the required **.shp** file. Note that custom maps created in the Cartesian coordinate system are not

supported.

 **NOTE**

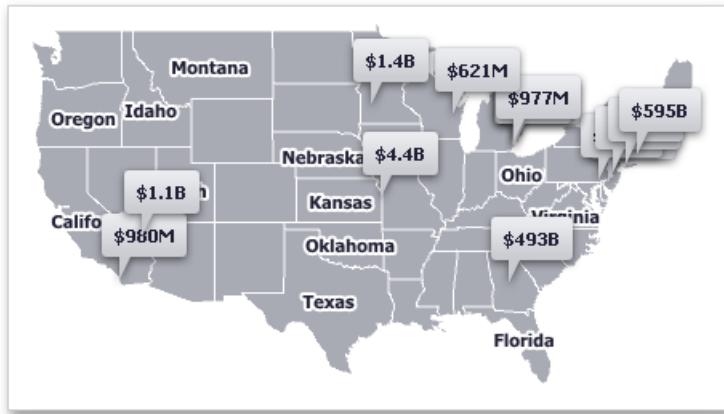
If the map is opened using the **Load Map** button, the dashboard XML definition will contain the path to a map shapefile. If the map is opened using the **Import Map** button, the dashboard XML definition will contain the map itself.

 **NOTE**

Attributes from the corresponding **.dbf** file located in the same directory will automatically be included in the map.

# Geo Point Map

The **Geo Point Map** dashboard item allows you to place callouts on the map using geographical coordinates.



Topics in this section describe specific capabilities of the Geo Point Map dashboard item.

- [Providing Data](#)

# Providing Data

This topic describes how to bind the **Geo Point Map** dashboard item to data using the **Dashboard Designer**.

The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner (see [Bind Dashboard Items to Data](#) for details). The only difference is in the data sections that these dashboard items have.

The image below shows a sample Geo Point Map dashboard item that is bound to data.



Note that the Geo Point Map provides two data item groups for data binding: DATA ITEMS and TOOLTIP DATA ITEMS. Tables below list the available data sections.

## DATA ITEMS

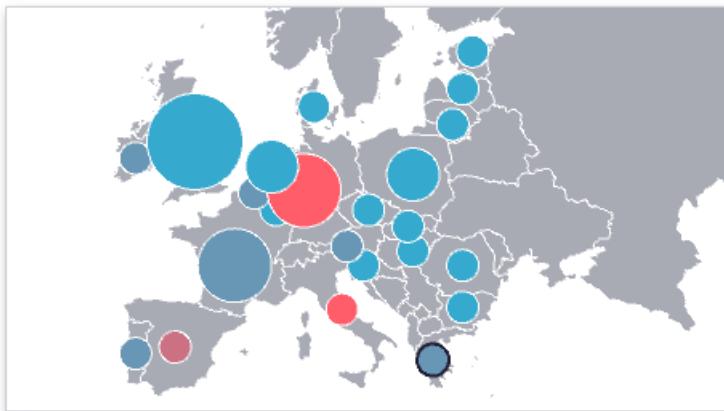
SECTION	DESCRIPTION
<b>Latitude</b>	Accepts a dimension used to provide geographic latitude.
<b>Longitude</b>	Accepts a dimension used to provide geographic longitude.
<b>Value</b>	Accepts values related to geographic points. These values are displayed within map callouts.

## TOOLTIP DATA ITEMS

SECTION	DESCRIPTION
<b>Dimensions</b>	Accepts dimensions allowing you to add supplementary content to the tooltips.
<b>Measures</b>	Accepts measures allowing you to add summaries to the tooltips.

# Bubble Map

The **Bubble Map** dashboard item allows you to place bubbles on the map. Each bubble can represent data using its weight and color.



Topics in this section describe specific capabilities of the Bubble Map dashboard item.

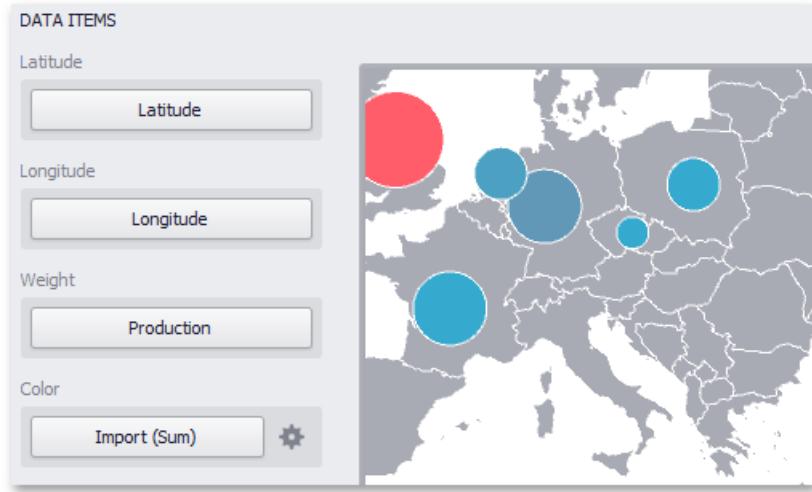
- [Providing Data](#)
- [Coloring](#)
- [Legends](#)

# Providing Data

This topic describes how to bind the **Bubble Map** dashboard item to data using the **Dashboard Designer**.

The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner (see [Bind Dashboard Items to Data](#) for details). The only difference is in the data sections that these dashboard items have.

The image below shows a sample Bubble Map dashboard item that is bound to data.



Note that the Bubble Map provides two data item groups for data binding: DATA ITEMS and TOOLTIP DATA ITEMS. Tables below list the available data sections.

## DATA ITEMS

- **Latitude** - Accepts a dimension used to provide geographic latitude.
- **Longitude** - Accepts a dimension used to provide geographic longitude.
- **Weight** - Accepts a measure used to evaluate the bubble's weight.
- **Color** - Accepts a measure used to evaluate the bubble's color.

The Bubble Map dashboard item automatically selects palette and scale settings used to color bubbles. To customize these settings, click the **Options** button next to the **Color** placeholder. This invokes the **Color Scale Options** dialog, which allows you to specify the palette and scale options. To learn how to use this dialog, see [Coloring](#).

## TOOLTIP DATA ITEMS

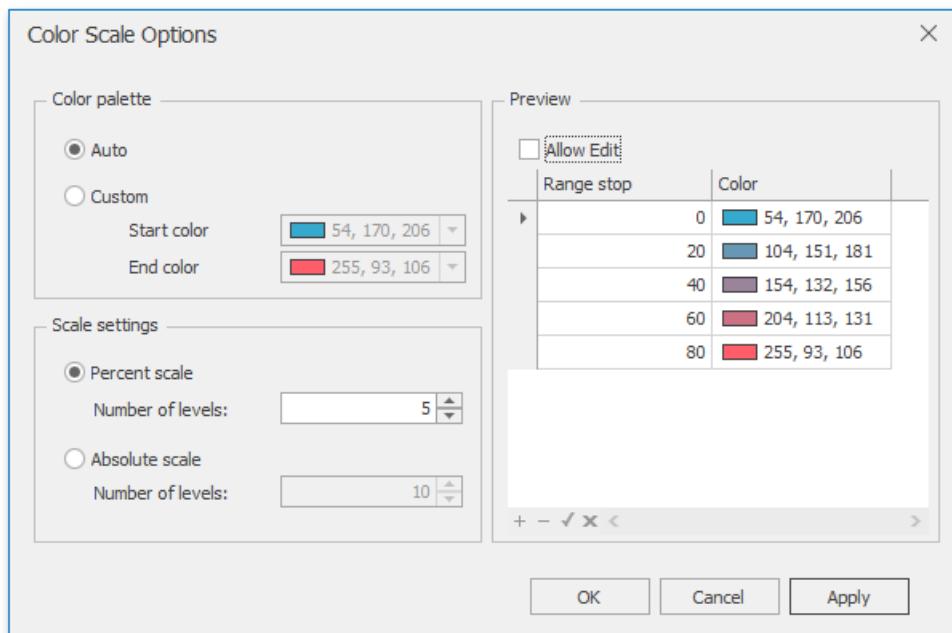
- **Dimensions** - Accepts dimensions allowing you to add supplementary content to the tooltips.
- **Measures** - Accepts measures allowing you to add summaries to the tooltips.

# Coloring

The Bubble Map dashboard item automatically selects palette and scale settings used to color bubbles depending on the [provided](#) values.



To customize these settings, click the **Options** button next to the **Color** placeholder. This invokes the **Color Scale Options** dialog, which allows you to specify the palette and scale options.



You can specify the following settings in this window.

- **Color palette** - allows you to specify the start and end color of the palette.
- **Scale settings** - specifies whether a *percent* scale or an *absolute* scale is used to define a set of colors. You can specify the number of levels that represent the number of colors used to color the map.
- **Preview** is used to display a full set of palette colors generated based on the start/end colors and the number of levels. Use the **Allow Edit** check box to automatically change the generated colors or specify value ranges for each color.

# Legends

Bubble Map provides two types of legends used to identify map objects - color and weighted legends.

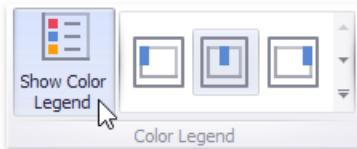
- [Color Legend](#)
- [Weighted Legend](#)

## Color Legend

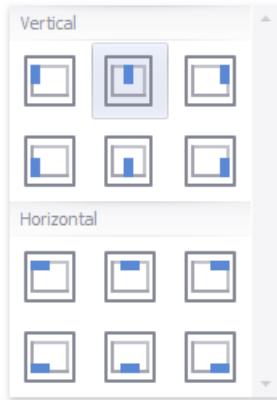
The color legend helps you to identify which colors correspond to specific values.



To display a color legend within a map, use the **Show Color Legend** button in the **Color Legend** section of the **Design** Ribbon tab.

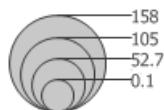


To specify the legend's position and orientation, select one of the predefined options from the gallery in the **Design** Ribbon tab.

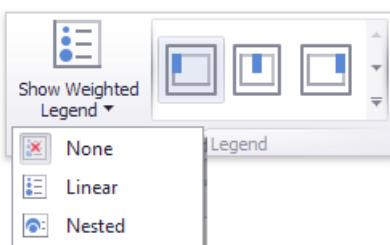


## Weighted Legend

The weighted legend allows you to identify values corresponding to specific bubble sizes.



To select the required weighted legend type, use the **Show Weighted Legend** button in the **Weighted Legend** section of the **Design** Ribbon tab.

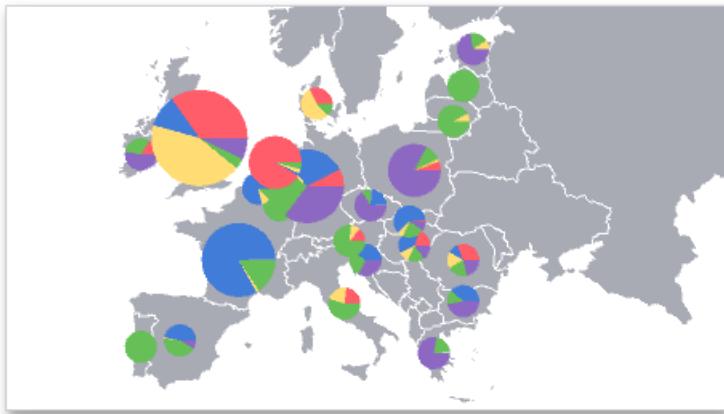


To specify the legend's position, select one of the predefined options from the gallery in the **Design** Ribbon tab.



# Pie Map

The **Pie Map** dashboard item allows you to display pies on the map. Each pie visualizes the contribution of each value to the total.



Topics in this section describe specific capabilities of the Pie Map dashboard item.

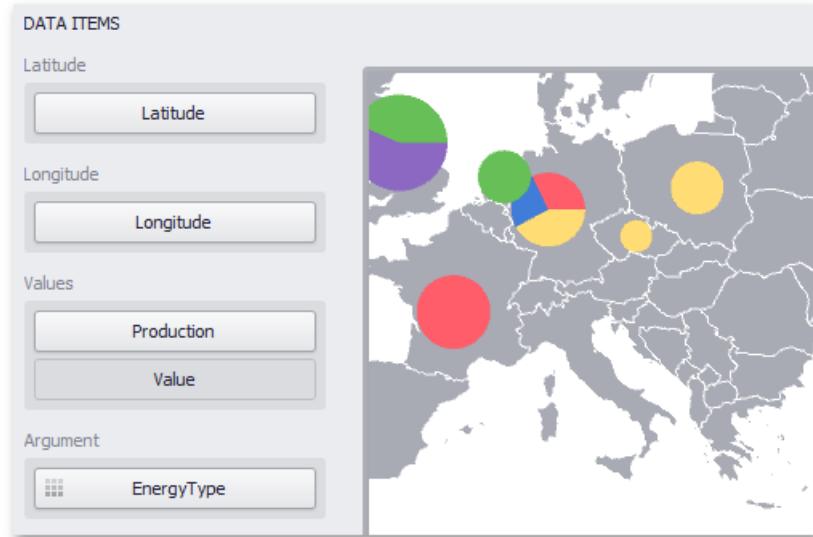
- [Providing Data](#)
- [Pie Options](#)
- [Coloring](#)
- [Legends](#)

# Providing Data

This topic describes how to bind the **Pie Map** dashboard item to data using the **Dashboard Designer**.

The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner (see [Bind Dashboard Items to Data](#) for details). The only difference is in the data sections that these dashboard items have.

The image below shows a sample Pie Map dashboard item that is bound to data.



Note that the Pie Map provides two data item groups for data binding: DATA ITEMS and TOOLTIP DATA ITEMS. Tables below list the available data sections.

## DATA ITEMS

SECTION	DESCRIPTION
<b>Latitude</b>	Accepts a dimension used to provide geographic latitude.
<b>Longitude</b>	Accepts a dimension used to provide geographic longitude.
<b>Values</b>	Accepts measures used to calculate pie values. In case of negative measure values, Pie Map uses their absolute values. If you added a data item to the <b>Argument</b> section and several data items to the <b>Values</b> section, you can use the <b>Values</b> drop-down menu to switch between the provided values. To invoke the <b>Values</b> menu, click the  icon in the map's caption or use the map's context menu.
<b>Argument</b>	Allows you to provide data for pie arguments.

## TOOLTIP DATA ITEMS

SECTION	DESCRIPTION
<b>Dimensions</b>	Accepts dimensions allowing you to add supplementary content to the tooltips.
<b>Measures</b>	Accepts measures allowing you to add summaries to the tooltips.

# Pie Options

The Pie Map dashboard item allows you to take into account the weight of pies. In this case, the relative sizes of the pies depend on the corresponding summary values.



To enable this capability, use the **Weighted Pies** button in the **Design** ribbon tab.

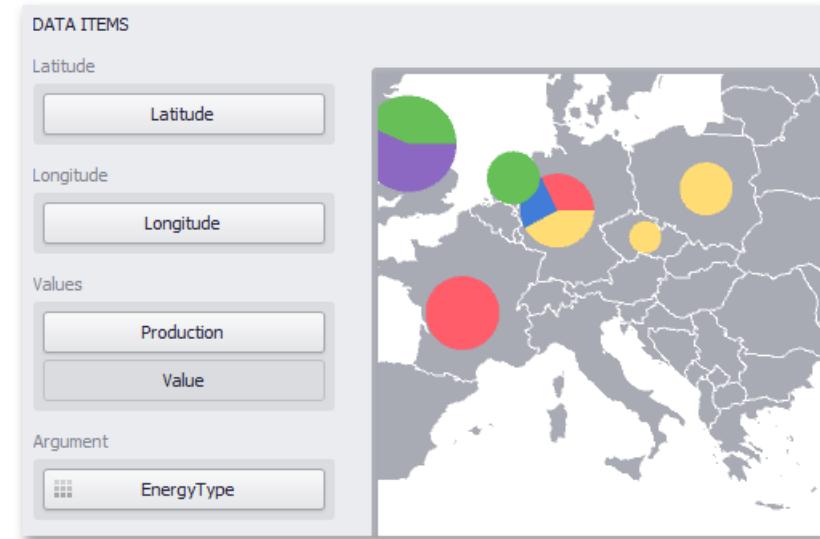


# Coloring

In **Default** color mode, the Pie Map dashboard item colors its segments in the following way:

- If the Pie Map dashboard item contains arguments (the **Arguments** section), different argument values are colored by **hue**.
- If the Pie Map dashboard item contains only measures (the **Values** section), values corresponding to different measures are colored by hue.

The image below illustrates the Pie Map dashboard item whose argument values are painted in different colors. A special icon (■■■) on the data item shows that color variation is enabled.



## 💡 TIP

### Documentation:

- [Coloring Basics](#)

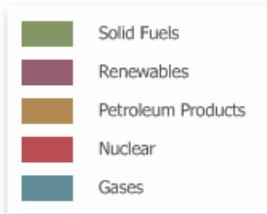
# Legends

The Pie Map provides two types of legends used to identify map objects - color and weighted legends.

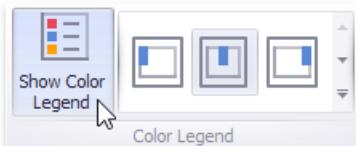
- [Color Legend](#)
- [Weighted Legend](#)

## Color Legend

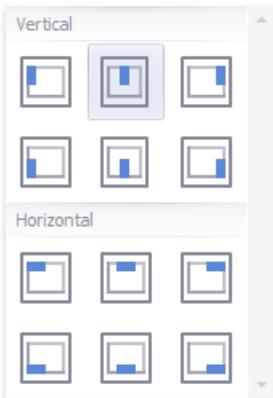
The color legend helps you to identify which colors correspond to specific argument values.



To display a color legend within a map, use the **Show Color Legend** button in the **Color Legend** section of the **Design** Ribbon tab.

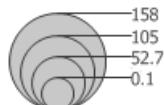


To specify the legend's position and orientation, select one of the predefined options from the gallery in the **Design** Ribbon tab.



## Weighted Legend

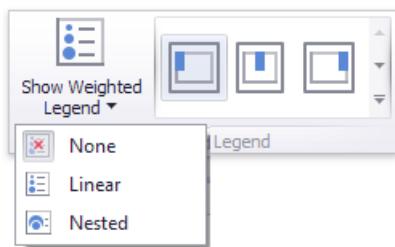
The weighted legend allows you to identify values corresponding to specific pie sizes.



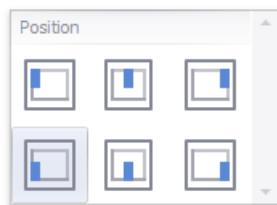
### NOTE

The Pie Map dashboard item does not display the weighted legend if weighed pies are disabled.

To select the required weighted legend type, use the **Show Weighted Legend** button in the **Weighted Legend** section of the **Design** Ribbon tab.



To specify the legend's position, select one of the predefined options from the gallery in the **Design** Ribbon tab.



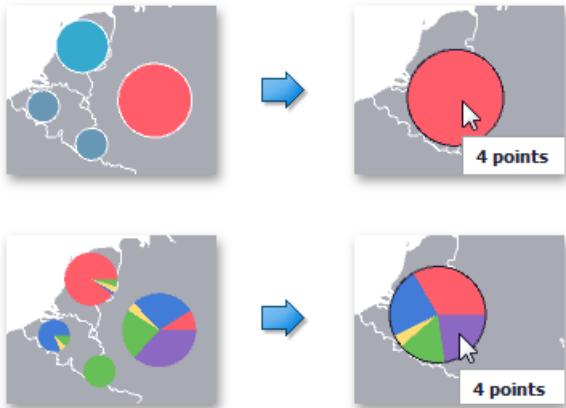
# Clustering

When a **Geo Point** map contains a large number of objects (callouts, bubbles or pies), showing each object individually on the map is not useful. The **Dashboard Designer** provides the capability to group neighboring map objects. This feature is called **Clustering**.

For instance, the **Geo Point Map** dashboard item combines callouts to bubbles.



The **Bubble Map** and **Pie Map** dashboard items cluster bubbles/pies with other bubbles/pies.



To enable clustering in the Designer, use the **Enable Clustering** button in the **Data** ribbon tab.



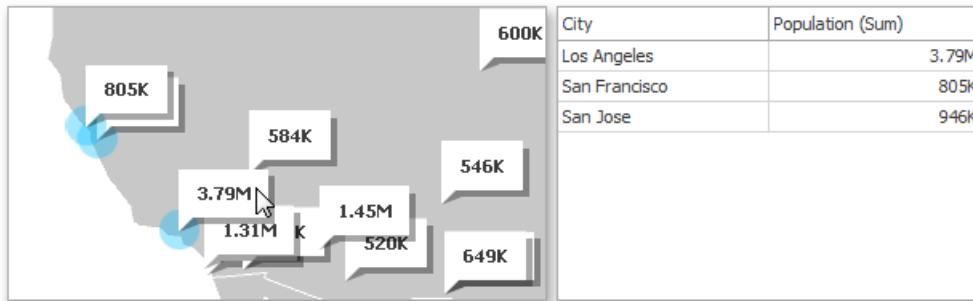
# Interactivity

This document describes the **Master Filtering** capability, which enables interaction between the **Geo Point Map** and other dashboard items.

## Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about the filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

When Master Filtering is enabled, you can click a callout/bubble/pie (or multiple callouts/bubbles/pies by holding down the **CTRL** key) to make other dashboard items only display data related to the selected callout(s)/bubble(s)/pie(s).

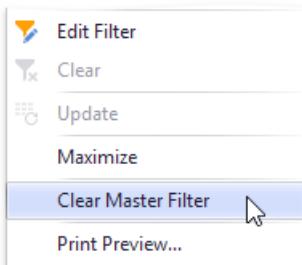


### NOTE

When you select a clustered bubble or pie, master filtering is applied by all points that are clustered into this bubble/pie.

To learn how to enable Master Filtering in the Designer, see the [Master Filtering](#) topic.

To reset filtering, use the **Clear Master Filter** button (the icon) in the map's [caption](#), or the **Clear Master Filter** command in the context menu.



# Labels

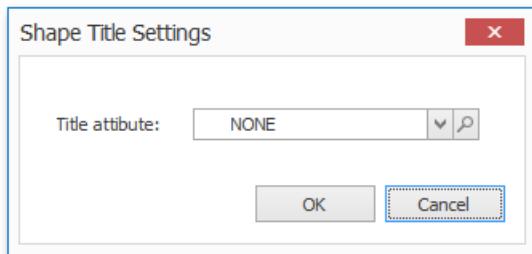
Geo Point maps provide the capability to display titles within map shapes and allows you to add supplementary content to the callout/bubble/pie tooltips.

## Shape Titles

To manage map titles, click the **Shape Title** button in the **Design** ribbon tab.

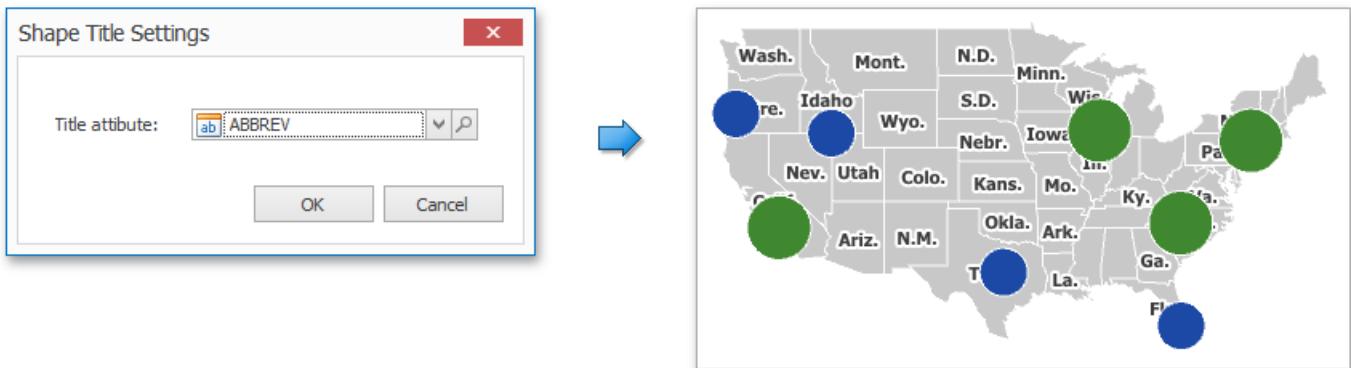


This invokes the **Shape Title Settings** dialog.



In this dialog, you can specify attributes whose values will be displayed within shapes. Use the button to preview the available attributes and their values for the current map.

The **Title attribute** option allows you to select the attribute whose values are displayed within corresponding map shapes.



## Toolips

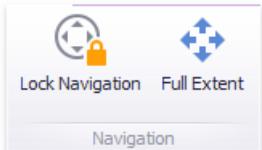
Geo Point maps also allow you to add supplementary content to the callout/bubble/pie tooltips using the **TOOLTIP DATA ITEMS** area. To learn more, see the Tooltip Data Items paragraph in the [Providing Data](#) topic.

# Map Navigation

Geo Point maps allow you to perform navigation actions such as zooming and scrolling.

The Dashboard Designer allows you to specify the initial zooming/scrolling state for the Geo Point map using the mouse.

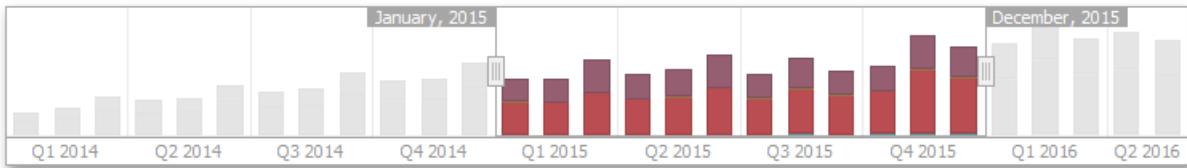
You can disable the capability to scroll/zoom the map using the **Lock Navigation** button in the **Design** ribbon tab.



Use the **Full Extent** button to display the entire map within the dashboard item.

# Range Filter

The **Range Filter** dashboard item allows you to apply filtering to other dashboard items. This item displays a chart with selection thumbs that allow you to filter out values displayed along the argument axis.



This section consists of the following subsections.

- [Providing Data](#)

Explains how to supply the Range Filter dashboard item with data.

- [Series](#)

Enumerates and describes different types of series that can be displayed within the Range Filter dashboard item.

- [Interactivity](#)

Describes features that enable interaction between the Range Filter and other dashboard items.

- [Predefined Ranges](#)

Shows you how to add predefined date-time periods that can be used to perform a selection (for instance, *year-to-date* or *quarter-to-date*).

- [Coloring](#)

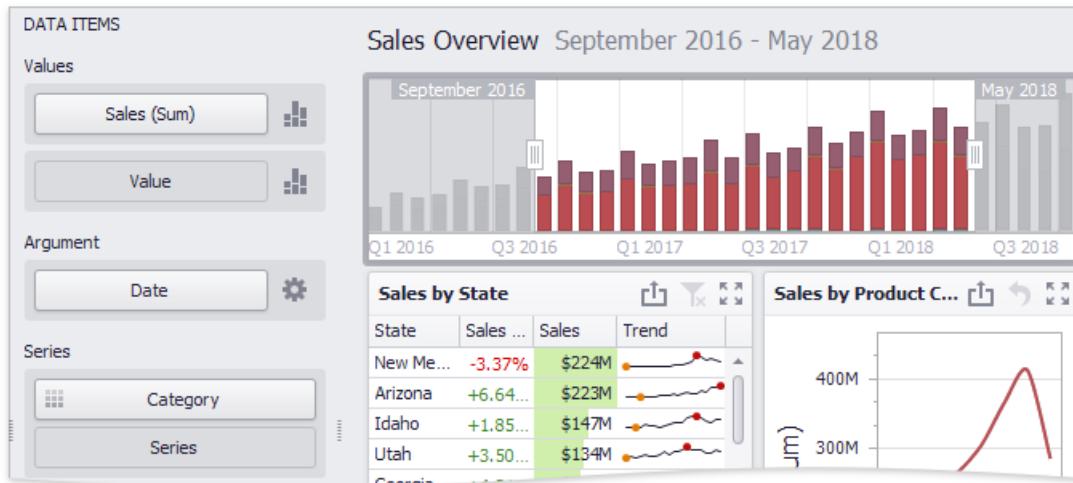
Describes coloring capabilities of the Range Filter dashboard item.

# Providing Data

The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner. To learn more, see the [Bind Dashboard Items to Data](#) topic.

The only difference is in the data sections that the required dashboard item has. This topic describes how to bind a **Range Filter** dashboard item to data in the Designer.

The image below shows a sample Range Filter dashboard item that is bound to data.



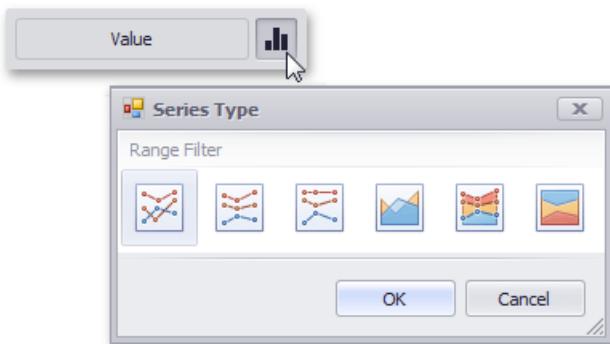
To bind the Range Filter dashboard item to data, drag and drop a data source field to a placeholder contained in one of the available data sections. A table below lists and describes Range Filter data sections.

SECTION	DESCRIPTION
<b>Values</b>	Contains data items against which the Y-coordinates of data points are calculated.
<b>Argument</b>	Contains a data item that provides values displayed along the horizontal axis of the Range Filter. <a href="#">Filtering</a> is performed based on these values. Note that the <a href="#">Options</a> button (the gear icon) allows you to create <a href="#">predefined ranges</a> used to select the required date-time interval.
<b>Series</b>	Contains data items whose values are used to create chart series.

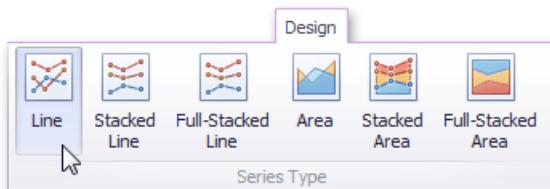
# Series

The **Range Filter** dashboard item supports various **Line** and **Area** series types.

To switch between series types in the Designer, click the options button next to the required data item in the **Values** section. In the invoked **Series Type** dialog, select the required series type and click **OK**.

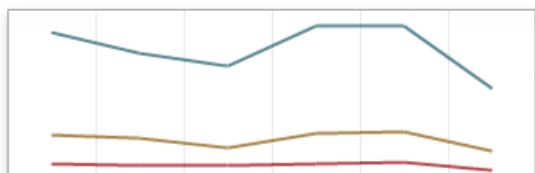


You can also do this using the buttons in the **Series Type** group of the **Design** Ribbon tab.

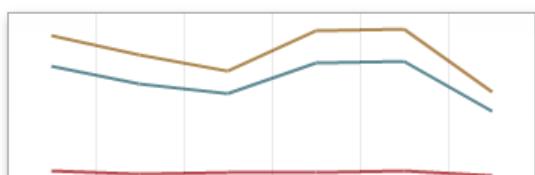


The Range Filter supports the following series types.

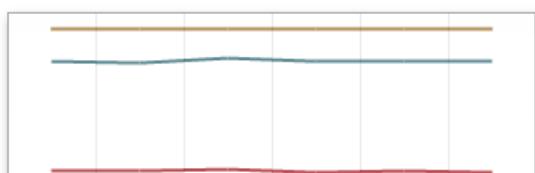
## Line:



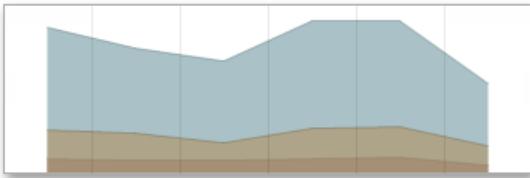
## Stacked Line:



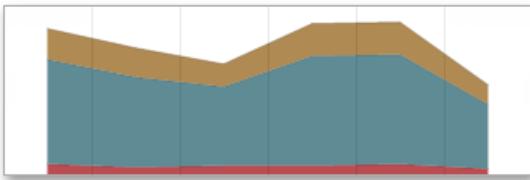
## Full-Stacked Line



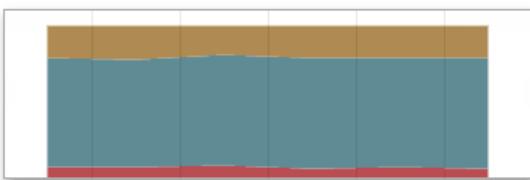
## Area:



**Stacked Area:**



**Full-Stacked Area:**



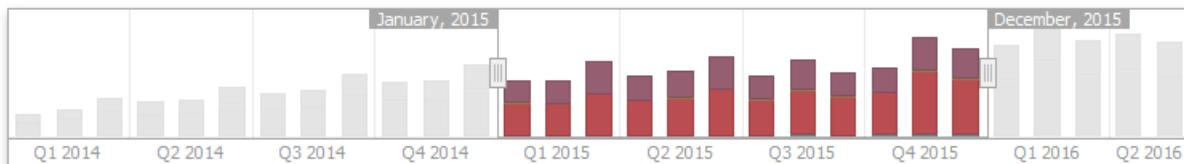
# Interactivity

This document describes the features that enable interaction between the **Range Filter** and other dashboard items. These features include **Master Filtering**.

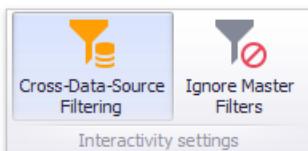
## Master Filtering

The Dashboard allows you to use any data-aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more, see the [Master Filtering](#) topic, which describes filtering concepts common to all dashboard items.

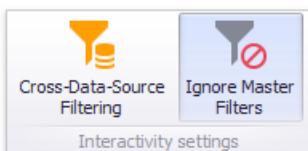
Master filtering is always enabled for the Range Filter dashboard item. This Range Filter displays a chart with selection thumbs that allow you to filter out values displayed along the argument axis.



To enable filtering across data sources for the Range Filter, use the **Cross-Data-Source Filtering** button in the **Data** Ribbon tab.

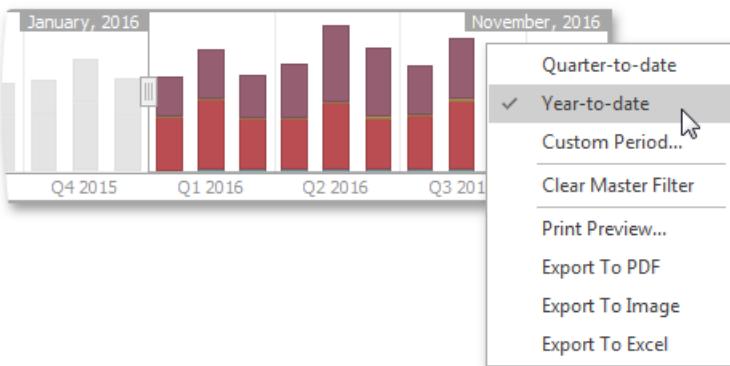


You can enable/disable ignoring of other master filter items using the **Ignore Master Filters** button in the **Data** Ribbon tab.

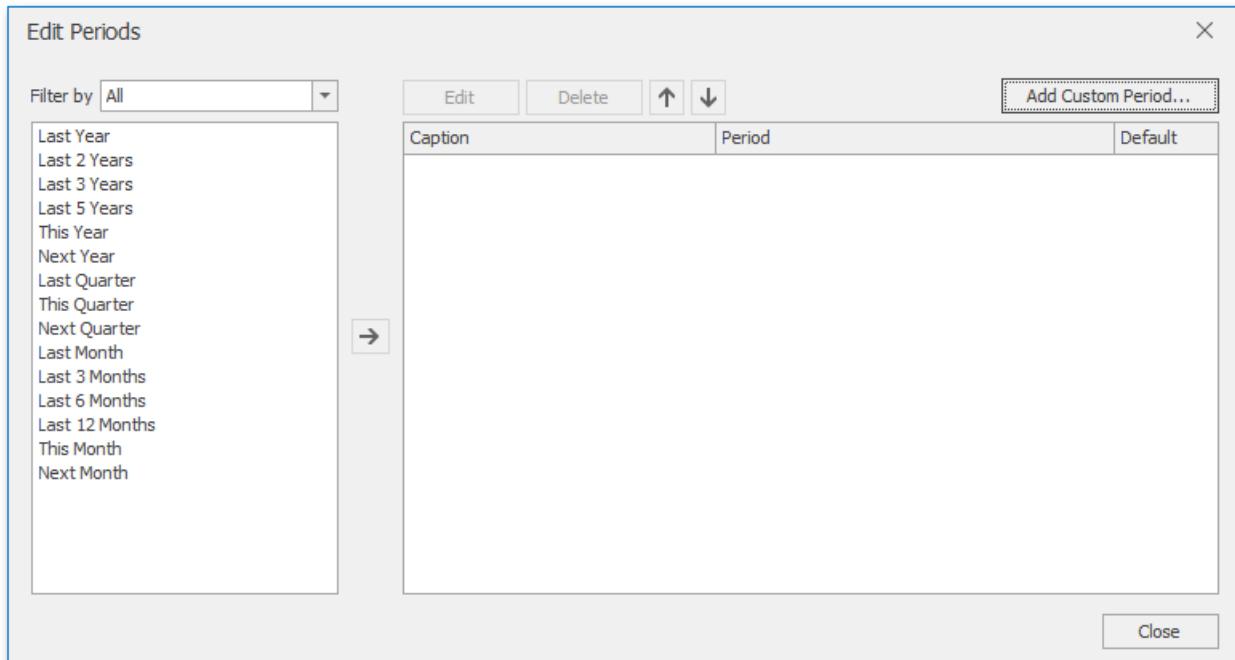


# Predefined Ranges

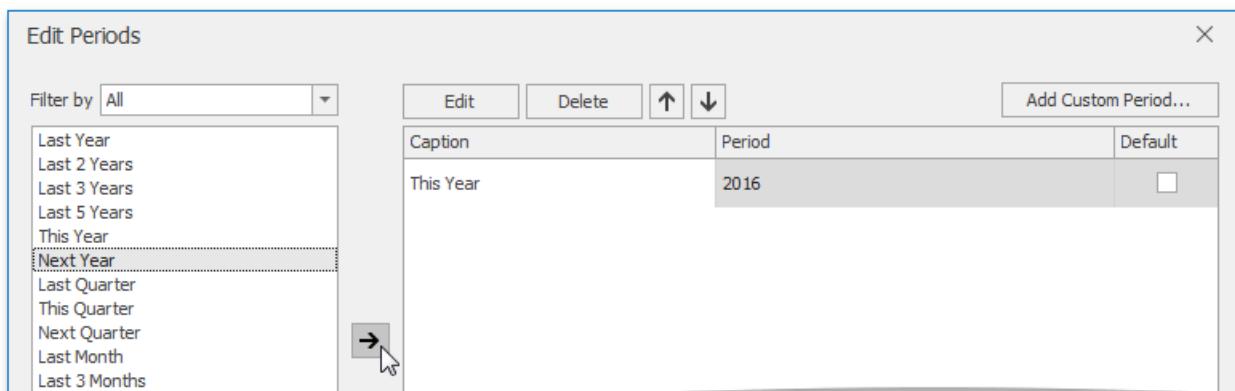
The Range Filter dashboard item allows you to add a number of predefined date-time periods that can be used to perform a selection (for instance, *year-to-date* or *quarter-to-date*).



To add a period, click the **Options** button (the icon) next to the **Argument** placeholder or use the **Edit Periods** button in the ribbon's **Design** tab. This invokes the **Edit Periods** dialog.



To add the selected period, use the button or double-click this period.

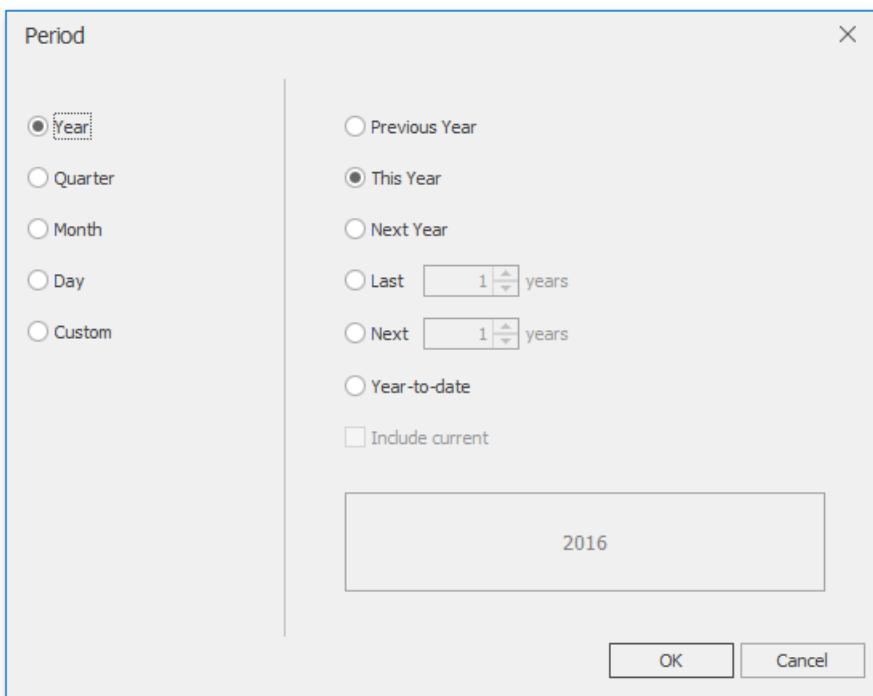


This period will be added to the right pane of the Edit Periods dialog. The following settings are available for the added period.

- **Caption** - Specifies the caption corresponding to the period.

- **Period** - Displays the date-time interval corresponding to the period.
- **Default** - Allows you to use the selected period as the default selection in the Range Filter dashboard item.

If necessary, you can customize the selected period by clicking the **Edit** button in the Edit Periods dialog. This invokes the **Period** dialog.



#### **NOTE**

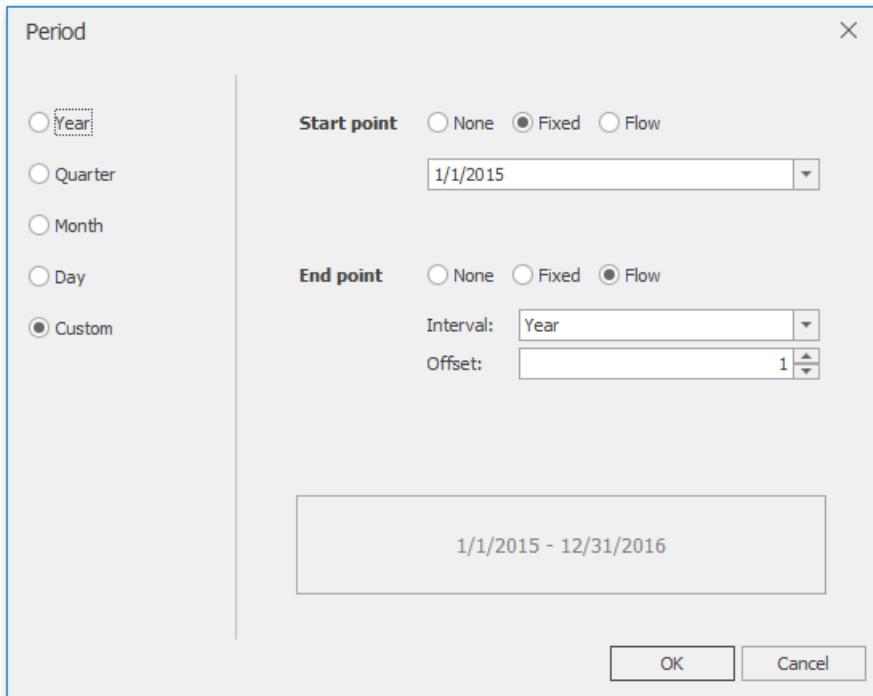
Note that the **Edit** dialog above contains the displayed periods (**Year**, **Quarter**, **Month**, **Day**) if the **group interval** of the Range Filter argument is set to **Day-Month-Year**.

This dialog allows you to add the following periods.

- **Year** - A period duration is measured in years.
  - **Previous Year** - Identifies the entire previous year.
  - **This Year** - Identifies the entire current year.
  - **Next Year** - Identifies the entire next year.
  - **Last Years** - Identifies a specific number of previous years. Use the **Include current** option to specify whether or not the period is ended with the current year.
  - **Next Years** - Identifies a specific number of next years. Use the **Include current** option to specify whether or not the period is started from the current year.
  - **Year-to-date** - A period from the beginning of the current year and up to the current day.
- **Quarter** - Period duration is measured in quarters.
  - **Previous Quarter** - Identifies the entire previous quarter.
  - **This Quarter** - Identifies the entire current quarter.
  - **Next Quarter** - Identifies the entire next quarter.
  - **Last Quarter** - Identifies a specific number of previous quarters. Use the **Include current** option to specify whether or not the period ends with the current quarter.
  - **Next Quarter** - Identifies a specific number of following quarters. Use the **Include current** option to specify whether or not the period starts from the current quarter.
  - **Quarter-to-date** - A period from the beginning of the current quarter and up to the current day.
- **Month** - Period duration is measured in months.

- **Previous Month** - Identifies the entire previous month.
- **This Month** - Identifies the entire current month.
- **Next Month** - Identifies the entire next month.
- **Last Month** - Identifies a specific number of previous months. Use the **Include current** option to specify whether or not the period ends with the current month.
- **Next Month** - Identifies a specific number of the following months. Use the **Include current** option to specify whether or not the period starts with the current month.
- **Month-to-date** - A period from the beginning of the current month and up to the current day.
- **Day** - Period duration is measured in days.
  - **Previous Day** - Identifies the entire previous day.
  - **This Day** - Identifies the entire current day.
  - **Next Day** - Identifies the entire next day.
  - **Last Day** - Identifies a specific number of previous days. Use the **Include current** option to specify whether or not the period ends with the current day.
  - **Next Day** - Identifies a specific number of the following days. Use the **Include current** option to specify whether or not the period starts with the current day.
- **Custom** - A custom period.

- Allows you to specify a period with the custom boundaries (**Start point** and **End point**).



You can specify the following settings for the start/end boundaries.

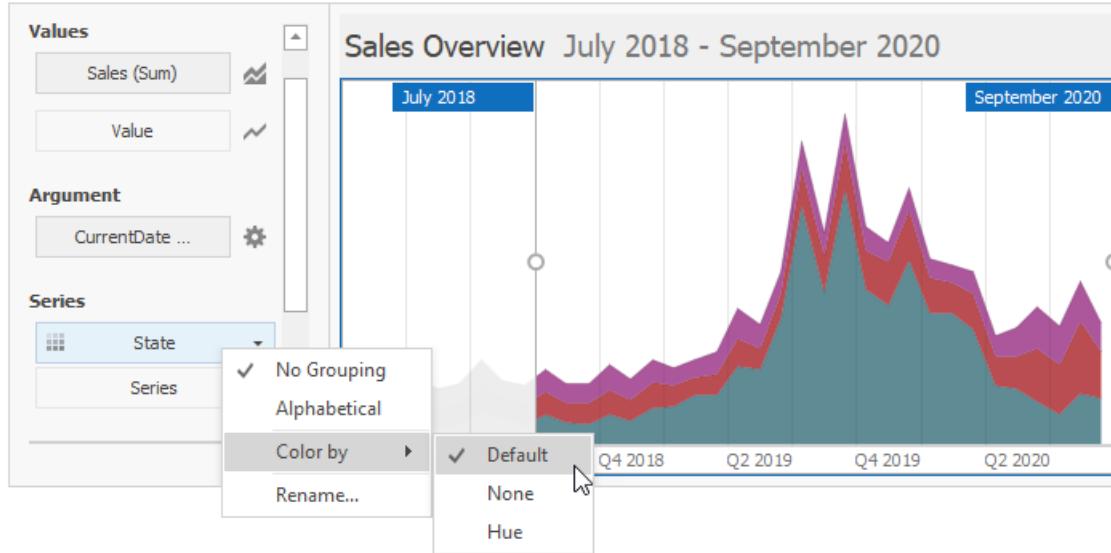
- **None** - The selection will begin from the start/end of the visible range.
- **Fixed** - Allows you to select a specific date value using the calendar.
- **Flow** - Allows you to select a relative date value. The **Interval** option specifies the interval between the current date and the required date. The **Offset** option allows you to set the number of such intervals.

#### **NOTE**

Note that the **Offset** option can accept negative and positive values. Negative values correspond to dates before the current date, while positive values correspond to future dates.

# Coloring

The Range Filter dashboard item paints different measures and series dimensions by **hue** in **Default** color mode. The image below shows the Range Filter item whose *State* series dimension values are painted in different colors. A special icon (■) on the data item shows that color variation is enabled.



## TIP

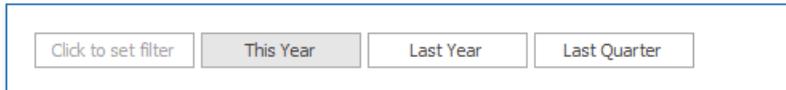
### Documentation:

- [Coloring Basics](#)

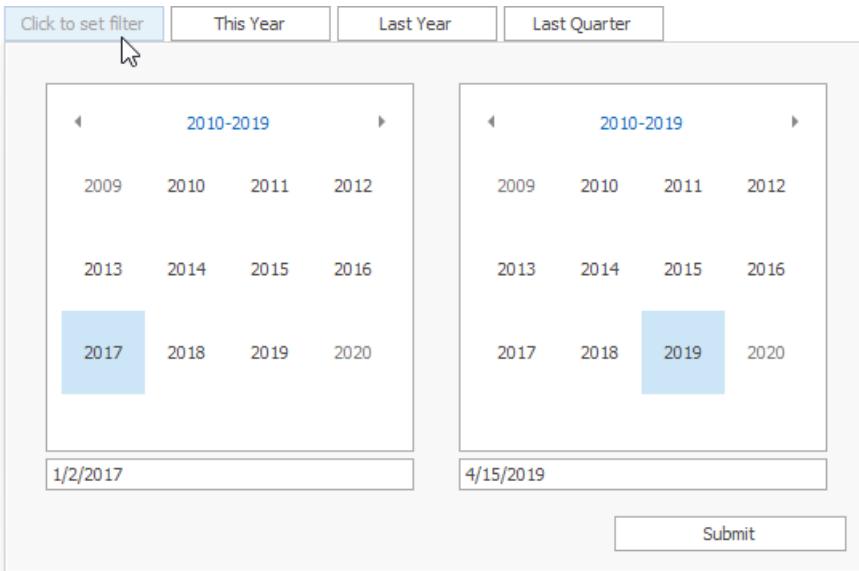
# Date Filter

The **Date Filter** dashboard item allows you to filter dashboard data based on the selected data range. The range can be relative (Last 3 Months), use fixed dates (01-01-2018), or presets (Month-to-date). You can also filter dates before or after a specified date.

The DateFilter item displays a set of intervals that can be used as quick filters.

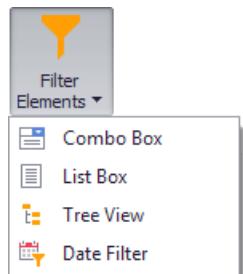


End-users can click the button to invoke the Date Picker:



## Add a New Date Filter to the Dashboard

To create a Date Filter item, click the **Filter Elements** drop-down button in the **Insert** group on the **Home** ribbon page and select **Date Filter**.



## Bind to Data

Use the **Data Items Pane** to perform data binding. Drag the dimension field from the **Data Source Browser** to the data item, and click the *Options* button to select **group intervals**.

The screenshot shows the 'DATA ITEMS' pane in Power BI. It includes sections for 'Dimension' (with a dropdown for 'OrderDate (Year)' and a gear icon), 'HIDDEN DATA ITEMS', 'Dimensions' (with a 'Dimension' button), and 'Measures' (with a 'Measure' button).

## Filter Type

A filter can be a DateTime value, DateTime range or infinite interval before or after a specified date.

To specify the filter type, click the drop-down **Filter Type** in the ribbon (Date Filter Tools contextual tab-> Design page -> Layout group):



## Date Picker

The screenshot shows a Date Filter item with two calendar controls. The left calendar displays 'January 2017' with dates from 1 to 31. The right calendar displays 'March 2019' with dates from 1 to 31. Both calendars show days of the week (SU, MO, TU, WE, TH, FR, SA). Below each calendar is a text input field: '1/9/2017' under the left calendar and '3/1/2019' under the right calendar. At the bottom is a 'Submit' button.

The DateFilter item contains a Date Picker - a button with a drop-down calendar. This button initially displays "Click to set filter".

The calendar drops down when the end user:

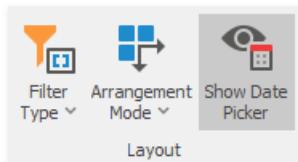
- clicks the button without a specified range (the button with the "Click to set filter" caption)
- clicks the icon on the button with the specified datetime range.

A drop-down calendar may contain a single calendar control (the Filter Type is Exact, Before or After) or two calendar controls (the

Filter Type is Between).

When the user selects the date, the Date Picker caption displays information about that date (date range) and the icon. The caption text is constructed from a custom string with date placeholders. If the user clicks the caption, The Date Picker button acts as a checked button to apply the date range (checked) or reset the date filter (unchecked) to its default value. When the user clicks the icon, the drop-down calendar appears and enables the user to select another date range.

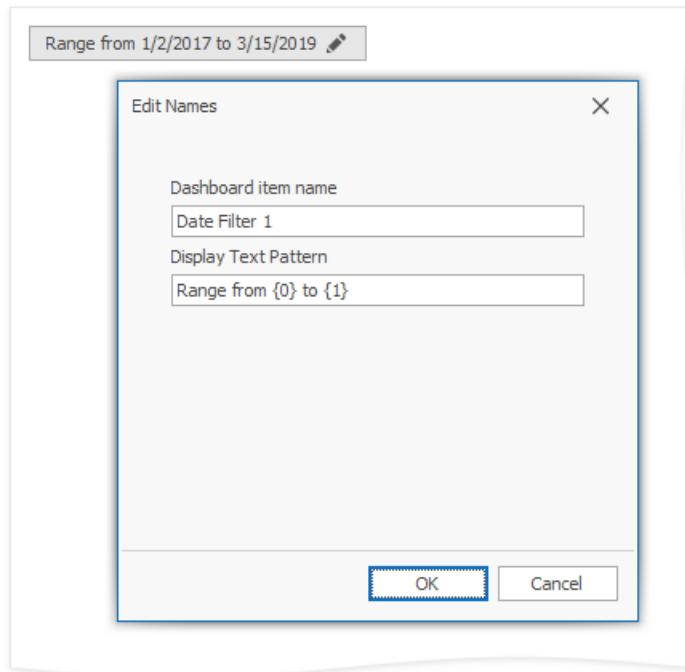
To show or hide the Date Picker component, click the **Show Date Picker** check button in the ribbon (Date Filter Tools contextual tab-> Design page -> Layout group):



## Display Format

To specify the date-time value format, use the **Format** submenu in the data item menu, as described in the [Formatting Data](#) topic.

To specify a custom string displayed in the Date Picker component, use the **Edit Names** dialog. To invoke the dialog, right-click the DateFilter item and click the **Edit Names...** menu item or click the **Edit Names** button in the **Design** Ribbon tab.



You can include placeholders in a custom string. The {0} placeholder is the interval's start, the {1} placeholder is the interval's end.

## Create Quick Filters

Quick Filters are buttons displayed within the DateFilter item. Each button has a DateTime range assigned to it. You can click the button to apply that range as a Date filter. The button is checked until the end-user clicks the same button once more to reset the filter to its default value. The button becomes unchecked if the end user clicks another button.



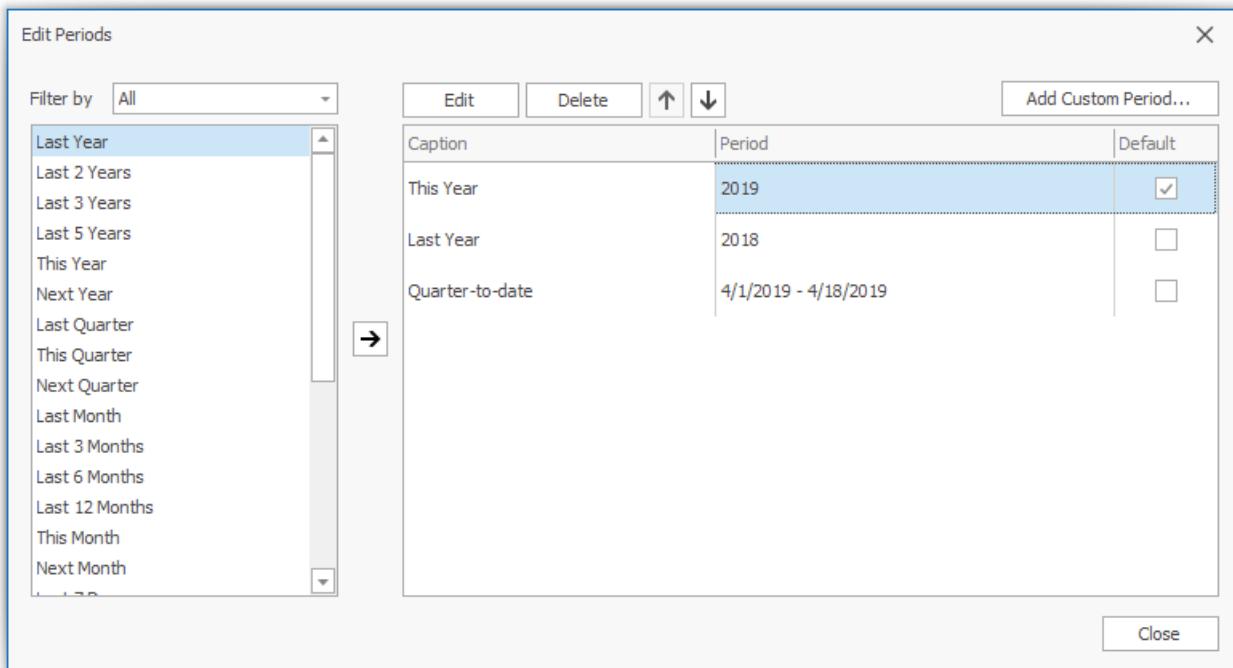
The item's context menu contains commands with the same captions that act as quick filters.

A newly created DateFilter dashboard item has no quick filters. To add a quick filter:

- in the dashboard designer, click the **Options** button (the gear icon) next to the *Argument* placeholder
- or select the **Edit Periods** command in the context menu
- or click the **Edit Periods** in the ribbon (Date Filter Tools contextual tab-> Design page -> Interactivity group):



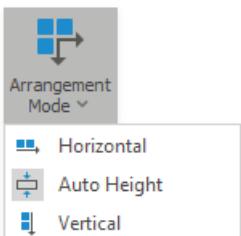
This invokes the **Edit Periods** dialog. You can select a [predefined range](#) or add a custom period, specify the quick filter's range and caption.



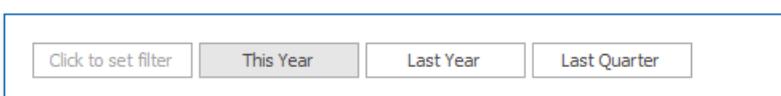
## Arrange Quick Filters

Quick filters in the DateFilter item can be arranged horizontally or vertically. The default mode is *auto height*, in which quick filters are displayed horizontally and the dashboard item shrinks automatically to fit the items and save space.

To specify the arrangement mode, click the **Arrangement Mode** drop-down in the ribbon (Date Filter Tools contextual tab-> Design page -> Layout group):



Auto Height Arrangement Mode:



Vertical Arrangement Mode:

Click to set filter

Year-to-date

Last Year

This Month

Horizontal Arrangement Mode:

Click to set filter

Year-to-date

Last Year

This Month

# Images

The Dashboard Designer allows you to add images to a dashboard.



You can either add a static image or you can use the Bound Image as a detail item along with the [Master Filtering](#) feature.

- [Image Types Overview](#)
- [Providing Images](#)
- [Interactivity](#)
- [Image Settings](#)

# Image Types Overview

The **Dashboard Designer** allows you to create two types of an **Image** dashboard item.

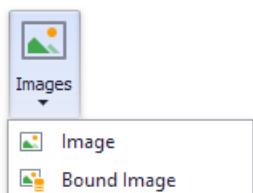
- The **Image** dashboard item allows you to add **static** images to a dashboard.



- The **Bound Image** dashboard item can be bound to a set of images (for instance, stored in the database). You can use the Bound Image as a detail item along with the [Master Filtering](#) feature.

Category	Picture
Beverages	
Condiments	
Confections	
Dairy Products	
Grains/Cereals	
Meat/Poultry	
Produce	
Seafood	

To create the required Image dashboard item, use the **Images** button in the **Home** ribbon tab.



# Providing Images

## Providing Static Images

To load an image to a dashboard item, use the **Load Image** and **Import Image** buttons in the Ribbon, or commands in the context menu (**Load Image...** and **Import Image...**, respectively).

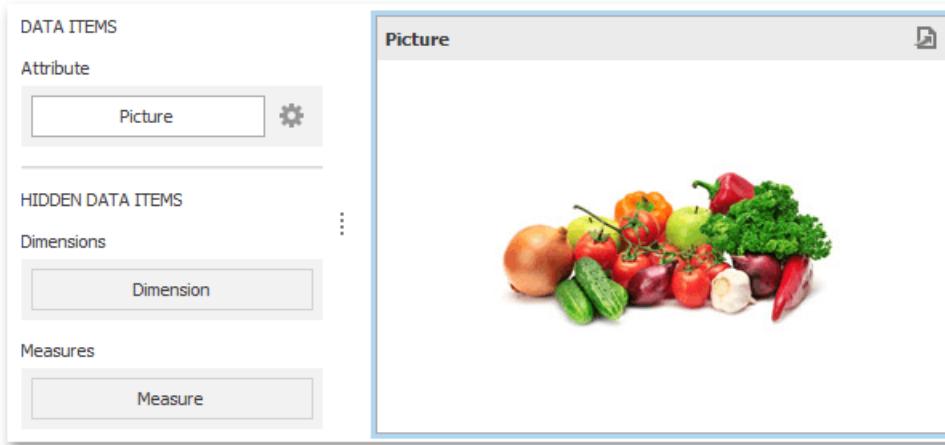


These commands invoke the **Open** dialog, which allows you to locate the desired image.

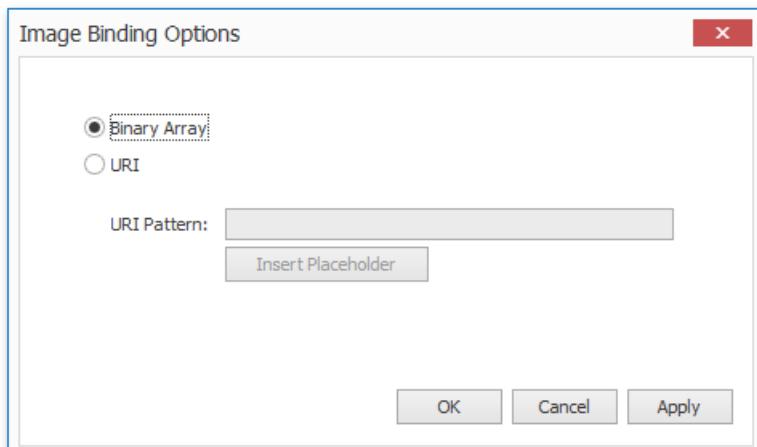
The **Load Image** command saves the path to the image in the dashboard definition, while the **Import Image** command saves the image itself.

## Binding the Bound Image to Data

The Bound Image dashboard item provides the Attribute data section containing the corresponding placeholder.



Specify the binding mode for the Bound Image by clicking the Options button (the icon) next to the Attribute placeholder. This invokes the following dialog.

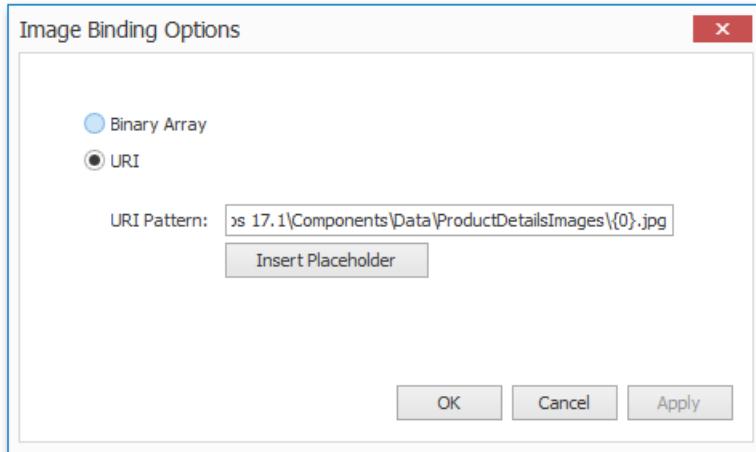


This dialog provides two options.

- **Binary Array** - Use this mode if images are stored in the data source as byte arrays.
- **URI** - Use this mode to locate images accessible by a predefined URL. In this case, the data source field should return strings

that are parts of URIs to these images.

For instance, the URI pattern in the form below specifies the path to the folder containing the required images.



Data source field values will be inserted to the position of the {0} placeholder. Thus, the Bound Image maps the current dimension value with the image placed at the specified URI.

#### NOTE

Note that the Bound Image can display only a single image simultaneously. If [Master Filtering](#) is not applied to the Bound Image, it selects the displayed image in the following ways.

- In the **Binary Array** mode, the displayed image cannot be predicted precisely as a result of sorting limitations for the *image/binary* data types. Use the [Master Filtering](#) feature to display the specified image.
- In the **URI** mode, the Bound Image displays an image corresponding a first attribute value taking into account the attribute's sort order.

# Interactivity

This document describes the features that enable interaction between the **Bound Image** and other dashboard items. These features include **Master Filtering**.

## Master Filtering

The Dashboard allows you to use most of the data-aware dashboard items as a filter for other dashboard items (**Master Filter**). To learn more, see the [Master Filtering](#) topic, which describes filtering concepts common to all dashboard items.

Data displayed in the **Bound Image** dashboard item can be filtered by other master filter items. For instance, the **Bound Image** below shows an image corresponding to a category selected in the **Grid** dashboard item.

Category	Picture
Beverages	
Condiments	
Confections	
Dairy Products	
Grains/Cereals	
Meat/Poultry	
Produce	
Seafood	

You can prevent the Bound Image from being affected by other master filter items using the **Ignore Master Filters** button on the **Data** ribbon tab.

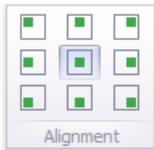


# Image Settings

You can customize the representation of Image and Bound Image dashboard items in different ways.

## Image Alignment

To specify how the image is aligned within the dashboard item, use the **Alignment** group in the **Design** ribbon tab.



## Image Size Mode

You can specify the image size mode that defines how the image fits within the dashboard item.

To do this, use the **Size Mode** group in the Ribbon's **Design** tab.



The following table illustrates each size mode in two cases: when the image is smaller than the dashboard item, and vice versa.

SIZE MODE	IMAGE SMALLER THAN DASHBOARD ITEM	IMAGE LARGER THAN DASHBOARD ITEM	DESCRIPTION
Clip			The image is clipped if it is larger than the <b>Image</b> dashboard item.
Stretch			The image is stretched or shrunk to fit the size of the <b>Image</b> dashboard item.
Squeeze			If the dimensions of the <b>Image</b> dashboard item exceed those of the image it contains, the image is shown in full-size. Otherwise, the image is resized to fit the dimensions of the <b>Image</b> dashboard item.
Zoom			The image is sized proportionally (without clipping), so that it best fits the <b>Image</b> dashboard item. If the aspect ratio of the <b>Image</b> dashboard item is the same as the aspect ratio of the image, it will be resized to fit into the <b>Image</b> dashboard item while maintaining its aspect ratio. Otherwise, the image will be resized in the closest fitting dimension (either the height or the width), and the remaining dimension will be resized while maintaining the image's aspect ratio.

# Text Box

Use the **Text Box** dashboard item to display rich text within a dashboard.

The screenshot shows a dashboard interface with two main components. On the left is a sidebar titled "Product" containing a list of items with radio buttons: DesktopLCD 21, DesktopLED 21, HD Video Player, Projector Plus, Projector PlusHD, SuperLCD 42, SuperLCD 70, SuperLED 42, and SuperPlasma 50. The "DesktopLCD 21" item is selected. To its right is a larger panel titled "Product Description". At the top of this panel is the bolded text "DesktopLCD 21". Below it is a table of product details:

<i>Production Start:</i>	<b>31-Mar-10</b>
<i>Consumer Rating:</i>	<b>3 of 5</b>
<i>Retail Price:</i>	<b>\$170</b>
<i>Best Sales Year:</i>	<b>2015</b>
<i>Best Sales Company:</i>	<b>ACME</b>

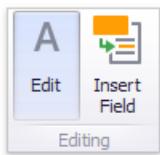
Below the table is a descriptive paragraph: "The 21" Brilliance LCD Computer Monitor is changing the way people display computer signals. It's amazing build quality and high precision design means you get the best possible computer picture for the best possible price. It delivers crystal-clear images with mind-blowing video. The bottom-line is simple, this Monitor offers Full HD resolution with 240Hz refresh rate."

You can either add a static text or you can use the Text Box as a detail item along with the [Master Filtering](#) or [Filtering](#) features.

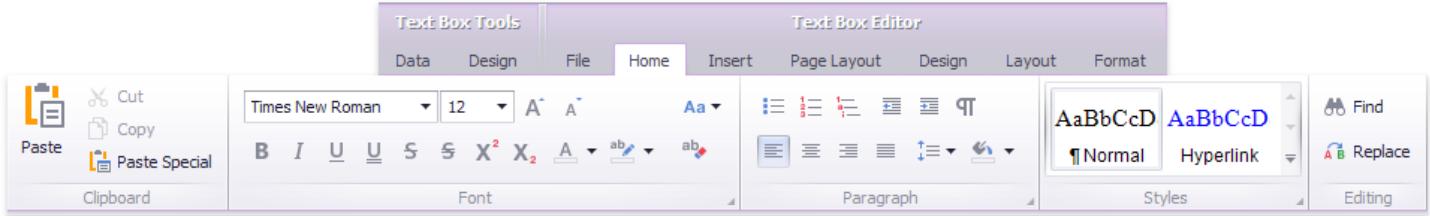
- [Editing Text](#)
- [Providing Data](#)
- [Interactivity](#)

# Editing Text

To edit the text within the Text Box, click the **Edit** button in the ribbon's **Design** tab or use the corresponding item in the context menu.



This adds the **Text Box Editor** context category to the Dashboard Designer's ribbon and allows you to modify the content within the Text Box.



To learn how to edit the content within the Text Box, see [Rich Text Editor](#). After you change the document, click **Edit** again to finish editing.

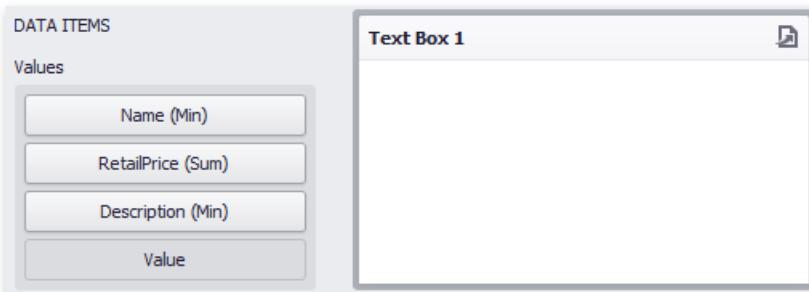
## NOTE

Note that the Text Box can be bound to data. To learn how to do this, see [Providing Data](#).

# Providing Data

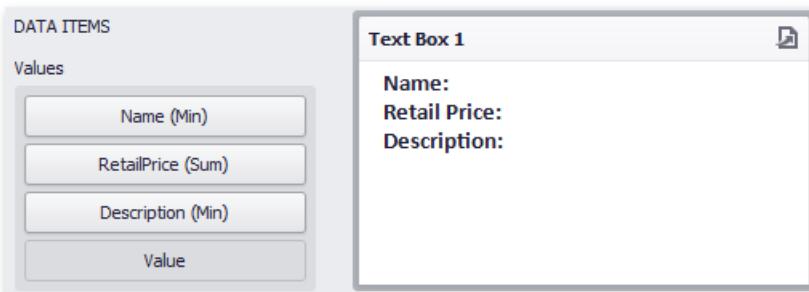
The Text Box dashboard item can be [bound to data](#) as other data-aware dashboard items. To do this, perform the following steps.

1. Drop the *Name*, *RetailPrice* and *Description* data source fields from the *Products* table to the **Values** section of the Text Box.



Note that [summary types](#) of the created measures are **Min**, **Sum** and **Min**, respectively.

2. Click the [Edit](#) button in the **Design** ribbon tab and add the *Name*, *Retail Price* and *Description* strings to the document.



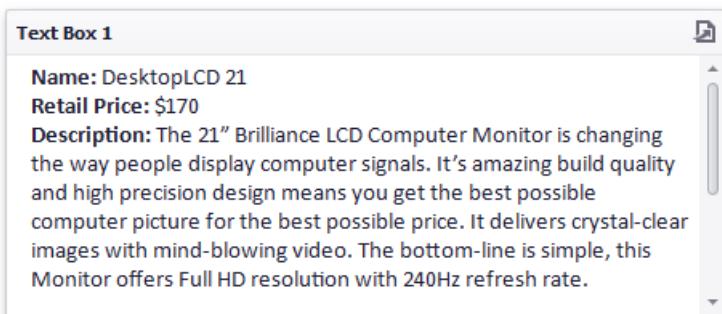
3. Place the pointer next to *Name*, right-click the document and select **Insert Field** (or use the [Insert Field](#) button in the ribbon). Then, click the *Select value* placeholder and select the *Name (Min)* measure.



4. Perform the third step for *Retail Price* and *Description*.

Name: Name (Min)  
Retail Price: RetailPrice (Sum)  
Description: Description (Min)

5. Click the [Edit](#) button again to leave the editing mode. The Text Box will show data in the following way.



You can use this Text Box as a detail item along with the [Master Filtering](#) feature to filter data according to the selected product.

# Interactivity

This document describes the features that enable interaction between the **Text Box** and other dashboard items. These features include **Master Filtering**.

## Master Filtering

The Dashboard allows you to use most of the data-aware dashboard items as a filter for other dashboard items (**Master Filter**).

To learn more, see the [Master Filtering](#) topic, which describes filtering concepts common to all dashboard items.

Data displayed in the Text Box dashboard item can be filtered by other master filter items. For instance, the Text Box below shows data corresponding to a product selected in the [List Box](#) dashboard item.

**Product**

- DesktopLCD 21
- DesktopLED 21
- HD Video Player
- Projector Plus
- Projector PlusHD
- SuperLCD 42
- SuperLCD 70
- SuperLED 42
- SuperPlasma 50

**Product Description**

**DesktopLCD 21**

*Production Start:* 31-Mar-10

*Consumer Rating:* 3 of 5

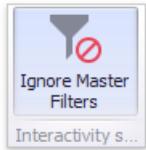
*Retail Price:* \$170

*Best Sales Year:* 2015

*Best Sales Company:* ACME

The 21" Brilliance LCD Computer Monitor is changing the way people display computer signals. It's amazing build quality and high precision design means you get the best possible computer picture for the best possible price. It delivers crystal-clear images with mind-blowing video. The bottom-line is simple, this Monitor offers Full HD resolution with 240Hz refresh rate.

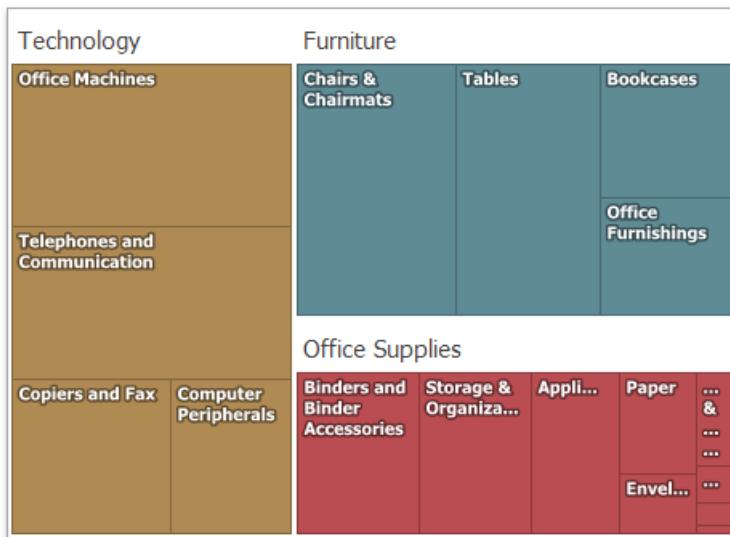
You can prevent the Text Box from being affected by other master filter items using the **Ignore Master Filters** button on the **Data** ribbon tab.



Interactivity s...

# Treemap

Use the Treemap dashboard item to visualize data in nested rectangles that are called *tiles*.



This section is divided into the following subsections.

- [Providing Data](#)
- [Interactivity](#)
- [Layout](#)
- [Grouping](#)
- [Coloring](#)
- [Labels](#)

# Providing Data

The Dashboard Designer allows you to bind various dashboard items to data in a virtually uniform manner. To learn more, see the [Bind Dashboard Items to Data](#) topic. The only difference is in the data sections that the required dashboard item has.

The Treemap dashboard item has the **Values** and **Arguments** data sections that provide numeric and discrete categorical data, respectively. The steps below provide the most common scenarios of binding a Treemap to data.

1. Drop the *Sales* and *Profit* fields to the **Values** section.

The screenshot shows the Dashboard Designer interface. On the left, the 'DATA ITEMS' panel is open, showing the 'Values' section with three items: 'Sales (Sum)', 'Profit (Sum)', and 'Value'. Below it is the 'Arguments' section with one item: 'Argument'. At the bottom of the panel are 'HIDDEN DATA ITEMS' and 'Dimensions' sections. To the right, a Treemap visualization titled 'Treemap 1' is displayed. It contains two large tiles: a teal tile labeled 'Sales (Sum)' and a red tile labeled 'Profit (Sum)'. The overall layout is clean and organized, typical of a modern dashboard design tool.

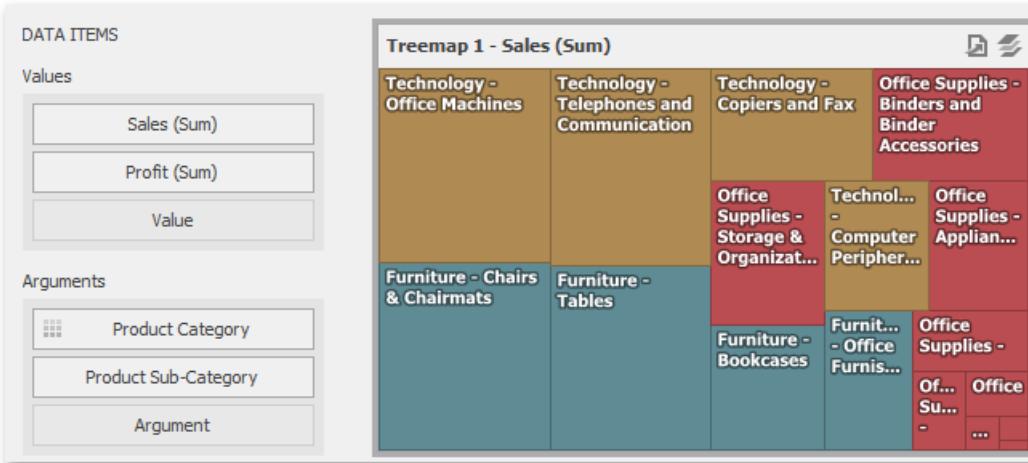
The Treemap will draw two tiles whose sizes correspond to the *Sales* and *Profit* summary values.

2. Drop the *Product Category* field to **Arguments**.

The screenshot shows the Dashboard Designer interface again. The 'DATA ITEMS' panel now includes the 'Arguments' section with 'Product Category' and 'Argument'. To the right, a Treemap visualization titled 'Treemap 1 - Sales (Sum)' is shown with three categories: 'Technology' (brown), 'Furniture' (teal), and 'Office Supplies' (red). A context menu is open over the 'Office Supplies' tile, showing options for 'Sales (Sum)' and 'Profit (Sum)'. The 'Sales (Sum)' option is checked. This demonstrates how to switch between different data series for a specific category.

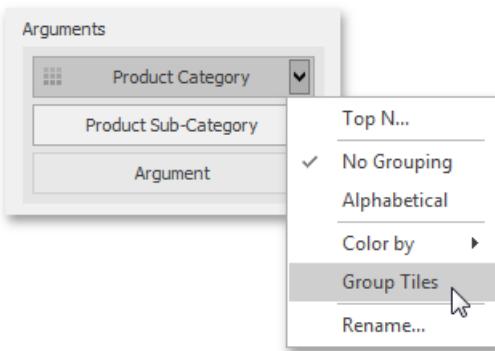
Treemap will create individual tiles for all categories. You can switch between *Sales* and *Profit* values by clicking the icon in the item's [caption](#) or you can use its context menu.

3. Drop the child *Product Sub-Category* field into **Arguments**.

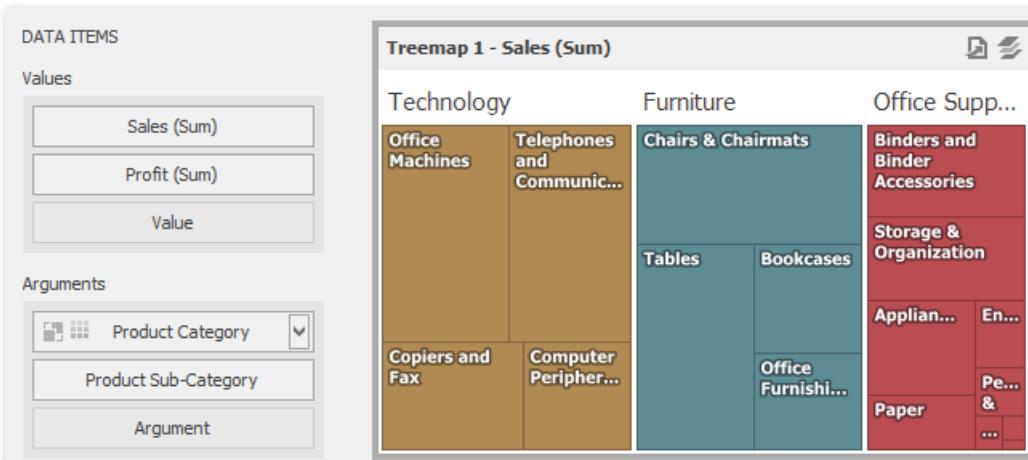


The Treemap will visualize all combinations of categories and corresponding sub-categories using individual tiles.

4. If the **Arguments** section contains several dimensions, you can **group** child tiles by values of the parent dimension. To group sub-categories inside corresponding categories, click the *CategoryName* menu button and select **Group Tiles**.



Sub-category tiles will be grouped into category groups.



# Interactivity

This section describes features that enable interaction between the **Treemap** dashboard item and other items. These features include **Master Filtering** and **Drill-Down**.

The section contains the following topics.

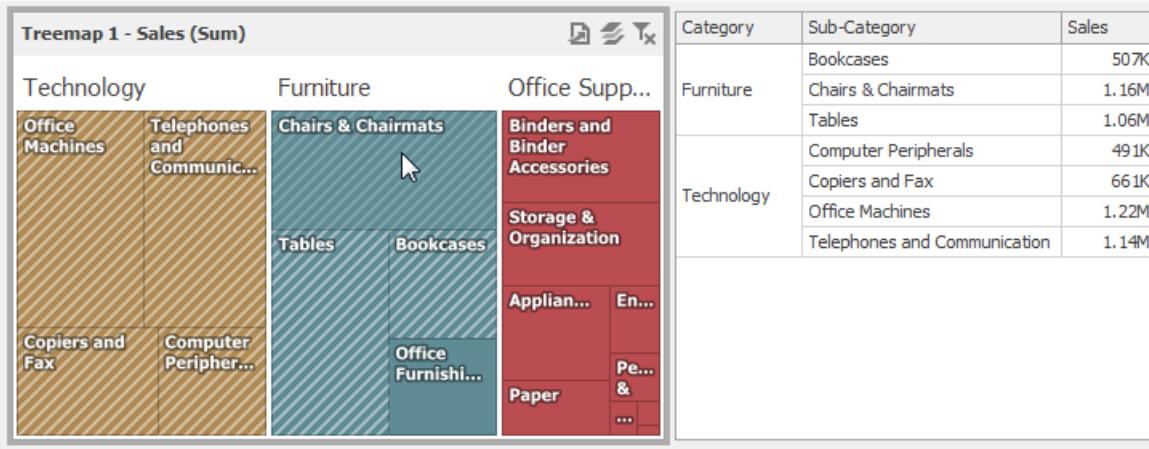
- [Master Filtering](#)
- [Drill-Down](#)

# Master Filtering

The **Dashboard Designer** allows you to use any data aware dashboard item as a filter for other dashboard items. To learn more, see the [Master Filtering](#) topic, which describes filtering concepts common to all dashboard items.

The Treemap dashboard item supports filtering by tiles/groups.

When Master Filtering is enabled, you can click a tile or group caption (or multiple tiles/groups by holding down the **CTRL** key) to make other dashboard items only display data related to the selected tile/group(s).



## NOTE

If the Single Master Filter is used, you can select only tiles corresponding to the bottommost level.

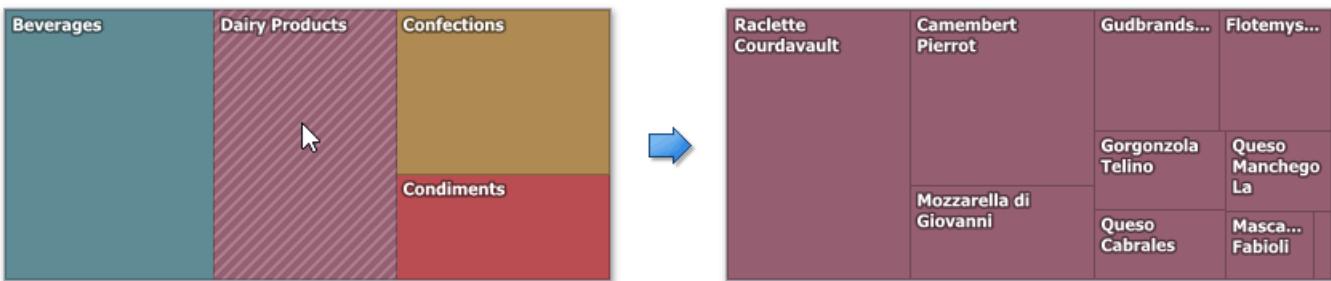
# Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more about drill-down concepts common to all dashboard items, see the [Drill-Down](#) topic.

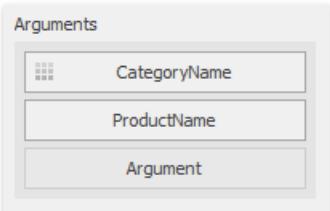
When drill-down is enabled, you can click a tile to view its details.

## NOTE

When **Master Filtering** is enabled, you can view the details by double-clicking a tile.



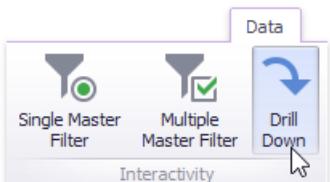
Drill-down requires that the **Arguments** section contains several dimensions, from the least detailed to the most detailed dimension.



## NOTE

In OLAP mode, you can perform drill-down for either a hierarchy data item or several dimension attributes.

To enable drill-down, click the **Drill Down** button in the **Data** Ribbon tab (or the  button if you are using the toolbar menu).



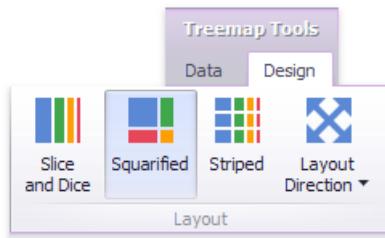
To return to the previous detail level (drill up), use the **Drill Up**  button in the caption of the Treemap dashboard item, or the **Drill Up** command in the context menu.

## NOTE

Grouping is not in effect when the drill-down is enabled.

# Layout

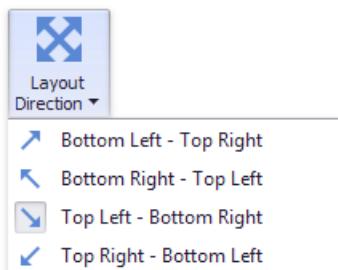
This topic describes how to change a layout algorithm used to arrange Treemap tiles. To do this in the Designer, use buttons from the **Layout** group placed in the **Design** ribbon tab.



The following algorithms are available.

ALGORITHM	EXAMPLE	DESCRIPTION
Slice and Dice	A treemap visualization where the total area is divided into vertical columns of varying widths. Each column contains a different category label at the top, such as 'Office Machines', 'Chairs & Chairmats', 'Telephones and Communication', 'Tables', 'Copiers and Fax', 'Binders and Binder Accessories', 'Storage & Organization', 'Bookcases', 'Computer Peripherals', 'Appliances', 'Office Furnishings', 'Paper', 'En...', 'Pens & Art', and '...'. The colors of the tiles vary by category.	This layout algorithm divides the space between items, slicing it in the specified direction depending on item value.
Squarefied	A treemap visualization where the tiles are arranged in a grid-like pattern to make their width/height ratio closer to 1. The same category labels as the Slice and Dice example are present, though some are partially cut off. The tiles are more rectangular compared to the vertical slices in the first example.	The Squarefied algorithm arranges tiles so that their width/height ratio will be closer to 1.
Striped	A treemap visualization where the tiles are arranged in horizontal rows. The categories are the same as the other examples, but the layout is more horizontal, creating a striped effect.	This algorithm is a modified version of the Squarefied algorithm. The difference here is that tiles are drawn side by side as columns or rows.

You can also set a layout direction to specify an arrangement of tiles depending on their sizes. To do this, click the **Layout Direction** button and select the required direction.

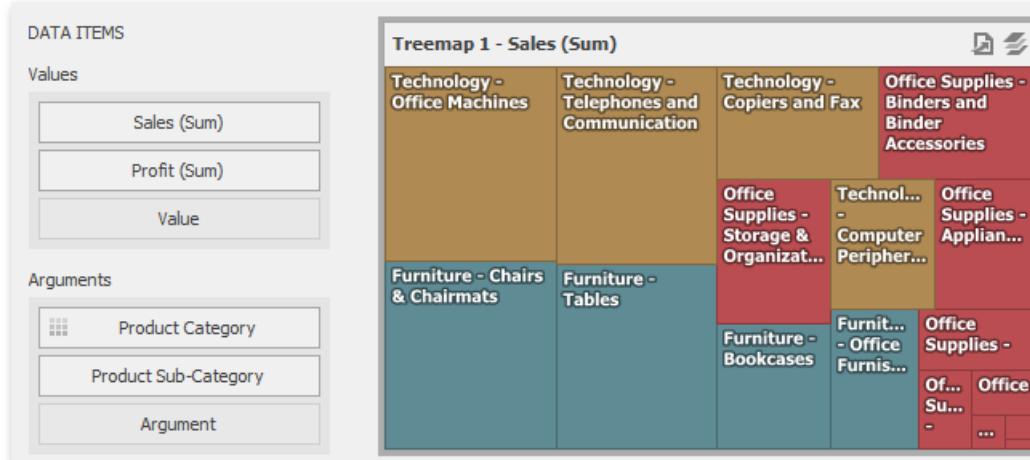


- **Bottom Left - Top Right** - Arrange tiles from the bottom-left to the top-right corner.
- **Bottom Right - Top Left** - Arrange tiles from the bottom-right to the top-left corner.
- **Top Left - Bottom Right** - Arrange tiles from the top-left to the bottom-right corner.

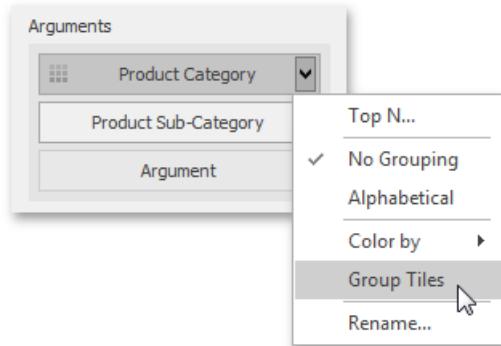
- **Top Right - Bottom Left** - Arrange tiles from the top-right to the bottom-left corner.

# Grouping

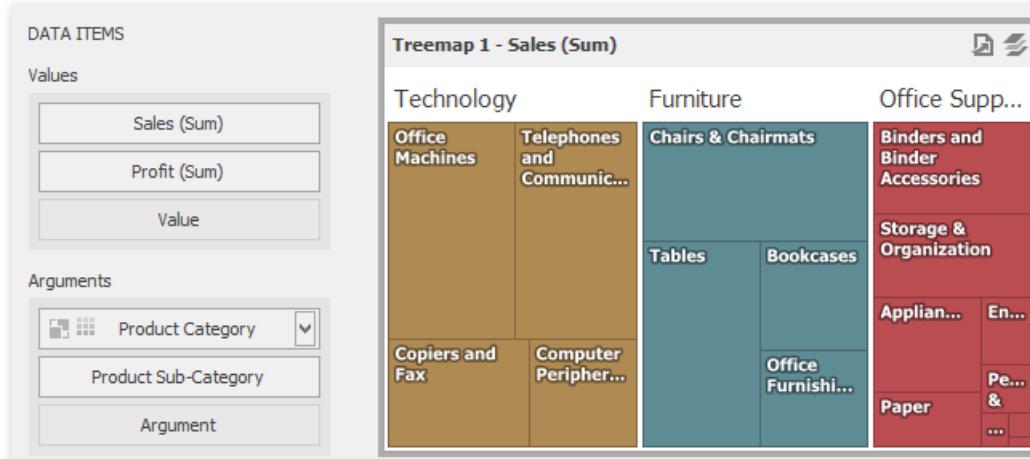
If you use several [arguments](#) in the Treemap, you can group tiles corresponding to child values by parent values. For instance, the following Treemap dashboard item displays combinations of categories and sub-categories.



To group sub-categories inside corresponding categories, click the *Product Category* menu button and select **Group Tiles**.



Product tiles will be grouped into category groups.



Note that the icon will be displayed within the *Product Category* dimension.

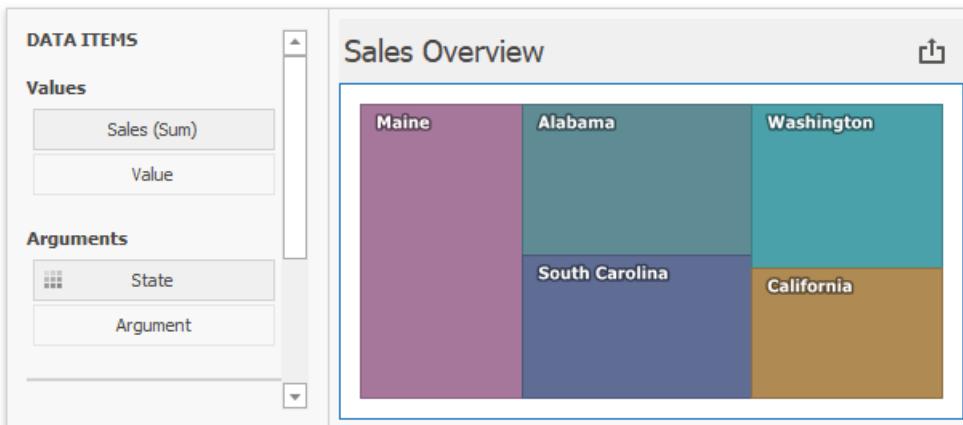
# Coloring

In **Default** color mode, the Treemap dashboard item colors its tiles in the following ways:

- If the Treemap dashboard item contains only measures (the **Values** section), values corresponding to different measures are colored by **hue**.



- If the Treemap dashboard item contains arguments (the **Arguments** section), values corresponding to the first argument are colored by hue.



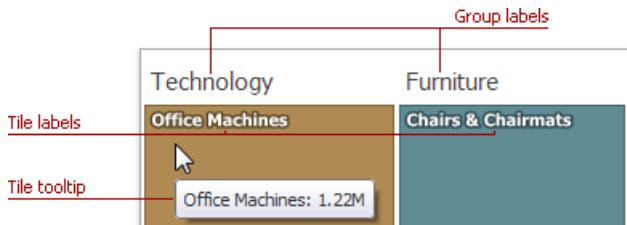
## ⓘ TIP

### Documentation:

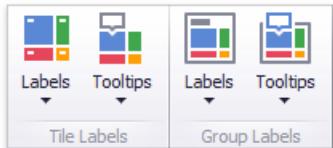
- [Coloring Basics](#)

# Labels

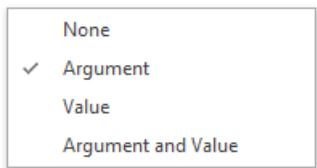
The Treemap displays **labels** that contain descriptions for tiles and **groups**, and provide **tooltips** with additional information.



You can specify which information should be displayed within tile and group labels separately. To do this, use the **Labels** and **Tooltips** buttons in the **Design** Ribbon tab.



Use buttons within the **Tile Labels/Group Labels** ribbon groups to manage tile and group labels, respectively. These buttons invoke the drop-down menu, which is similar for all buttons.



# Filter Elements

Filter elements represent a special type of dashboard item that allows you to apply filtering to other dashboard items.

Topics in this section.

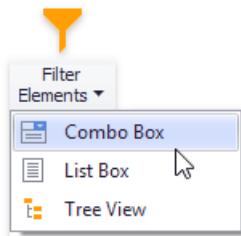
- [Filter Elements Overview](#)
- [Providing Data](#)
- [Interactivity](#)

# Filter Elements Overview

The **Dashboard Designer** allows you to create filter elements that used to filter other dashboard items.

- [Combo Box](#)
- [List Box](#)
- [Tree View](#)
- [Date Filter](#)

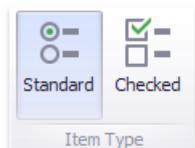
To add the required filter element to the dashboard, use the **Filter Elements** button in the **Home** ribbon tab.



## Combo Box

The **Combo Box** dashboard item allows you to select a value(s) from the drop-down list.

You can switch the combo box type in the ribbon **Design** tab.



COMBO BOX TYPE	EXAMPLE	DESCRIPTION
Standard	A screenshot of a standard dropdown menu. The top item '(All)' is selected. Below it is a list of categories: Beverages, Condiments, Confections, Dairy Products, Grains/Cereals, and Meat/Poultry. The 'Condiments' item is currently being selected by a cursor.	Allows you to select only a single value.
Checked	A screenshot of a checked dropdown menu. The top item '(All)' is selected and checked. Below it is a list of categories: Beverages, Condiments, Confections, Dairy Products, Grains/Cereals, and Meat/Poultry, all of which are checked. At the bottom of the menu are 'OK' and 'Cancel' buttons.	Allows you to select multiple values in the invoked drop-down list.

## List Box

The **List Box** dashboard item allows you to select a value(s) from the list.

You can switch the list box type in the ribbon **Design** tab.



LIST BOX TYPE	EXAMPLE	DESCRIPTION
Checked	<input type="checkbox"/> (All) <input checked="" type="checkbox"/> Beverages <input checked="" type="checkbox"/> Condiments <input checked="" type="checkbox"/> Confections <input type="checkbox"/> Dairy Products <input checked="" type="checkbox"/> Grains/Cereals <input type="checkbox"/> Meat/Poultry <input type="checkbox"/> Produce <input type="checkbox"/> Seafood	Allows you to select multiple values in the list box.
Radio	<input type="radio"/> (All) <input checked="" type="radio"/> Beverages <input type="radio"/> Condiments <input type="radio"/> Confections <input type="radio"/> Dairy Products <input type="radio"/> Grains/Cereals <input type="radio"/> Meat/Poultry <input type="radio"/> Produce <input type="radio"/> Seafood	Allows you to select only a single value in the radio group.

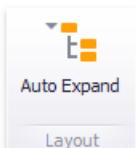
## Tree View

The **Tree View** dashboard item displays values in a hierarchical way and allows you to expand/collapse nodes.

The screenshot shows a 'Tree View 1' item. The hierarchy is as follows:

- (All)
- 2016 (checked)
- 2017 (checked)
- 2018 (selected)
  - January (checked)
  - February (checked)
  - March
  - April
  - May
  - June

You can manage the initial expanded state of filter values using the **Auto Expand** button in the **Design** ribbon tab.



## Date Filter

The **Date Filter** dashboard item allows you to filter dashboard data based on the selected data range. The range can be relative (Last 3 Months), use fixed dates (01-01-2018), or presets (Month-to-date). You can also filter dates before or after a specified date.

The DateFilter item displays a set of intervals that can be used as quick filters.

[Click to set filter](#)

[This Year](#)

[Last Year](#)

[Last Quarter](#)

See [Date Filter](#) for details.

# Providing Data

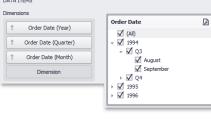
This topic describes how to bind filter elements to data using the **Dashboard Designer**.

The Dashboard Designer allows you to bind various dashboard items to data in a consistent manner (see [Bind Dashboard Items to Data](#) for details), the only difference being the data sections that these dashboard items comprise.

## Binding Overview

All filter elements provide the **Dimensions** data section, which accepts dimensions used to provide filter values.

To learn about the specifics of binding various filter elements to data, see the table below.

DASHBOARD ITEM	DATA SECTIONS	DESCRIPTION
Combo Box		The Combo Box filter element can contain several dimensions at the <b>Dimensions</b> data section. In this case, the drop-down list will contain combinations of dimension values.
List Box		The List Box filter element can contain several dimensions at the <b>Dimensions</b> data section. In this case, the list will contain combinations of dimension values.
Tree View		The Tree View filter element allows you to display dimension values in a hierarchical way. This can be the set of dimensions with different <a href="#">group intervals</a> (for instance, Year/Quarter/Month) or the set of related dimensions (for instance, geographical data such as continents/countries/cities).

# Interactivity

This document describes the filtering capabilities supported by filter elements. You can use filter elements to apply master filtering to other dashboard items or introduce hierarchical filtering by adding several connected filters.

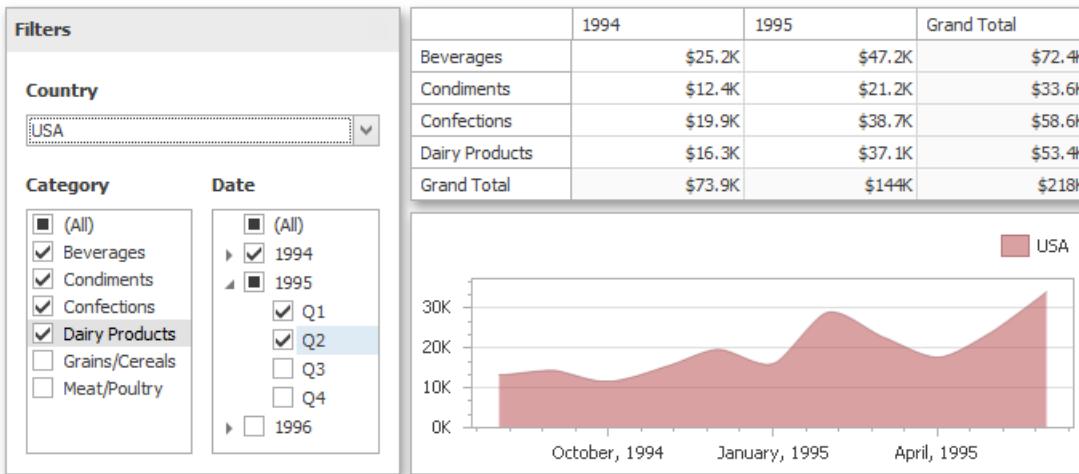
## Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more, see the [Master Filtering](#) topic, which describes filtering concepts common to all dashboard items.

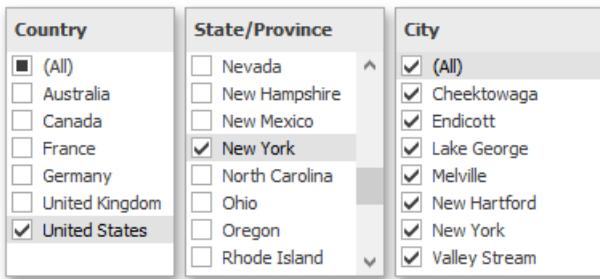
### IMPORTANT

Note that filter elements do not support Master Filter selection modes. You can switch the selection mode by [changing the type](#) of the required filter element.

Depending on the filter element type, you can select a value(s) to make other dashboard items display only data related to the selected value(s).



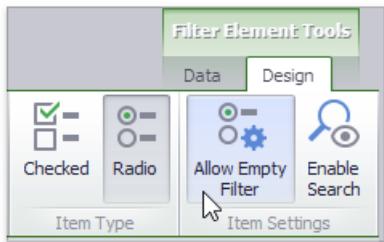
You can also create a set of related filter elements containing relevant filter values. For instance, in the image below, the **State/Province** filter element contains states related to the 'United States' value, while the **City** filter element contains cities related to the 'New York' value.



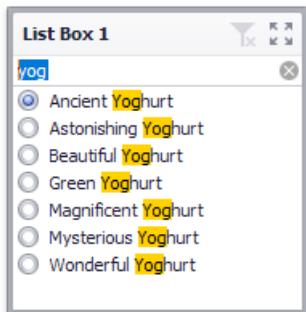
Disable the **Ignore Master Filters** option for the required filter element to allow applying filtering to this element.

## Filter Element Options

Standard Combo Box and Radio List Box filter elements have the *(Allow Empty Filter)* option that enables the filter mode without selected items. To enable the mode, click the **Allow Empty Filter** button in the **Design** ribbon tab.



The **Enable Search** button displays the search box that allows you to search and filter as you type:

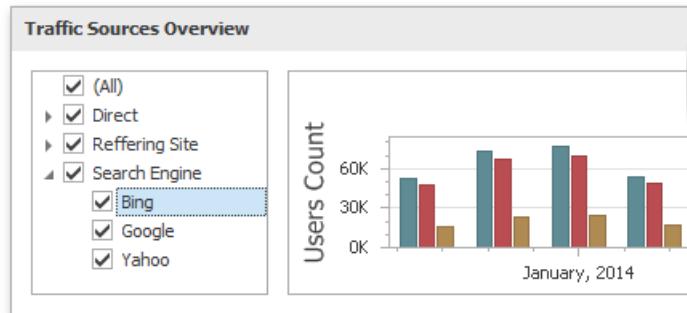


# Dashboard Item Group

DevExpress Dashboard provides the capability to combine dashboard items into a group. The dashboard item group serves two main purposes.

- Combine dashboard items within the dashboard into a separate [layout group](#).
- Manage [interaction](#) between dashboard items within and outside the group.

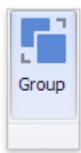
For instance, you can combine related [filter elements](#) and [data visualization dashboard items](#) into a group.



- [Create a Group](#)
- [Interactivity](#)

## Create a Group

To create a new group, use the **Group** button in the **Home** ribbon tab.



You can add dashboard items to a group and manage item layout using [drag-and-drop](#). To learn how to manage a group's caption, see the [Dashboard Item Caption](#) topic.

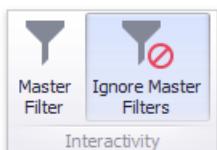
### NOTE

Note that a dashboard item group cannot be added to another group.

## Interactivity

The dashboard item group provides the capability to manage [interaction](#) between dashboard items within and outside the group.

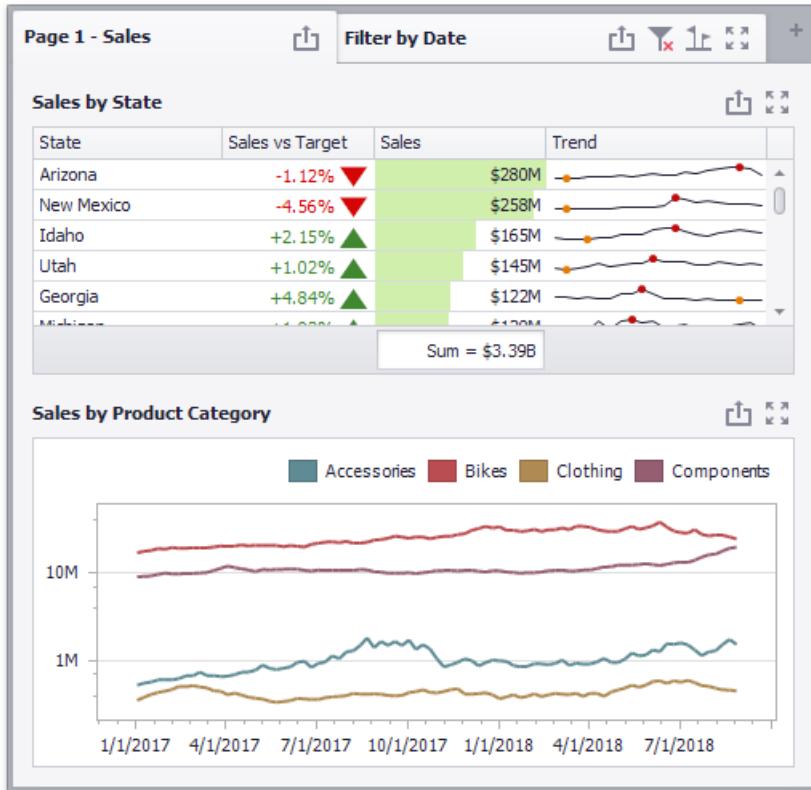
The **Master Filter** button allows you to specify whether the current group allows you to filter external dashboard items using master filter items contained within the group. If this option is disabled, master filter items contained within the group can filter only dashboard items from this group.****



The **Ignore Master Filters** button allows you to isolate dashboard items contained within the group from being filtered using external master filter items.

# Tab Container

The **Tab container** dashboard item allows you to split the dashboard layout into several pages. Common filter controls for large elements in a dashboard can be located on a separate tab page.



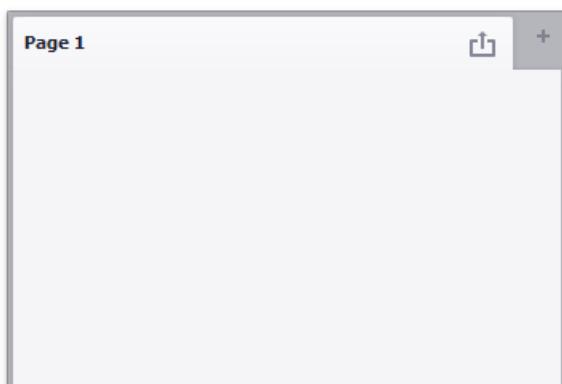
- Overview
- Tab Order
- Display Item as Page
- Selection
- Interactivity

## Overview

To create a tab container, use the **Tab Container** button in the **Home** ribbon tab:



A newly created tab container contains an empty tab page (*Page 1*).

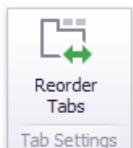


Click the + (plus) icon to add an empty page to the tab container. You can use **drag-and-drop** to add dashboard items to a tab page and manage the layout. Tab containers cannot be nested, so you cannot add a tab container to another tab container. However, a tab container can contain [item groups](#).

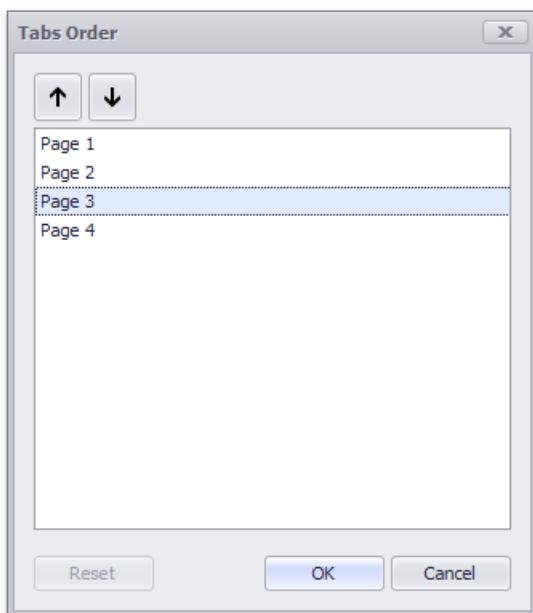
See the [Dashboard Item Caption](#) topic to learn how to manage a tab container's caption.

## Tab Order

To change the tab page order, click the **Reorder Tabs** button on the **Tab settings** group.



The **Tabs Order** dialog is invoked.



Click up and down arrows to change the order of the tab pages in the tab container.

## Display Item as Page

The tab caption is above the caption of the content element on the page. If a tab page contains a single element, the *Display Item as Page* feature is activated. It merges the dashboard item with a tab page and displays a single caption, as illustrated below.

The diagram illustrates the 'Display Item as Page' feature. On the left, a screenshot of a tab page titled 'Page 1' shows a list of countries under the heading 'Countries'. A red arrow points from this screenshot to a second screenshot on the right. The second screenshot shows the same list of countries, but the heading 'Countries' has been removed, and the list is now displayed directly under the tab caption 'Page 1'.

Countries
(All)
Austria
Belgium
Bulgaria
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece

To disable the *Display Item as Page* feature, use one of the following methods:

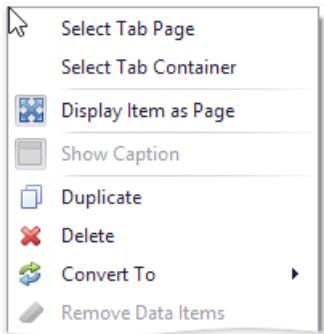
- Select the tab page and click the **Display Item as Page** button in the **Layout** group on the **Design** ribbon tab of the **Page Tools** contextual tab set.



- Select the **Display Item as Page** command in the tab page context menu.

## Selection

Click the element's border or use the item's context menu to select a page or a tab container:



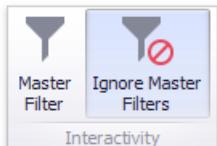
## Interactivity

The tab page allows you to manage the [interaction](#) between dashboard items inside and outside the page.

The **Master Filter** button (in the **Interactivity** group on the **Data** ribbon tab of the **Page Tools** contextual tab set) controls whether the current tab page allows you to filter dashboard items outside the page using master filter items contained within the page. If this button is switched off, master filter items in the page can filter only dashboard items in this page.

### NOTE

The default tab page behaves opposite to the default group. While the group isolates filter items from the outside, the tab page does not change the item's data interactivity behavior.



The **Ignore Master Filters** button (in the **Interactivity** group on the **Data** ribbon tab of the **Page Tools** contextual tab set) allows you to isolate dashboard items contained within the page from external master filter items.

# Data Shaping

This section describes how to perform various data shaping operations (such as grouping, sorting and filtering) in the **Dashboard Designer**.

The section contains the following topics.

 [Summarization](#)

 [Grouping](#)

 [Sorting](#)

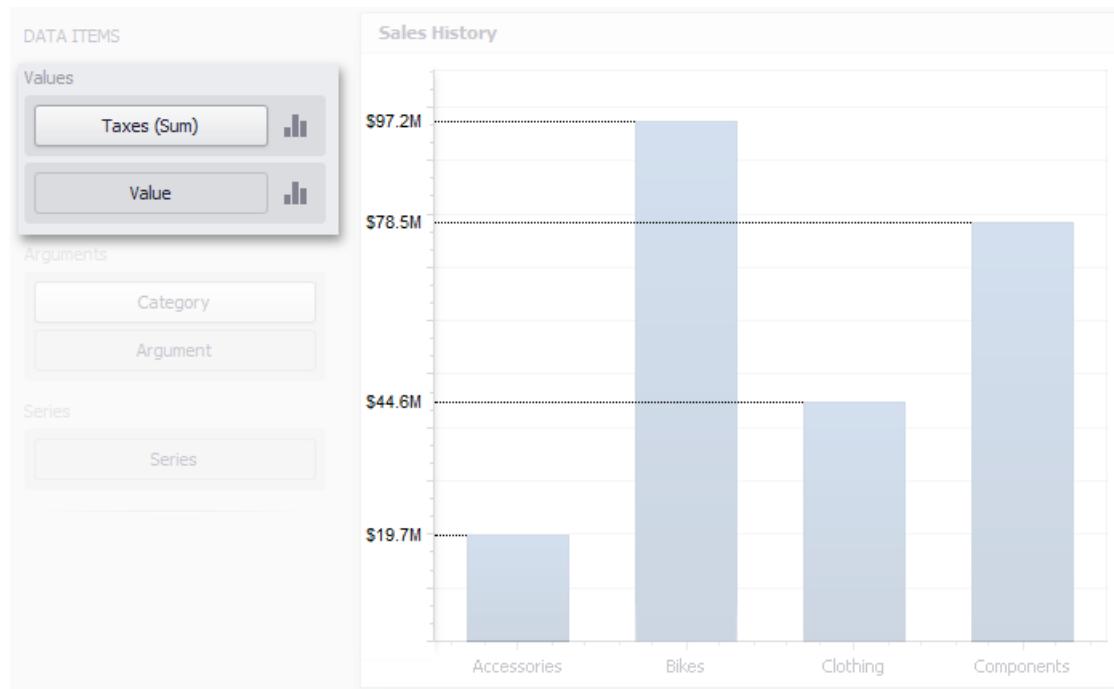
 [Filtering](#)

 [Top N](#)

 [Formatting Data](#)

# Summarization

To obtain numeric values that should be displayed within a dashboard item, Dashboard calculates a summary function against the specified measure.



This topic describes how to specify which summary function should be calculated against a particular measure.

The following sections are available.

- [Summary Function Types](#)
- [Changing Summary Type](#)

## Summary Function Types

The following summary functions are available.

- **Count** - The number of values (excluding **Null** and **DBNull** values).

This is the only summary type that can be calculated against non-numeric data.

- **Count Distinct** - The number of distinct values.

- **Sum** - The sum of the values.

$$\text{Sum} = \sum_i v_i$$

- **Min** - The smallest value.

- **Max** - The largest value.

- **Average** - The average of the values.

$$\bar{v} = \frac{1}{n} \cdot \sum_i v_i$$

- **StdDev** - An estimate of the standard deviation of a population, where the sample is a subset of the entire population.

$$StdDev = \sqrt{\frac{1}{n-1} \cdot \sum_i (v_i - \bar{v})^2}$$

- **StdDevP** - The standard deviation of a population, where the population is the entire data to be summarized.

$$StdDevP = \sqrt{\frac{1}{n} \cdot \sum_i (v_i - \bar{v})^2}$$

- **Var** - An estimate of the variance of a population, where the sample is a subset of the entire population.

$$Var = \frac{1}{n-1} \cdot \sum_i (v_i - \bar{v})^2$$

- **VarP** - The variance of a population, where the population is the entire data to be summarized.

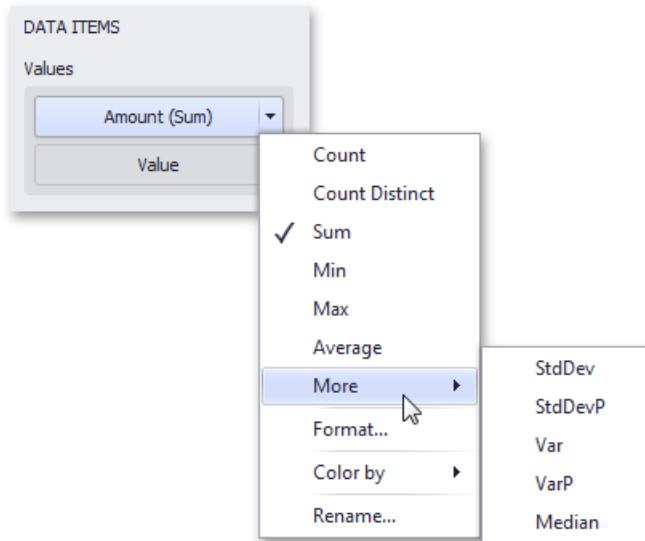
$$VarP = \frac{1}{n} \cdot \sum_i (v_i - \bar{v})^2$$

- **Median** - The *median* of the values (excluding **Null** and **DBNull** values). A *median* is the number separating the higher half of a value range from the lower half.

## Changing Summary Type

By default, Dashboard calculates **Sum** for numeric measures and **Count** for measures that contain another type of data.

You can change the summary function type for numeric measures. To do this in the Designer, invoke the data item menu and select the desired summary type. Less common summary types are organized in the **More** submenu.



# Grouping

The **Dashboard Designer** allows you to group dimension values and display summaries for entire groups rather than individual values.

You can arrange dimension values in groups of different sizes by specifying the appropriate **group interval**. For instance, date-time values can be grouped by years, months, quarters, etc.

This topic lists the supported text and date-time group intervals, and describes how to change the group interval.

The following sections are available.

- [Text Group Intervals](#)
- [Date-Time Group Intervals](#)
- [Changing Group Interval](#)

## Text Group Intervals

String values support the following grouping intervals.

- **No Grouping** - each value is displayed "as is".
- **Alphabetical** - values are grouped alphabetically (e.g., A, B, C, ... Z).

## Date-Time Group Intervals

Date-time values support the following group intervals.

### NOTE

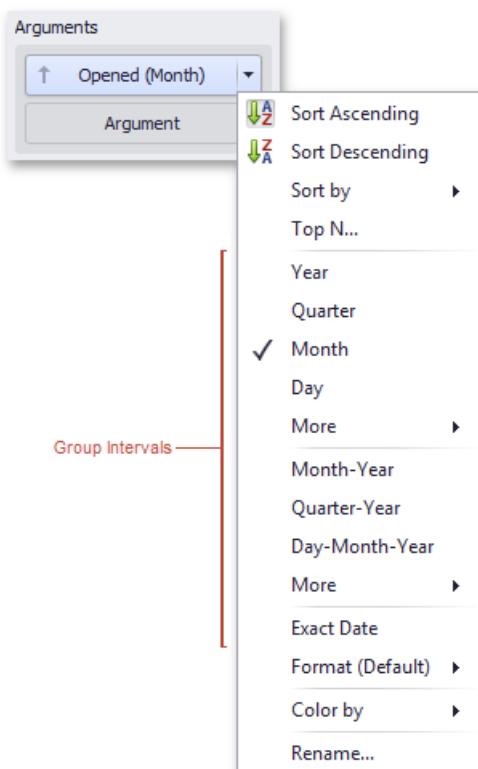
Examples in the table below are formatted using the default settings. To learn how to customize format settings, see [Formatting Data](#).

GROUP INTERVAL	DESCRIPTION	EXAMPLES
<b>Year</b>	Values are grouped by the year.	2010, 2011, 2012
<b>Quarter</b>	Values are grouped by the quarter.	Q1, Q2, Q3, Q4
<b>Month</b>	Values are grouped by the month.	January, February, March, ... December
<b>Day</b>	Values are grouped by the day of the month.	1, 2, 3, ... 31
<b>Hour</b>	Values are grouped by the hour.	0, 1, 2, ... 23
<b>Minute</b>	Values are grouped by the minute.	0, 1, 2, ... 59
<b>Second</b>	Values are grouped by the second.	0, 1, 2, ... 59
<b>Day of the Year</b>	Values are grouped by the day of the year.	1, 2, 3, ... 365
<b>Day of the Week</b>	Values are grouped by the day of the week.	Sunday, Monday, Tuesday, ... Saturday
<b>Week of the Year</b>	Values are grouped by the week of the year.	1, 2, 3, ... 52

GROUP INTERVAL	DESCRIPTION	EXAMPLES
<b>Week of the Month</b>	Values are grouped by the week of the month.	1, 2, 3, 4, 5
<b>Week-Year</b>	Values are grouped by the date of the first day of the week (uses culture settings).	7/1/2018, 7/8/2018, 7/15/2018, ... 11/4/2018, 11/11/2018, 11/18/2018, ...
<b>Month-Year</b>	Values are grouped by the year and month.	January 2012, February 2012, ... December 2012, January 2013, ...
<b>Quarter-Year</b>	Values are grouped by the year and quarter.	Q3 2012, Q4 2012, Q1 2013, Q2 2013, ...
<b>Day-Month-Year</b>	Values are grouped by date.	3/4/2012, 3/5/2012, 3/6/2012, ...
<b>Date-Hour</b>	Values are grouped by date with the hour value.	3/4/2012 0:00 AM, 3/4/2012 1:00 AM, 3/4/2012 2:00 AM, ...
<b>Date-Hour-Minute</b>	Values are grouped by date with the hour and minute values.	3/4/2012 0:00 AM, 3/4/2012 0:01 AM, 3/4/2012 0:02 AM, ...
<b>Date-Hour-Minute-Second</b>	Values are grouped by date with the hour, minute and second values.	3/4/2012 0:00:00 AM, 3/4/2012 0:00:01 AM, 3/4/2012 0:00:02 AM, ...
<b>Exact Date</b>	Each value is displayed "as is".	2009, Q2 2009, 6/15/2009 1:45:30 PM, ...

## Changing Group Interval

To specify the group interval in the Designer, invoke the data item menu and select the desired group interval. Less common group intervals are organized in the **More** submenus.



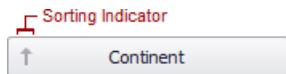
# Sorting

The Dashboard Designer allows you to easily change the sort order of values within a dashboard item. You can also enable sorting by parameter values.

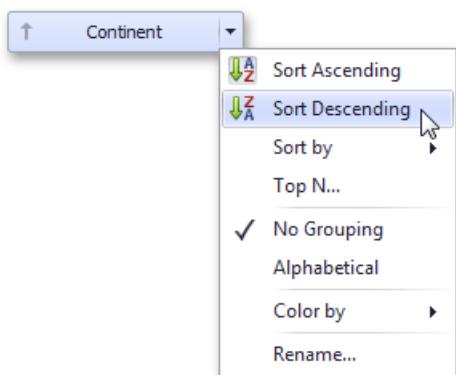
- [Changing Sort Order](#)
- [Sorting by Measure Values](#)
- [OLAP Sorting Specifics](#)

## Changing Sort Order

The sort order of dimension values is indicated with an arrow.



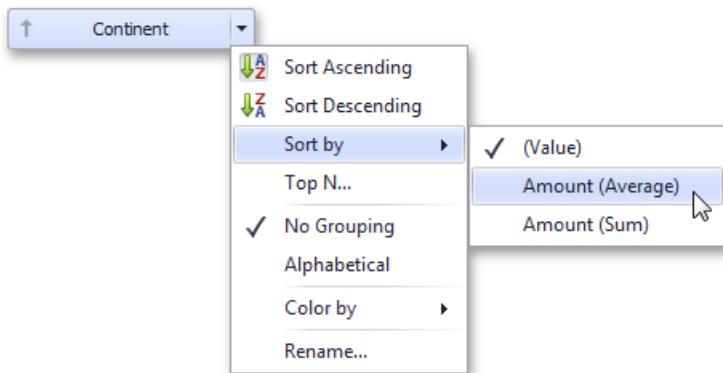
To change the sort order in the Designer, click the data item. You can also toggle sorting from the data item menu.



## Sorting by Measure Values

Dashboard allows you to sort dimension values by summary values calculated for a specific measure.

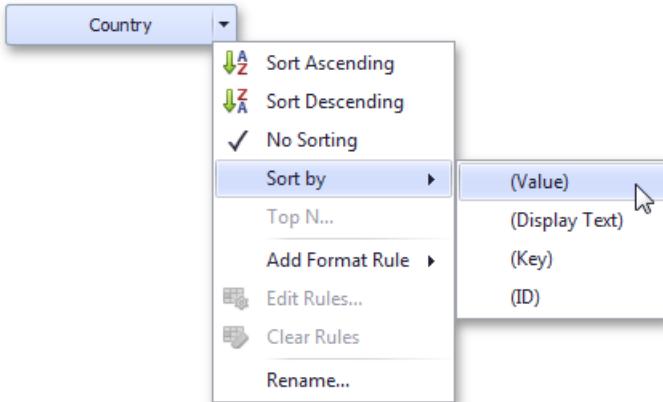
To enable sorting by measure in the Designer, use the **Sort by** submenu in the dimension's menu.



You can also sort dimension values by the values of [hidden measures](#).

## OLAP Sorting Specifics

In [OLAP](#) mode, you can use the following options to specify the sort order for attribute members.



- **No Sorting** - Specifies the default server sorting for the current attribute.
- **Sort by** - Allows you to choose the OLAP member property by whose values sorting is performed:
  - **(Value)** - sorting is performed by member values;
  - **(Display Text)** - sorting is performed by captions associated with members;
  - **(Key)** - sorting is performed by member keys;
  - **(ID)** - sorting is performed by member IDs.

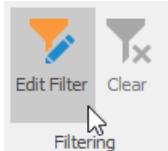
# Filtering

The Dashboard Designer allows you to filter data in the dashboard items or apply filters to a specific measure. [Dimensions](#) and [hidden dimensions](#) are used to build filter criteria.

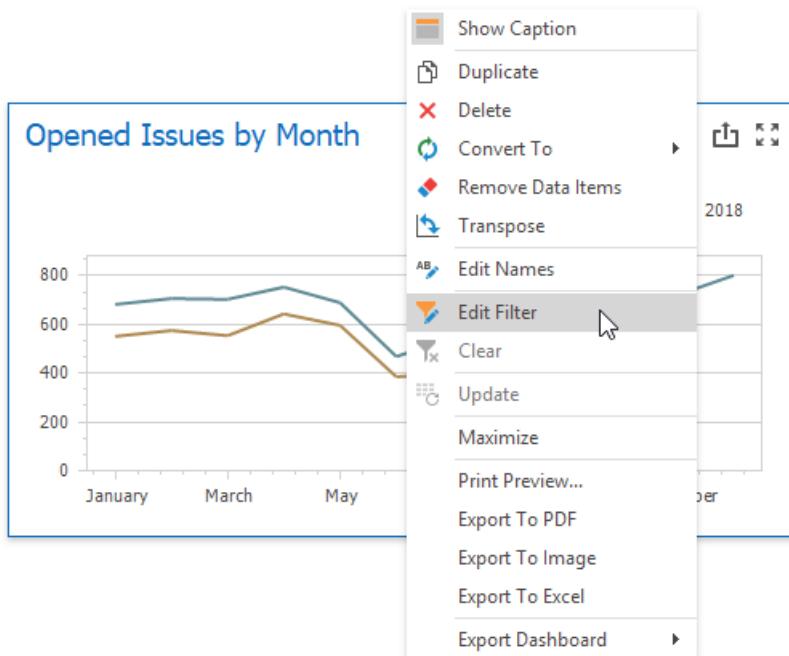
## Dashboard Item Filter

Filters that apply to a [dashboard item](#) affect only this item. To add filters, select the target dashboard item and do one of the following:

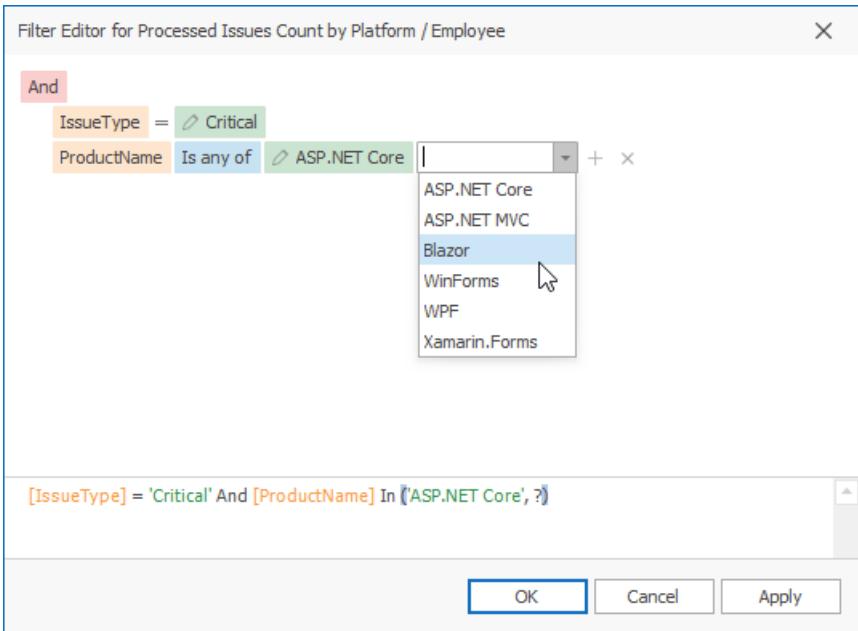
- Click the **Edit Filter** button in the Ribbon menu's **Data** tab.



- Right-click a dashboard item and select **Edit Filter** from its context menu.



This invokes the [Filter Editor](#) dialog that allows you to build complex filter criteria:



#### TIP

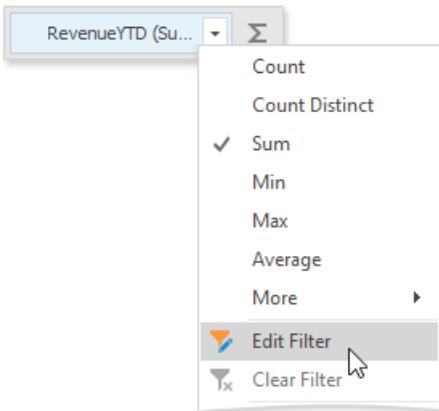
[Documentation: Filter Editor](#)

To clear the applied filter, select **Clear** from the dashboard item's context menu or click the **Clear** button in the **Data** Ribbon tab.

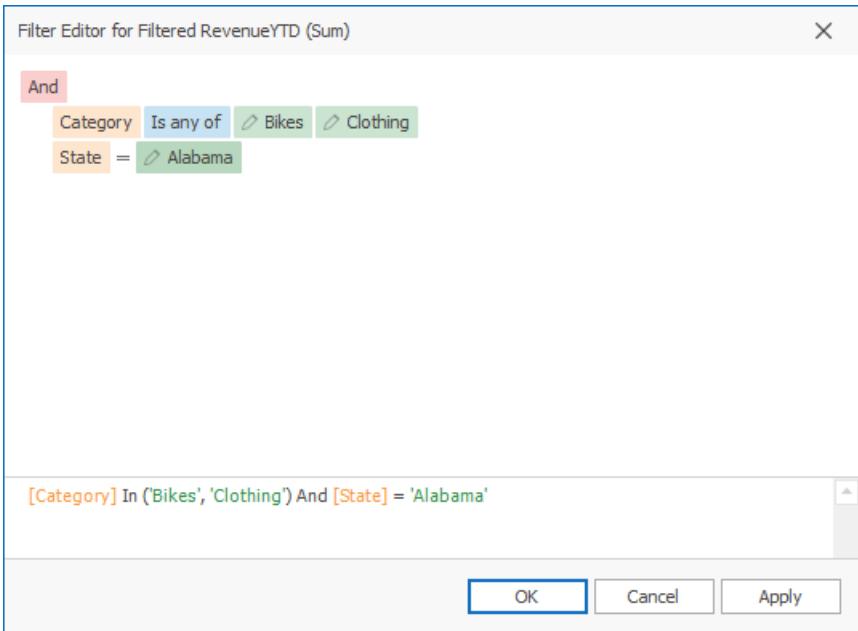
## Measure Filter

You can apply filters to individual [measures](#). If you create multiple measures that only differ in applied filters, you can compare values calculated over different date-time periods or against different categories.

Select a dashboard item and right-click a measure to be filtered. Select **Edit Filter** from its context menu.



This invokes the **Filter Editor** dialog where you can specify filter criteria:



The filtered measure has the *Filter* icon:



To clear the applied filter, select **Clear** from the measure's context menu.

#### **NOTE**

The measure filter is technically an expression that uses the `filter(summaryExpression, filterCriteria)` function, where `summaryExpression` is the measure to be filtered and `filterCriteria` is the filter. See the following topic for more information about functions you can use in dashboard expressions: [Expression Constants, Operators, and Functions](#).

The image below shows a Chart with three measures:

- *2019 - Opened* is filtered by year 2019.
- *2020 - Opened* is filtered by year 2020.
- *Opened* is the original measure without filters.



## Visible Data Filter

You can specify a Visible Data Filter to limit displayed data. This filter type does not filter underlying data used in calculations or intermediate level aggregations.

Click the **Set Visible Data Filter** button in the Ribbon menu's **Data** tab to invoke the Visible Data Filter Editor, where you can set a filter condition:



For example, a Grid dashboard item has 35 rows and displays sales percentages.

State	Percent of Sales (Sum)	Sales (Sum)
Oregon	9.28%	\$590M
Wisconsin	7.47%	\$475M
Idaho	7.21%	\$458M
Georgia	6.04%	\$384M
Indiana	5.35%	\$340M
Virginia	4.13%	\$262M

Count = 35      Sum = \$6.35B

The image below shows the difference between filters (the filter condition is the same):

- **Dashboard Item Filter:** sales percentages are recalculated based on the visible data.
- **Visible Data Filter:** sales percentages remain the same because this filter type does not affect calculations.

State	Percent of Sales (Sum)	Sales (Sum)
Wisconsin	60.06%	\$475M
Washington	21.88%	\$173M
Wyoming	18.06%	\$143M

Count = 3      Sum = \$790M

Dashboard Item Filter

State	Percent of Sales (Sum)	Sales (Sum)
Wisconsin	7.47%	\$475M
Washington	2.72%	\$173M
Wyoming	2.25%	\$143M

Count = 35      Sum = \$6.35B

Visible Data Filter

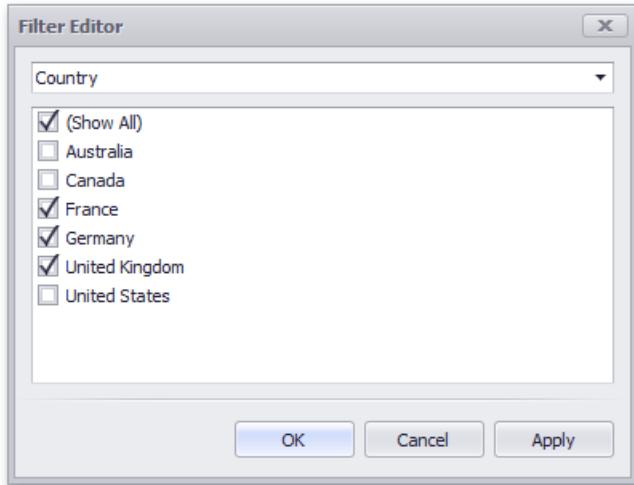
## Pass Parameter Values

You can use the Filter Editor to filter a dashboard item according to the current parameter value. See the following topic for details: [Pass Parameter Values](#).

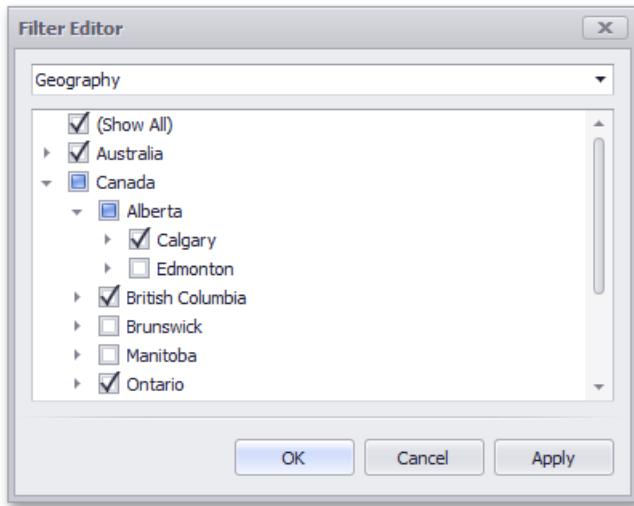
## OLAP Filtering Specifics

You cannot filter data by building complex filter criteria in **OLAP** mode. Instead, select the values you wish to include in or exclude from the dashboard to filter dimension attributes and hierarchies.

For dimension attributes, the Filter Editor contains a list of all values. You can select the values that you wish to display.



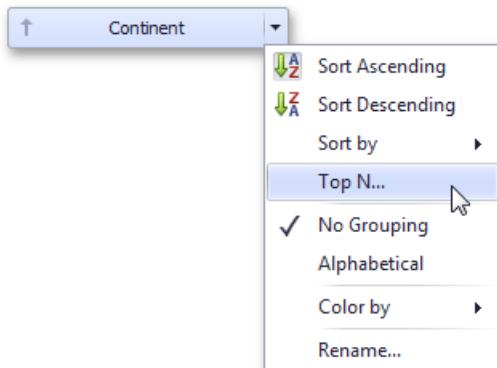
For hierarchies, a tree is displayed instead, allowing you to filter individual values at any hierarchy level.



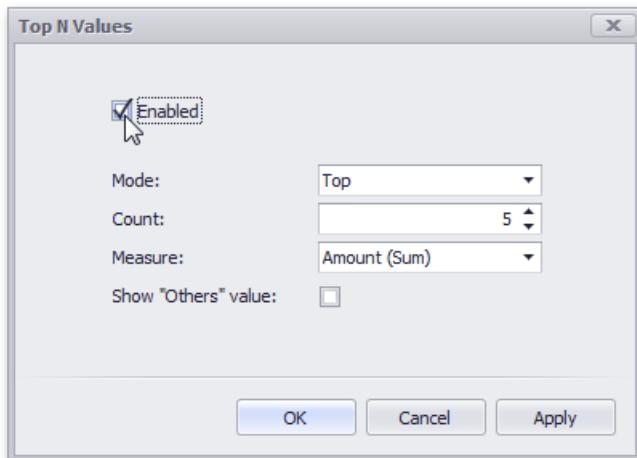
# Top N

The **Top N** feature allows you to display only a limited number of values that correspond to the highest or lowest values of a particular measure.

To display the top values in a dimension, select **Top N** from the data item menu.



This invokes the **Top N Values** dialog.



In this dialog, check the **Enabled** check box and specify the following settings.

SETTING	DESCRIPTION
<b>Mode</b>	Specifies whether top or bottom values should be displayed.
<b>Count</b>	The number of values to be displayed.
<b>Measure</b>	The parameter that will determine the top or bottom value.
<b>Show "Others" value</b>	If enabled, all values that are not the top/bottom values are consolidated in the "Others" value.

You can use the [hidden measure](#) as a parameter that will determine the top or bottom value.

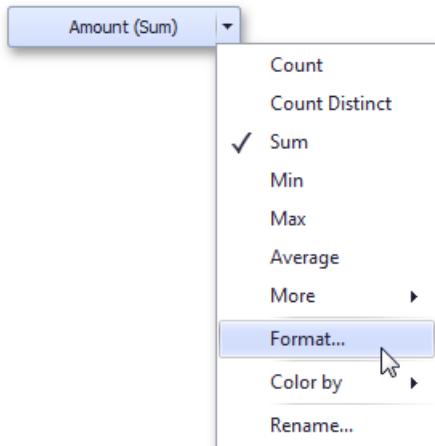
# Formatting Data

Dashboard allows you to customize various data format settings for numeric and date-time values.

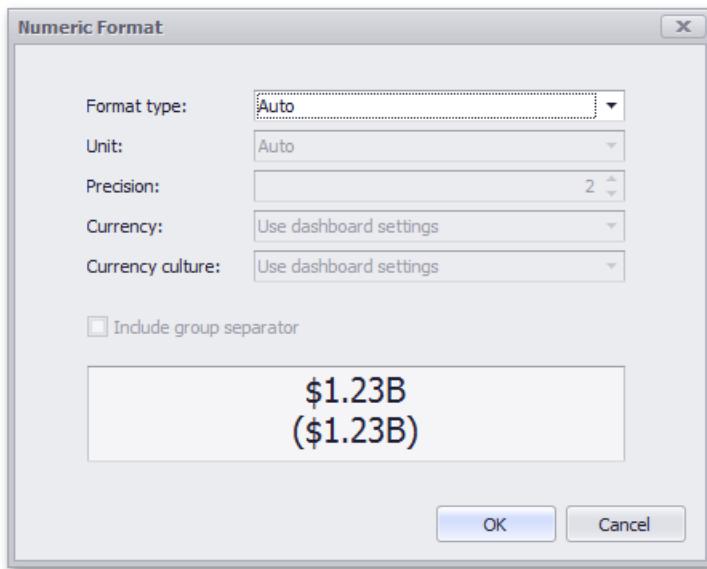
- [Formatting Numeric Values](#)
- [Formatting Date-Time Values](#)
- [Currency Formatting Specifics](#)

## Formatting Numeric Values

To specify a format for numeric values, select **Format** from the data item menu.



This invokes the **Numeric Format** window.



In the **Format type** field, select the required format type.

FORMAT TYPE	DESCRIPTION
<b>Auto</b>	Format settings are automatically determined based on the data type.
<b>General</b>	Converts a number to the most compact of either fixed-point or scientific notation, depending on the type of the number.
<b>Number</b>	Converts a number to a string of the "-d,ddd,ddd.ddd..." form where "-" indicates a negative number symbol (if required), "d" indicates a digit (0-9), "," indicates a group separator, and "." indicates a decimal point symbol.

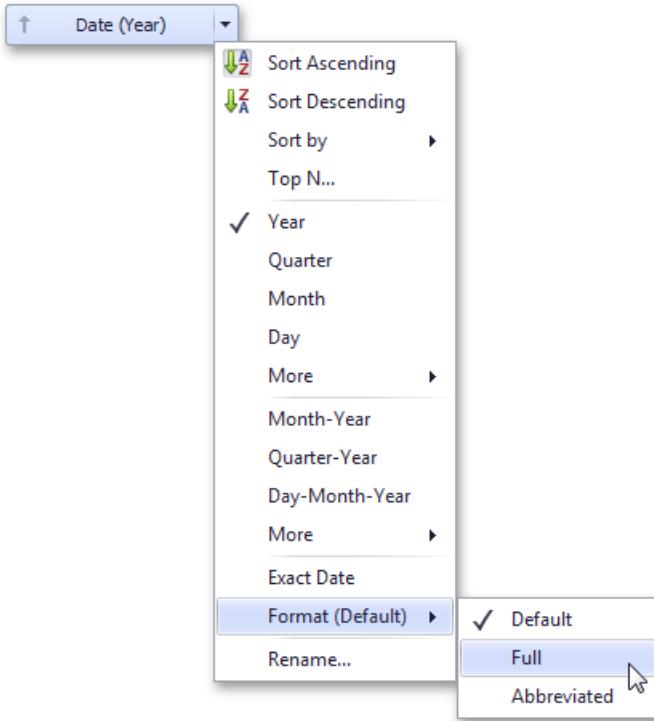
FORMAT TYPE	DESCRIPTION
<b>Currency</b>	Converts a number to a string that represents a currency amount. To learn about currency formatting specifics, see the <a href="#">Currency Formatting Specifics</a> section of this document.
<b>Scientific</b>	Converts a number to a string of the "-d.ddd...E+ddd" or "-d.ddd...e+ddd" form where each "d" indicates a digit (0-9).
<b>Percent</b>	Multiplies a number by 100 and converts it to a percentage string.

Other format settings are in effect for only specific format types.

SETTING	DESCRIPTION	FORMAT TYPES
<b>Unit</b>	The unit to which values should be converted.	Number, Currency
<b>Precision</b>	The number of fractional digits that should be displayed.	Scientific, Percent
<b>Currency</b>	Defines the currency sign and format settings that should be used to display currency values. To learn about currency formatting specifics, see the <a href="#">Currency Formatting Specifics</a> section of this document.	Currency
<b>Currency culture</b>	For currencies used in a region with several cultures, specifies the culture that defines format settings.	Currency
<b>Include group separator</b>	Specifies whether or not separators should be inserted between digit groups.	Number, Currency, Percent

## Formatting Date-Time Values

To specify a format for date-time values, use the **Format** submenu in the data item menu.



This submenu lists the available format types that depend on the selected group interval (for details on group intervals, see [Grouping](#)).

#### **NOTE**

Specific group intervals do not have format options. This means that corresponding values can only be presented in a single manner. The **Format** submenu is not displayed for such group intervals.

The following list shows format types by group interval.

- Year
  - *Full* - The full year pattern (Example - 6/15/2017 1:45:30 PM -> 2017 (en-US)).
  - *Abbreviated* - The year from 00 to 99 (Example - 6/15/2017 1:45:30 PM -> 17 (en-US)).
- Quarter
  - *Full* - The full quarter pattern (Example: 6/15/2017 1:45:30 PM -> Q2 (en-US)).
  - *Numeric* - The quarter from 1 through 4 (Example: 6/15/2017 1:45:30 PM -> 2 (en-US)).
- Month
  - *Full* - The full name of the month (Example: 6/15/2017 1:45:30 PM -> June (en-US)).
  - *Abbreviated* - The abbreviated name of the month (Example: 6/15/2017 1:45:30 PM -> Jun (en-US)).
  - *Numeric* - The month from 1 through 12 (Example: 6/15/2017 1:45:30 PM -> 6 (en-US)).
- Hour
  - *Long* - Long hour pattern, 12-hour format (Example: 6/15/2017 1:45:30 PM -> 1:00 PM).
  - *Short* - Short hour pattern, 24-hour format (Example: 6/15/2017 1:45:30 PM -> 13).
- Day of Week
  - *Full* - The full name of the day of the week (Example: 6/15/2017 1:45:30 PM -> Monday (en-US)).
  - *Abbreviated* - The abbreviated name of the day of the week (Example: 6/15/2017 1:45:30 PM -> Mon (en-US)).
  - *Numeric* - The day of the week from 1 through 7 (Example: 6/15/2017 1:45:30 PM -> 2 (en-US)).
- Day-Month-Year
  - *Long* - Long date pattern (Example: 6/15/2017 1:45:30 PM -> Monday, June 15, 2017 (en-US)).

- *Short* - Short date pattern (Example: 6/15/2017 1:45:30 PM -> 6/15/2017 (en-US)).
- Date-Hour
  - *Long* - Long date pattern, long hour pattern (Example: 6/15/2017 1:45:30 PM -> Monday, June 15, 2017 1:00 PM (en-US)).
  - *Short* - Short date pattern, long hour pattern (Example: 6/15/2017 1:45:30 PM -> 6/15/2017 1:00 PM (en-US)).
  - *Time only* - Long hour pattern (Example: 6/15/2017 1:45:30 PM -> 1:00 PM (en-US)).
- Date-Hour-Minute
  - *Long* - Long date pattern, long time pattern (Example: 6/15/2017 1:45:30 PM -> Monday, June 15, 2017 1:45 PM (en-US)).
  - *Short* - Short date pattern, long time pattern (Example: 6/15/2017 1:45:30 PM -> 6/15/2017 1:45 PM (en-US)).
  - *Time only* - Long time pattern (Example: 6/15/2017 1:45:30 PM -> 1:45 PM (en-US)).
- Date-Hour-Minute-Second
  - *Long* - Long date pattern, long time pattern (Example: 6/15/2017 1:45:30 PM -> Monday, June 15, 2017 1:45:30 PM (en-US)).
  - *Short* - Short date pattern, long time pattern (Example: 6/15/2017 1:45:30 PM -> 6/15/2017 1:45:30 PM (en-US)).
  - *Time only* - Long time pattern (Example: 6/15/2017 1:45:30 PM -> 1:45:30 PM (en-US)).

The list below illustrates format types related to the **Exact Date** group interval.

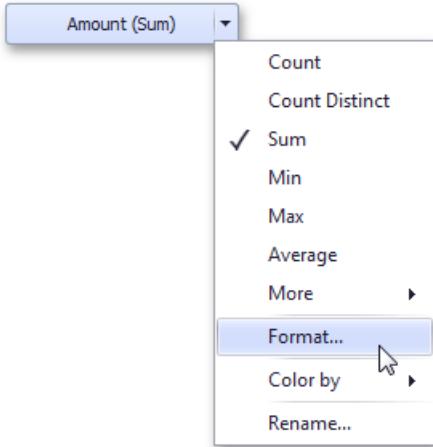
- Year
  - *Full* - The full year pattern (Example: 6/15/2017 1:45:30 PM -> 2017 (en-US)).
  - *Abbreviated* - The year from 00 to 99 (Example: 6/15/2017 1:45:30 PM -> 17 (en-US)).
- Quarter
  - *n/a* - The default year and full quarter pattern (Example: 6/15/2017 1:45:30 PM -> Q2 2017 (en-US)).
- Month
  - *n/a* - The default year pattern and the full name of the month (Example: 6/15/2017 1:45:30 PM -> June, 2017 (en-US)).
- Day
  - *Long* - Long date pattern (Example: 6/15/2017 1:45:30 PM -> Monday, June 15, 2017 (en-US)).
  - *Short* - Short date pattern (Example: 6/15/2017 1:45:30 PM -> 6/15/2017 (en-US)).
- Hour
  - *Long* - Long date pattern, long time pattern (Example: 6/15/2017 1:45:30 PM -> Monday, June 15, 2017 1:00 PM (en-US)).
  - *Short* - Short date pattern, long time pattern (Example: 6/15/2017 1:45:30 PM -> 6/15/2017 1:00 PM (en-US)).
  - *Time only* - Long time pattern (Example: 6/15/2017 1:45:30 PM -> 1:00 PM (en-US)).
- Minute
  - *Long* - Long date pattern, long time pattern (Example: 6/15/2017 1:45:30 PM -> Monday, June 15, 2017 1:45 PM (en-US)).
  - *Short* - Short date pattern, long time pattern (Example: 6/15/2017 1:45:30 PM -> 6/15/2017 1:45 PM (en-US)).
  - *Time only* - Long time pattern (Example: 6/15/2017 1:45:30 PM -> 1:45 PM (en-US)).
- Second
  - *Long* - Long date pattern, long time pattern (Example: 6/15/2017 1:45:30 PM -> Monday, June 15, 2017 1:45:30 PM (en-US)).
  - *Short* - Short date pattern, long time pattern (Example: 6/15/2017 1:45:30 PM -> 6/15/2017 1:45:30 PM (en-US)).
  - *Time only* - Long time pattern (Example: 6/15/2017 1:45:30 PM -> 1:45:30 PM (en-US)).

# Currency Formatting Specifics

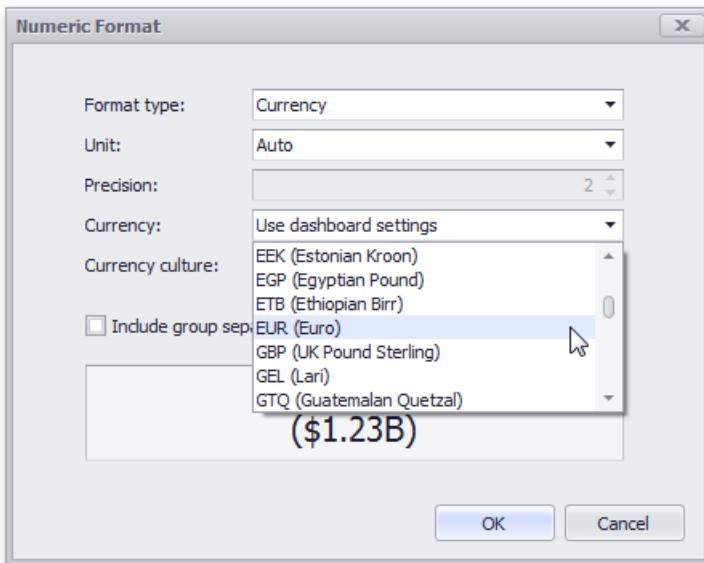
The Dashboard allows you to specify a currency format at two levels: for the entire dashboard and for individual data items.

## 1. Data Item Currency

To specify which currency to use for a particular data item, select **Format** from the data item menu.



In the **Numeric Format** dialog, select *Currency* in the **Format type** field and use the **Currency** combo box to select the required currency.



### NOTE

This option only affects the way values are displayed. The Dashboard **does not** convert monetary amounts from one currency to another.

For regions with several cultures, you can also select the culture that will be used to format currency values.

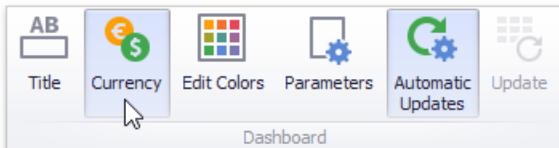


You can also apply the default dashboard currency by selecting *Use dashboard settings* in the **Currency** field.

## 2. Dashboard Currency

You can also specify the default currency for the dashboard. This setting will be applied to dashboard items that have no currency defined.

To set the dashboard currency, click the **Currency** button in the Ribbon.



This invokes the **Dashboard Currency** window. In this window, select the required currency using the **Currency** combo box.



### NOTE

This option only affects the way values are displayed. The Dashboard **does not** convert monetary amounts from one currency to another.

For regions with several cultures, you can also select the culture that will be used to format currency values.



Additionally, you can specify the client culture that should be used for the dashboard by selecting the *Use client system settings* item. In this instance, the current system culture will be used in WinForms applications, and the client culture will be used in Web applications.

# Interactivity

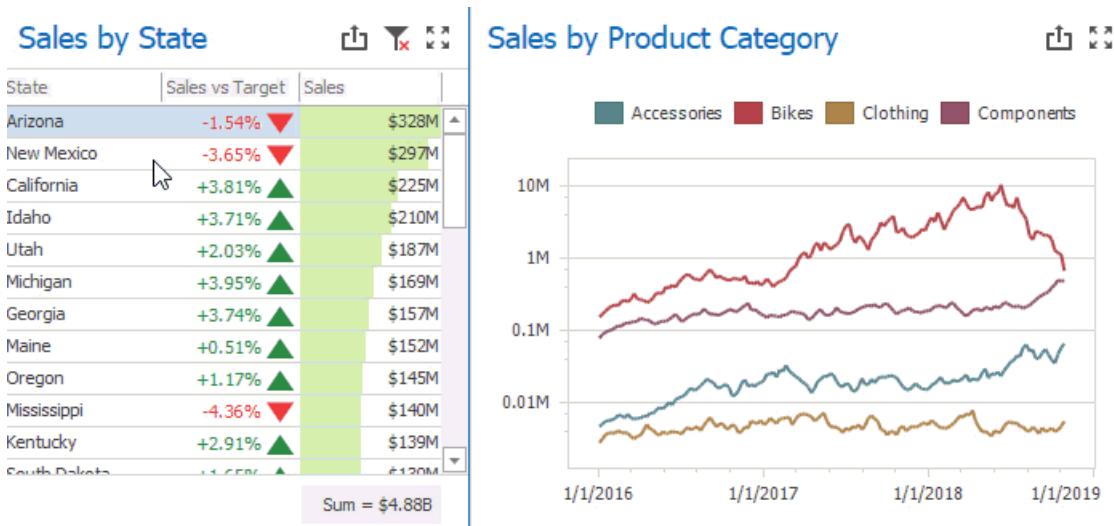
This section describes features that enable interaction between various dashboard items. These features include Master Filtering and Drill-Down.

The section consists of the following topics.

- [Master Filtering](#)
- [Drill-Down](#)
- [Neutral Filter Mode](#)

# Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). You can select elements in a **Master Filter** item (grid records, chart bars, pie segments, etc.) to filter data in other dashboard items by the selected values.



- Master Filtering Overview
- Master Filter Settings
- Apply Filtering

## Master Filtering Overview

Dashboard items can be divided into four groups by their master filtering capabilities.

1. **Data visualization dashboard items** allow you to enable master filtering by specifying the selection mode. The following dashboard items allow you to manage their master filtering mode.

- Chart
- Scatter Chart
- Grid
- Pies
- Cards
- Gauges
- Choropleth Map
- Geo Point Maps
- Treemap

To learn how to manage master filtering for these items, see [Master Filter Settings](#).

2. **Filter elements** represent a special type of dashboard item whose main purpose is to apply filtering to other dashboard items. This capability is always enabled for these dashboard items.

The following filter elements are available.

- Combo Box
- List Box
- Tree View

Instead of switching between standard master filtering modes, some filter elements allow you to switch their type.

This allows you to select a single value or multiple values.

To learn more, see the [Filter Elements](#) section.

3. **Range Filter** is a special type of dashboard item that displays a chart with selection thumbs and allows you to filter out values displayed along the argument axis.

To learn more, see the [Range Filter](#) section.

4. **Dashboard item group** allows you to manage interaction between dashboard items in and out of the group.

To learn more about the interactivity capabilities of the dashboard item group, see the **Interactivity** paragraph in the [Dashboard Item Group](#) topic.

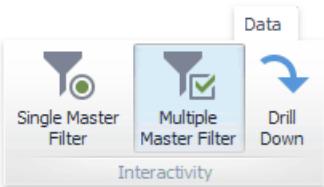
## Master Filter Settings

### Master Filtering Modes

The Master Filter item supports two selection modes.

- *Multiple* - Allows you to select multiple elements in the Master Filter item.
- *Single* - Allows you to select only one element in the Master Filter item. When this mode is enabled, the default selection will be set to a Master Filter element. You can change this selection, but cannot clear it.

To enable/disable master filtering, use the **Multiple Master Filter** or **Single Master Filter** buttons in the **Data** Ribbon tab.



#### **NOTE**

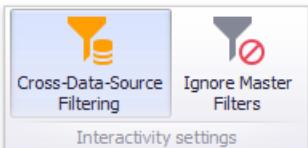
If the selected dashboard item contains several types of elements that can be used for filtering, the Ribbon or Toolbar will provide the appropriate buttons to switch between these types (e.g., the **Arguments** and **Series** buttons in the Chart). For details, refer to the documentation for individual dashboard items in the [Dashboard Item Settings](#) section.

### Filtering Across Data Sources

When different items in a dashboard are bound to different data sources, you can specify that a particular Master Filter should be applied across data sources. This means that it will apply filtering to fields with matching names in all data sources.

Fields are matched by their full names. For fields in other data sources to be affected by Master Filtering, their names must match the name of the field in the current data source, and they must belong to the same hierarchy level so that their full names also match. For instance, *Customer.City* and *Customer.Address.City* will not be treated as matching fields.

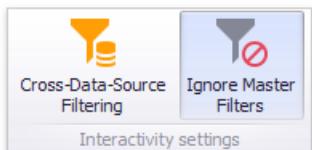
To enable filtering across data sources, use the **Cross-Data-Source Filtering** button in the **Data** Ribbon tab.



### Preventing Items from Being Filtered

You can prevent specific dashboard items from being affected by Master Filters. To do this, use the **Ignore Master Filters** button

in the **Data** Ribbon tab.



## Apply Filtering

To learn how to apply filtering in a specific [dashboard item](#), refer to the **Master Filtering** topic in the **Interactivity** section for this item.

# Drill-Down

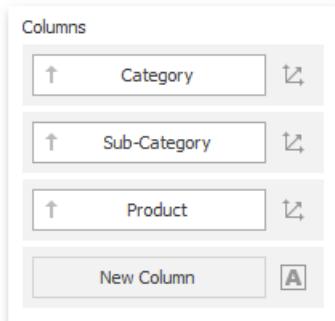
Dashboard provides the **Drill-Down** feature, which allows you to change the detail level of data displayed in a dashboard item. The Drill-Down feature enables users to drill down to display detail data, or drill up to view more general information.



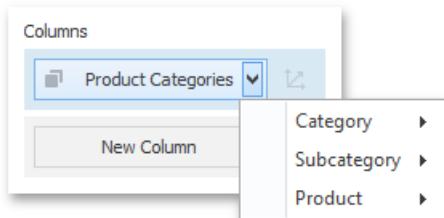
- Enable Drill-Down
- Perform Drill-Down

## Enable Drill-Down

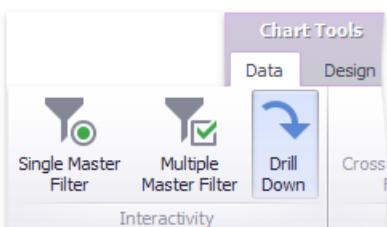
Drill-down requires that the [data section](#) contains several dimensions...



... or a hierarchy data item (in [OLAP mode](#)).



To enable drill-down, click the **Drill-Down** button in the **Data** Ribbon tab (or the button if you are using the toolbar menu).



### NOTE

If the selected dashboard item contains several types of elements that can be used for drill-down, the Ribbon or Toolbar will provide the appropriate buttons to switch between these types (e.g., **Arguments** and **Series** buttons in a Chart). For details, refer to the documentation for the individual dashboard items in the [Dashboard Item Settings](#) topic.

The following dashboard items support the Drill-Down feature.

- [Chart](#)
- [Scatter Chart](#)
- [Grid](#)
- [Pies](#)
- [Cards](#)
- [Gauges](#)
- [Treemap](#)

## Perform Drill-Down

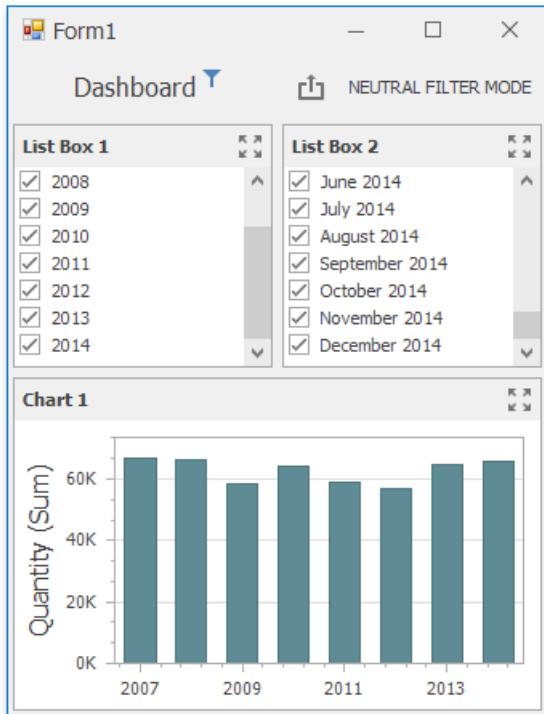
To learn how you can drill down using a particular [dashboard item](#), refer to the **Drill-Down** topic in the **Interactivity** section for this item.

# Neutral Filter Mode

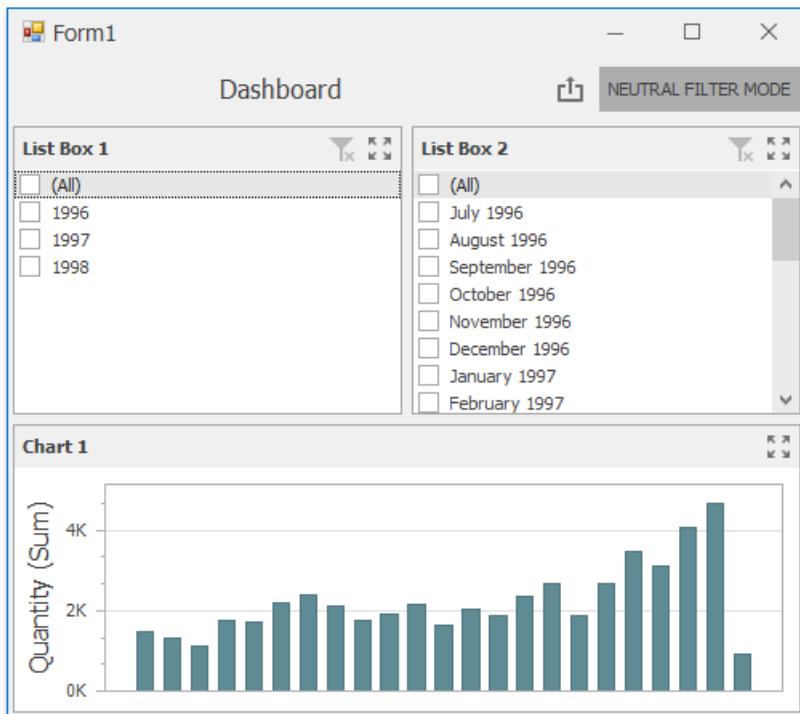
The [filter elements](#) show all items selected by default, to indicate that no filtering is currently taking place. Starting from this state, users typically begin each filtering operation by deselecting **All**, before they select individual items.

An extra click is required to begin any actual filtering operation, because the **standard filter mode** shows all items selected. This is not an optimal implementation for performance reasons, because it generates filtering criteria that are evaluated by the data layer and/or the database.

The dashboard in the image below illustrates how the filter elements are initialized in **standard filter mode**.



To solve these issues, the **Neutral Filter Mode** is implemented. It is neutral in the sense that it does not apply any criteria to the data source in its default state, resulting in improved performance.

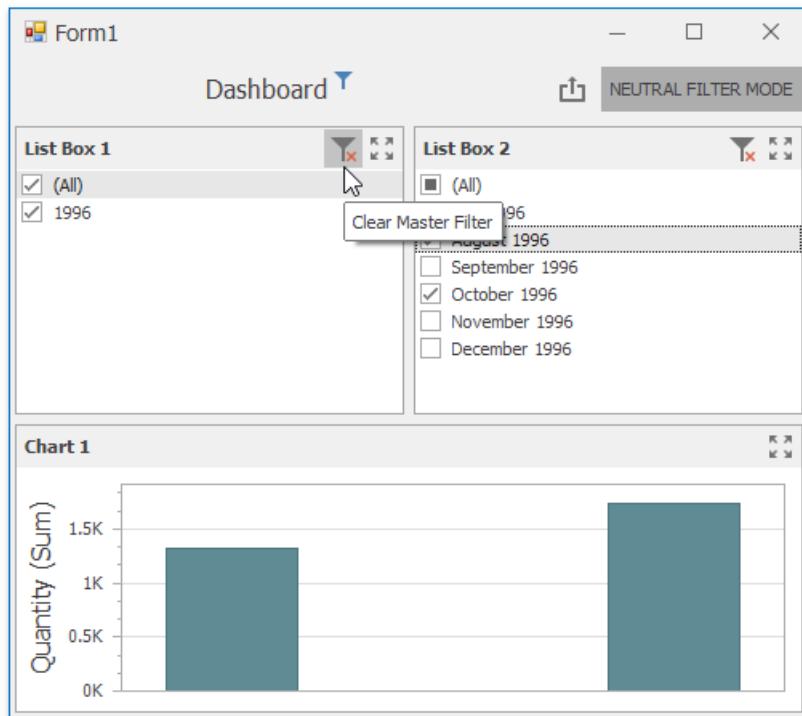


All items are shown deselected. This means that an extra click is no longer required in the most common scenarios, and this

behavior is familiar to end users from websites world-wide.

Built-in UI does not provide a command to switch the filter mode. Reload a dashboard after switching the mode.

The **Neutral Filter Mode** helps in a situation when there is a potential "dead lock", due to the fact that multiple filter elements influence each other. The **Clear Master Filter** button resets the filters.



# Appearance Customization

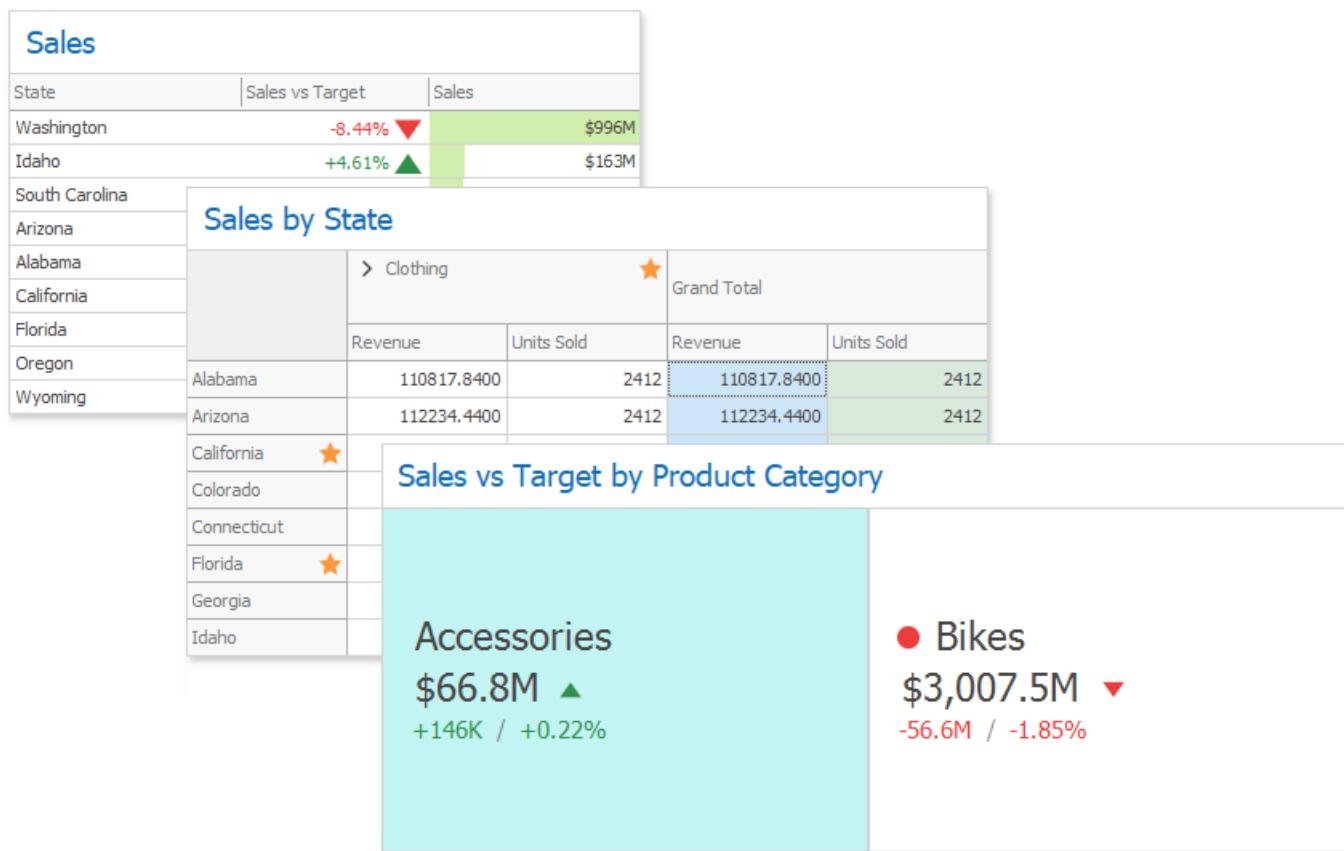
The topics in this section describe how to customize the appearance of a dashboard or any of its elements using conditional formatting and coloring.

This section contains the following topics:

- [Conditional Formatting](#)
- [Coloring](#)
- [Data Display Formatting](#)

# Conditional Formatting

The Dashboard Designer control supports conditional formatting. You can apply a custom style to data elements that satisfy a certain condition for [Grid](#), [Pivot](#), [Chart](#) and [Card](#) items.



## Format Rules

Comparison rules used in conditional formatting can be categorized as follows:

- [Value](#) - Compares static values (Greater Than, Less Than, Between, etc.).
- [Top-Bottom](#) - Highlights a specific number of top/bottom values (Top N, Bottom N).
- [Average](#) - Highlights values above or below the average value.
- [A Date Occurring](#) - Highlights date-time values that are within a specified interval.
- [Expression](#) - Uses complex conditions to apply formatting. You can also pass dashboard parameters to expressions.
- [Icon Ranges](#) - Display a specific icon based on a value range. You can select a predefined set of icons or apply a specific icon to each range.
- [Color Ranges](#) - Apply specific colors to different value ranges. You can select a predefined set of colors or use custom appearance settings to highlight values within specified ranges.
- [Gradient Ranges](#) - Apply formatting using gradient color scales.
- [Bar](#) - Visualizes numeric values as bars. You can also color bars corresponding to positive and negative values using different colors.
- [Bar Color Ranges](#) - Visualize numeric values as bars. Values within a range display a specific color.
- [Bar Gradient Ranges](#) - Visualize numeric values as bars. Values within a range display a specific bar gradient.

Format conditions that can be applied to different data item types are as follows:

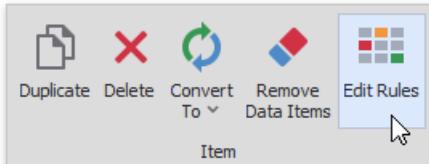
- numeric
  - [Value](#)
  - [Top-Bottom](#)
  - [Average](#)
  - [Expression](#)

- [Icon Ranges](#)
  - [Color Ranges](#)
  - [Gradient Ranges](#)
  - [Bar](#)
  - [Bar Color Ranges](#)
  - [Bar Gradient Ranges](#)
- string
    - [Value](#) (with a condition type set to *Equal To*, *Not Equal To* or *Text that Contains*)
    - [Expression](#)
  - date-time
    - [Value](#)
    - [A Date Occurring](#) (for dimensions with a continuous date-time group interval)
    - [Expression](#)
    - [Icon Ranges](#)
    - [Color Ranges](#)
    - [Gradient Ranges](#)
    - [Bar](#)
    - [Bar Color Ranges](#)
    - [Bar Gradient Ranges](#)

## Create and Edit a Format Rule

You can create format rules in the following ways:

- Click the **Edit Rules** button on the **Home** ribbon tab.



This action invokes the [Edit Rules](#) dialog where you can create a new format rule or manage rules applied to the dashboard item.

- Click the measure/dimension menu button in the Data Item's pane and select **Add Format Rule/Edit Rules**.



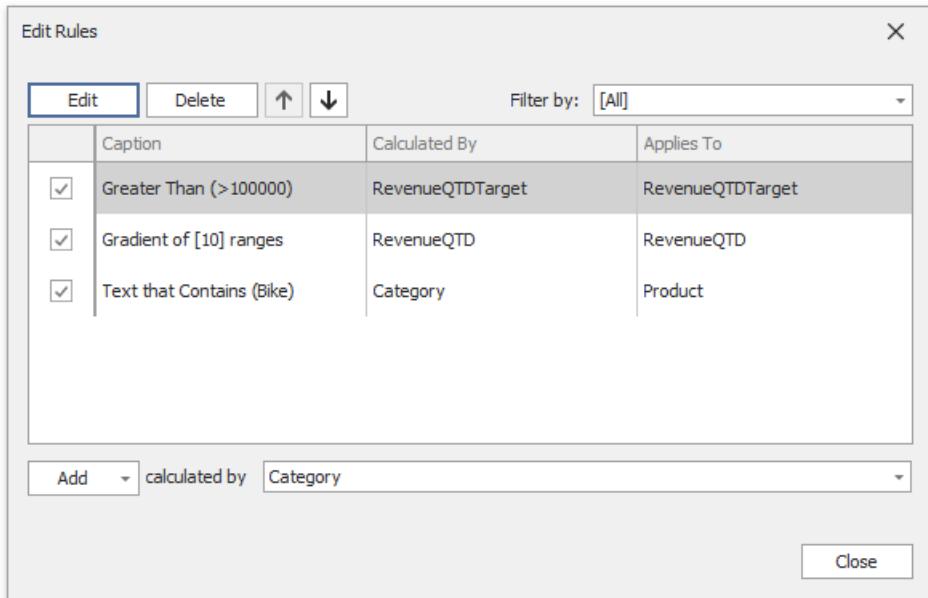
The **Add Format Rule** option invokes the pop-up menu where you can select the format rule and format condition's type for a new rule.

When you click **Edit Rules**, the [Edit Rules](#) dialog appears. You can edit all created format rules for the selected data item in the dialog.

The **Clear Rules** button clears the rules for the specified data item.

## The Edit Rules Dialog

The **Edit Rules** dialog contains format rules applied to the dashboard item:



You can manage format rules in the dialog in the following ways:

ACTION	DESCRIPTION
Edit the selected rule	Use the <b>Edit</b> button or double-click the rule.
Delete the selected rule	Use the <b>Delete</b> button.
Reorder format rules	Use the <b>Up</b> and <b>Down</b> buttons ( and ). You can reorder rules to specify their priority. Rules are applied from top to bottom. The bottom rule has the highest priority.
Enable/disable a rule	Use the corresponding check box in the left column.
Create a new rule	Click the <b>Add</b> button and select the format condition. The <b>calculated by</b> combo box allows you to select the measure/dimension that is used to calculate the format rule. For Card, when you create a rule for delta, specify the delta type whose values are used to calculate a condition in the <b>using</b> combo box.
Filter format rules by the specified data item	Use the <b>Filter by</b> combo box.

The **Add** button invokes a pop-up menu where you can specify appearance settings and set the condition's value for the format rule. Available settings depend on the selected format rule.

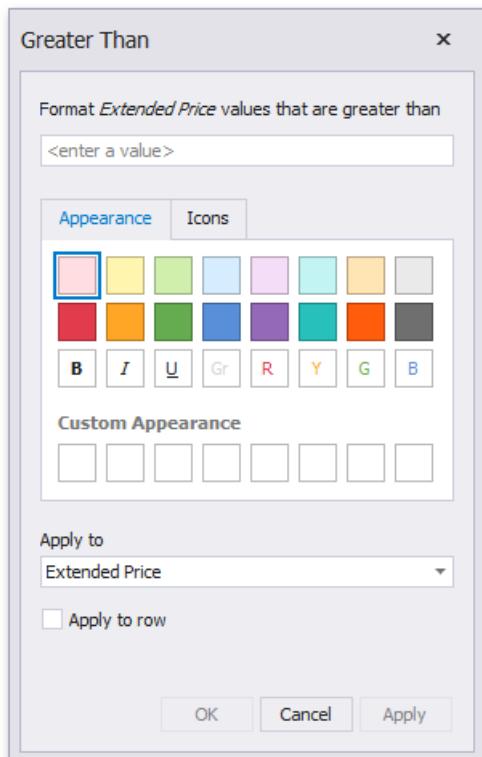
Edit Rules

	Caption	Calculated By	Applies To
<input checked="" type="checkbox"/>	Greater Than (>100000)	RevenueQTD	Title

Add calculated by RevenueQTD using Absolute variation

- Value > Greater Than
- Top/Bottom > Greater Than Or Equal To
- Average > Less Than
- Expression > Less Than Or Equal To
- Icon Ranges > Equal To
- Color Ranges > Not Equal To
- Gradient Ranges > Between
- Text that Contains

The image below displays the **Greater Than** dialog, which corresponds to the [Value](#) format condition for a [Grid](#) dashboard item. The format condition applies to the *ExtendedPrice* data item in the **Apply to** drop-down list.



## Dashboard Items Specific

Refer to the following topics for more information about specific format rule settings:

- [Conditional Formatting - Grid](#)
- [Conditional Formatting - Pivot](#)
- [Conditional Formatting - Card](#)
- [Conditional Formatting - Chart](#)
- [Conditional Formatting - Scatter Chart](#)

# Value

The **Value** format condition allows you to compare static values (such as Greater Than, Less Than, Between, etc.).

The following condition types are supported for measures or date-time dimensions:

- **Greater Than/Greater Than or Equal To**

The "Greater Than"/"Greater Than or Equal To" format conditions allow you to apply formatting to elements whose values are greater than/greater than or equal to the specified value. For instance, the following image displays a Grid dashboard item whose *Extended Price* cells are filled in green if their values are Greater Than 150 000.

The screenshot shows a 'Greater Than' format condition dialog on the left and a grid dashboard item on the right. The dialog has a text input field containing '150000'. The grid dashboard item lists sales persons and their extended prices, with rows for Margaret Peacock, Janet Leverling, Nancy Davolio, and Andrew Fuller highlighted in green, indicating they have values greater than 150,000.

Sales Person	Extended Price
Margaret Peacock	\$233K
Janet Leverling	\$203K
Nancy Davolio	\$192K
Andrew Fuller	\$167K
Laura Callahan	\$127K
Robert King	\$125K
Anne Dodsworth	\$77.3K
Michael Suyama	\$73.9K
Steven Buchanan	\$68.8K

This format condition can be applied to measures or date-time dimensions.

- **Less Than/Less Than or Equal To**

The "Less Than"/"Less Than or Equal To" format conditions allow you to apply formatting to elements whose values are less than/less than or equal to the specified value. For instance, the following image displays a Grid dashboard item whose *Extended Price* cells are filled in red if their values are Less Than 150 000.

The screenshot shows a 'Less Than' format condition dialog on the left and a grid dashboard item on the right. The dialog has a text input field containing '150000'. The grid dashboard item lists sales persons and their extended prices, with rows for Laura Callahan, Robert King, Anne Dodsworth, Michael Suyama, and Steven Buchanan highlighted in red, indicating they have values less than 150,000.

Sales Person	Extended Price
Margaret Peacock	\$233K
Janet Leverling	\$203K
Nancy Davolio	\$192K
Andrew Fuller	\$167K
Laura Callahan	\$127K
Robert King	\$125K
Anne Dodsworth	\$77.3K
Michael Suyama	\$73.9K
Steven Buchanan	\$68.8K

This format condition can be applied to measures or date-time dimensions.

- **Equal To/Not Equal To**

The "Equal To"/"Not Equal To" format conditions allow you to apply formatting to elements whose values are equal to/not equal to the specified value. For instance, the following image displays a Grid dashboard item whose *Sales Person* cells are filled in blue if their values are equal to 'Robert King'.

**Equal To**

Format *Sales Person* values that are equal to  
Robert King

**Appearance** **Icons**

Sales Person	Extended Price
Margaret Peacock	\$233K
Janet Leverling	\$203K
Nancy Davolio	\$192K
Andrew Fuller	\$167K
Laura Callahan	\$127K
Robert King	\$125K
Anne Dodsworth	\$77.3K
Michael Suyama	\$73.9K
Steven Buchanan	\$68.8K

This format condition can be applied to measures, string or date-time dimensions.

- **Between/Not Between**

The "Between"/"Not Between" format conditions allow you to apply formatting to elements whose values are between/not between the specified values. For instance, the following image displays a Grid dashboard item whose *Extended Price* cells are filled in orange if their values are Between 100 000 and 200 000.

**Between**

Format *Extended Price* values that are between  
100000 and 200000

**Appearance** **Icons**

Sales Person	Extended Price
Margaret Peacock	\$233K
Janet Leverling	\$203K
Nancy Davolio	\$192K
Andrew Fuller	\$167K
Laura Callahan	\$127K
Robert King	\$125K
Anne Dodsworth	\$77.3K
Michael Suyama	\$73.9K
Steven Buchanan	\$68.8K

This format condition can be applied to measures or date-time dimensions.

- **Text That Contains**

The "Text That Contains" format condition allows you to apply formatting to elements whose values contain the specified text. For instance, the following image displays a Grid dashboard item whose *Sales Person* cells are in cyan if their values contain the 'An' text.

**Text that Contains**

Format *Sales Person* values that contain the text  
An

**Appearance** **Icons**

Sales Person	Extended Price
Margaret Peacock	\$233K
Janet Leverling	\$203K
Nancy Davolio	\$192K
Andrew Fuller	\$167K
Laura Callahan	\$127K
Robert King	\$125K
Anne Dodsworth	\$77.3K
Michael Suyama	\$73.9K
Steven Buchanan	\$68.8K

This format condition can be applied to measures, string or date-time dimensions.

# Top-Bottom

The **Top-Bottom** format conditions allow you to highlight a specific number of topmost/bottommost values. You can specify this number as an absolute or percent value.

The following condition types are supported for measures:

- **Top N**

The "Top N" format condition allows you to apply formatting to elements whose values are ranked at the top. For instance, the following image displays a Grid dashboard item whose top 3 *Extended Price* values filled in green.

The screenshot shows the 'Top N' configuration dialog on the left and a grid dashboard item on the right. The dialog has fields for 'N = 3' and a checked 'Appearance' tab showing a color palette where the first three colors (light red, light yellow, and light green) are highlighted. The grid item shows a table of sales person names and their extended prices, with the top three rows (Margaret Peacock, Janet Leverling, Nancy Davolio) highlighted in light green.

Sales Person	Extended Price
Margaret Peacock	\$233K
Janet Leverling	\$203K
Nancy Davolio	\$192K
Andrew Fuller	\$167K
Laura Callahan	\$127K
Robert King	\$125K
Anne Dodsworth	\$77.3K
Michael Suyama	\$73.9K
Steven Buchanan	\$68.8K

- **Bottom N**

The "Bottom N" format condition allows you to apply formatting to elements whose values are ranked at the bottom. For instance, the following image displays a Grid dashboard item whose bottom 40 percent *Extended Price* values are filled in red.

The screenshot shows the 'Bottom N' configuration dialog on the left and a grid dashboard item on the right. The dialog has fields for 'N = 40.00 %' and a checked 'Appearance' tab showing a color palette where the first four colors (light red, light yellow, light green, and light blue) are highlighted. The grid item shows a table of sales person names and their extended prices, with the bottom four rows (Robert King, Anne Dodsworth, Michael Suyama, Steven Buchanan) highlighted in light red.

Sales Person	Extended Price
Margaret Peacock	\$233K
Janet Leverling	\$203K
Nancy Davolio	\$192K
Andrew Fuller	\$167K
Laura Callahan	\$127K
Robert King	\$125K
Anne Dodsworth	\$77.3K
Michael Suyama	\$73.9K
Steven Buchanan	\$68.8K

# Average

The **Average** format conditions allow you to highlight values above or below an average value.

The following condition types are supported for measures:

- **Above Average/Above or Equal Average**

The "Above Average"/"Above or Equal Average" format conditions allow you to apply formatting to elements whose values are above/above or equal to the average. For instance, the following image displays a **Grid** dashboard item whose *Extended Price* values that are above average (~ 141 000) filled in green.

The screenshot shows the 'Above Average' configuration dialog on the left and a grid dashboard item on the right. The dialog has tabs for 'Appearance' and 'Icons', with the 'Appearance' tab selected. A color palette shows various colors, and the green square is highlighted with a blue border. Below the palette are buttons for Bold (B), Italic (I), Underline (U), Grayscale (Gr), Red (R), Yellow (Y), Green (G), and Blue (B). To the right is a grid dashboard item showing sales data. The rows for Margaret Peacock, Janet Leverling, Nancy Davolio, Andrew Fuller, and Laura Callahan have green backgrounds, indicating their Extended Price values are above the average.

Sales Person	Extended Price
Margaret Peacock	\$233K
Janet Leverling	\$203K
Nancy Davolio	\$192K
Andrew Fuller	\$167K
Laura Callahan	\$127K
Robert King	\$125K
Anne Dodsworth	\$77.3K
Michael Suyama	\$73.9K
Steven Buchanan	\$68.8K

- **Below Average/Below or Equal Average**

The "Below Average"/"Below or Equal Average" format conditions allow you to apply formatting to elements whose values are below/below or equal to the average. For instance, the following image displays a **Grid** dashboard item whose *Extended Price* values that are below average (~ 141 000) filled in red.

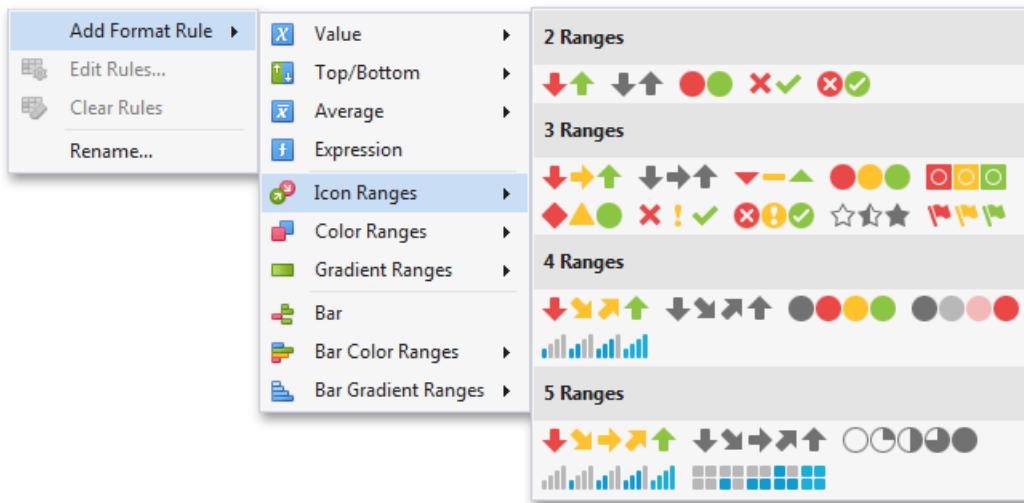
The screenshot shows the 'Below Average' configuration dialog on the left and a grid dashboard item on the right. The dialog has tabs for 'Appearance' and 'Icons', with the 'Appearance' tab selected. A color palette shows various colors, and the red square is highlighted with a blue border. Below the palette are buttons for Bold (B), Italic (I), Underline (U), Grayscale (Gr), Red (R), Yellow (Y), Green (G), and Blue (B). To the right is a grid dashboard item showing sales data. The rows for Laura Callahan, Robert King, Anne Dodsworth, Michael Suyama, and Steven Buchanan have red backgrounds, indicating their Extended Price values are below the average.

Sales Person	Extended Price
Margaret Peacock	\$233K
Janet Leverling	\$203K
Nancy Davolio	\$192K
Andrew Fuller	\$167K
Laura Callahan	\$127K
Robert King	\$125K
Anne Dodsworth	\$77.3K
Michael Suyama	\$73.9K
Steven Buchanan	\$68.8K

# Icon Ranges

Icon Ranges allow you to use predefined or custom sets of icons to apply conditional formatting to different ranges of values.

To format values according the required condition, click the data item menu button, select **Add Format Rule | Icon Ranges** and choose the required icon set.



This invokes the **Range Set** dialog containing the set of value ranges and corresponding icons. The Grid dashboard item on the right displays the default formatting applied using the predefined set of 3 icons.

**Range Set**

Format *Extended Price* values using range conditions

Format style: ▼▲▼▲

Use % ranges

▲	100.00 %	>=	67.00 %
▬	67.00 %	>=	33.00 %
▼	33.00 %	>=	0.00 %

Add Delete Reverse

Apply to: Extended Price

Apply to row

OK Cancel Apply

Sales Person	Extended Price
Margaret Peacock	▲ \$233K
Janet Leverling	▲ \$203K
Nancy Davolio	▲ \$192K
Andrew Fuller	▬ \$167K
Laura Callahan	▬ \$127K
Robert King	▬ \$125K
Anne Dodsworth	▼ \$77.3K
Michael Suyama	▼ \$73.9K
Steven Buchanan	▼ \$68.8K

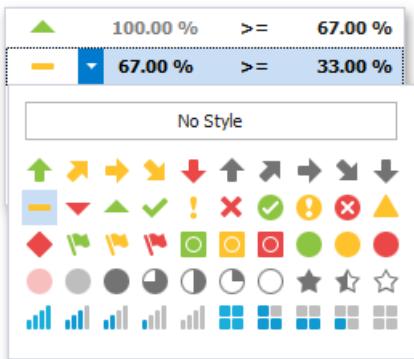
This dialog allows you to change the following options specific to Icon Ranges.

- The **Format Style** combo box allows you to change the icon set used to apply formatting.
- The **Use % ranges** check box specifies whether the percent or absolute scale is used to generate ranges.

## **i** NOTE

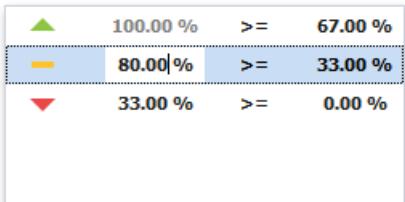
Note that this option is not available for date-time dimensions.

- To change the icon displayed for values corresponding to the specified range, click the button next to the required icon and select a new icon.



Select **No Style** to disable the indication for the required range.

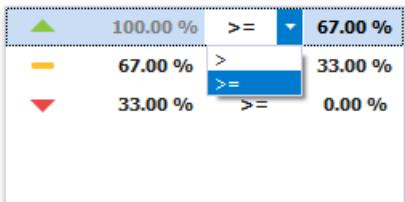
- You can change range boundaries by specifying the required values.



#### **i** NOTE

Note that a new value should fall into a range between corresponding values of the previous and next range.

- To change the comparison logic for the required range, click the comparison sign and select the required option.



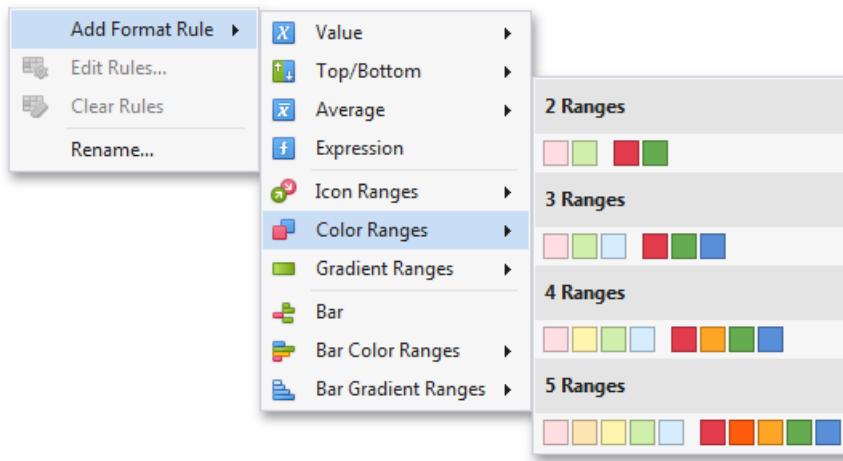
The *greater or equal* sign includes the smallest value of the current interval while the *greater* sign excludes the smallest value from the current interval and includes it in the next interval.

- Use the **Add** and **Delete** buttons to add new ranges or delete the selected range respectively. Note that new range is added below the selected range.

# Color Ranges

Color Ranges allow you to use predefined sets of colors to apply conditional formatting to different ranges of values. You can also use custom appearance settings for specific ranges.

To format values according the required condition, click the data item menu button, select **Add Format Rule | Color Ranges** and choose the required icon set.



This invokes the **Range Set** dialog containing the set of value ranges and corresponding appearance settings. The Grid dashboard item on the right displays the default formatting applied using the predefined set of 3 colors.

Sales Person	Extended Price
Margaret Peacock	\$233K
Janet Leverling	\$203K
Nancy Davolio	\$192K
Andrew Fuller	\$167K
Laura Callahan	\$127K
Robert King	\$125K
Anne Dodsworth	\$77.3K
Michael Suyama	\$73.9K
Steven Buchanan	\$68.8K

The Range Set dialog is open on the left. It shows three color swatches (light blue, light green, light pink) in the 'Format style' dropdown. The 'Use % ranges' checkbox is checked. Below it, three range conditions are listed:

- Light blue: 100.00 % >= 67.00 %
- Light green: 67.00 % >= 33.00 %
- Light pink: 33.00 % >= 0.00 %

Buttons at the bottom include Add, Delete, Reverse, OK, Cancel, and Apply.

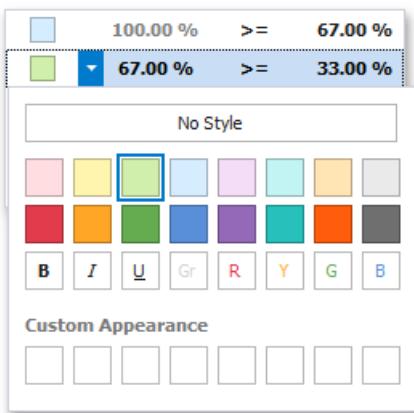
This dialog allows you to change the following options specific to Icon Ranges.

- The **Format Style** combo box allows you to change the color set used to apply formatting.
- The **Use % ranges** check box specifies whether the percent or absolute scale is used to generate ranges.

## **NOTE**

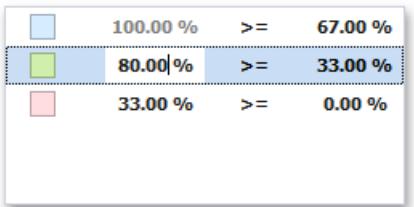
Note that this option is not available for date-time dimensions.

- To change the appearance settings applied to values corresponding to the specified range, click the button next to the required color and select a new color or specify custom appearance settings. To learn how to specify custom settings, see the **Specify Appearance Settings** paragraph in the [Conditional Formatting](#) topic.



Select **No Style** to disable the indication for the required range.

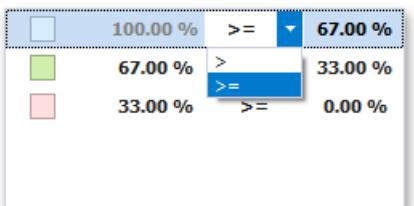
- You can change range boundaries by specifying the required values.



#### **i** NOTE

Note that a new value should fall into a range between corresponding values of the previous and next range.

- To change the comparison logic for the required range, click the comparison sign and select the required option.



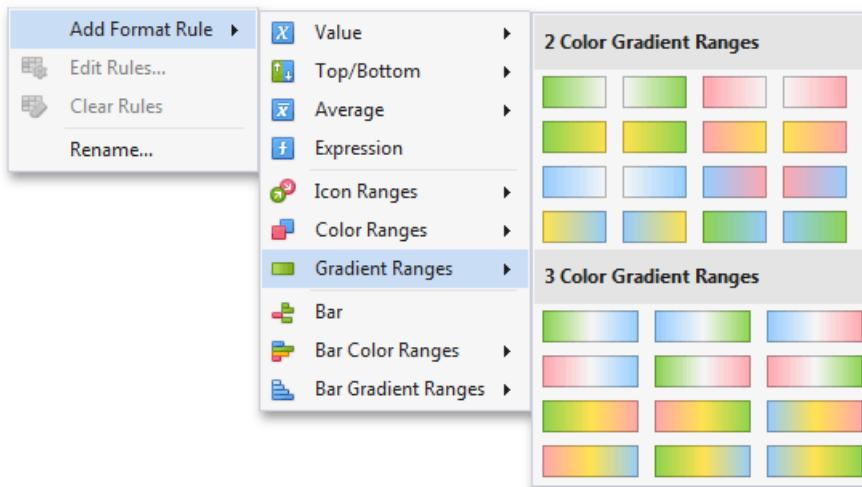
The *greater or equal* sign includes the smallest value for the current interval while the *greater* sign excludes the smallest value from the current interval and includes it in the next interval.

- Use the **Add** and **Delete** buttons to add new ranges or delete the selected range respectively.

# Gradient Ranges

Gradient Ranges allow you to use predefined color gradients to apply conditional formatting to different ranges of values. You can also use specific colors to generate custom gradients.

To format values according the required condition, click the measure menu button, select **Add Format Rule | Color Ranges** and choose the required color gradient.



This invokes the **Gradient Ranges** dialog containing the set of value ranges and corresponding appearance settings. The Grid dashboard item on the right displays the default formatting applied using the predefined Red-Blue gradient.

A screenshot of the 'Gradient Ranges' dialog. It includes a preview table of sales data and a configuration panel with sliders for percentage ranges and a 'Generate Ranges' button. The configuration panel also includes a 'Use % ranges' checkbox and a list of 10 generated ranges from 100.00% down to 10.00%. At the bottom, there are 'Apply to' dropdowns and buttons for 'OK', 'Cancel', and 'Apply'.

This dialog allows you to change the following options specific to Gradient Ranges.

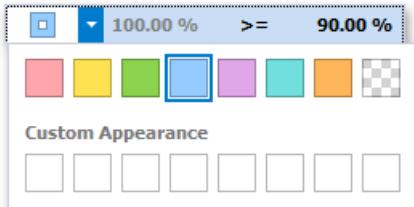
- **Number of ranges** allows you to specify the number of ranges used to classify values. Click the **Generate Ranges** button to generate a new gradient scale according to the specified number of ranges.

- The **Use % ranges** check box specifies whether the percent or absolute scale is used to generate ranges.

**NOTE**

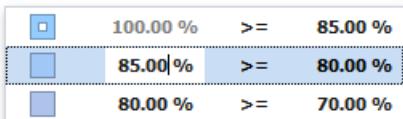
Note that this option is not available for date-time dimensions.

- To change the specific color in the gradient, click the button next to the required color and select a new color or specify a custom background color. This allows you to create a color gradient based on more than two colors. In this case, the specified colors are marked with an empty square.



To learn how to specify a custom color, see the **Specify Appearance Settings** paragraph in the [Conditional Formatting](#) topic.

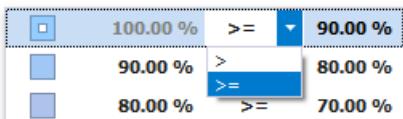
- You can change range boundaries by specifying the required values.



**NOTE**

Note that a new value should fall into a range between corresponding values of the previous and next range.

- To change the comparison logic for the required range, click the comparison sign and select the required option.

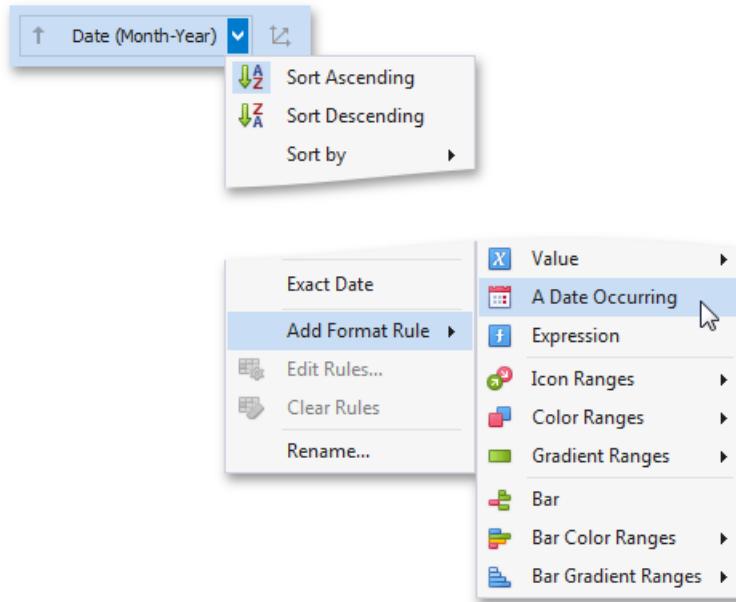


The *greater or equal* sign includes the smallest value in the current interval while the *greater* sign excludes the smallest value from the current interval and includes it in the next interval.

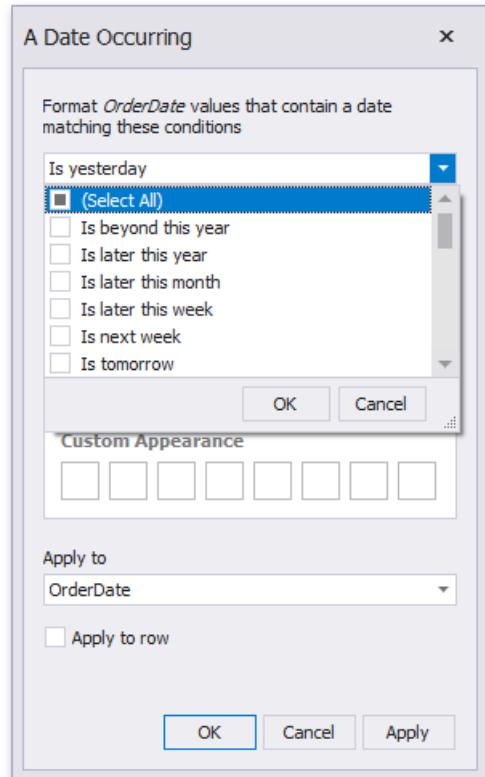
# A Date Occurring

A Date Occurring format condition allows you to highlight date-time values that fall into a specified interval. Note that this format condition can be applied to dimensions with the continuous date-time group interval.

To format values according the Date Occurring condition, click the menu button of the required dimension and select **Add Format Rule | A Date Occurring**.



This invokes the **A Date Occurring** dialog that allows you to select a date-time interval(s) whose value should be formatted.



The following intervals are supported.

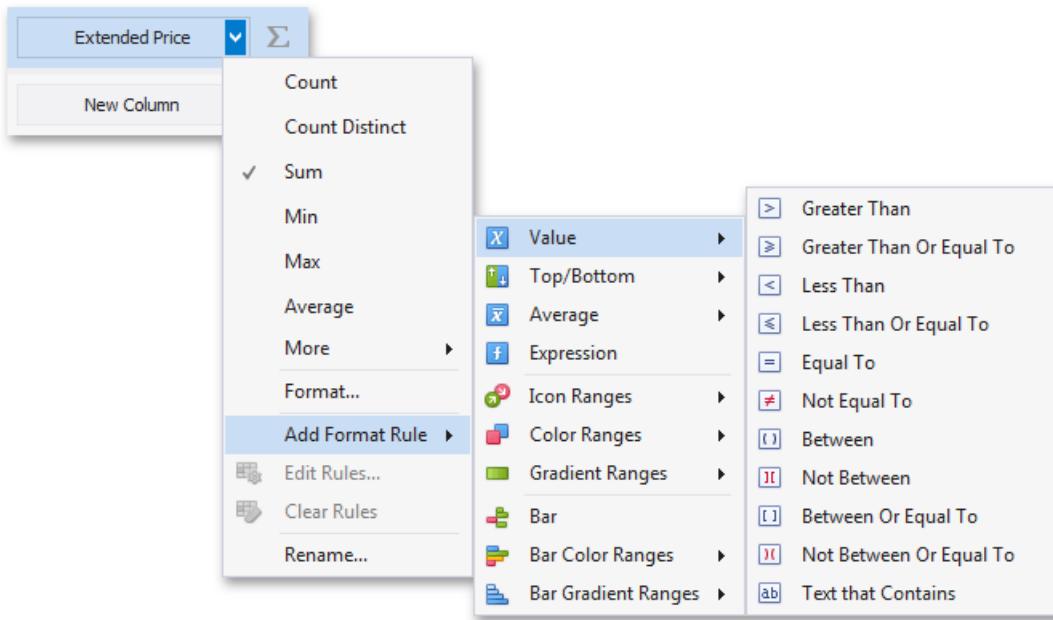
- **Is beyond this year** - Dates that follow the current year.
- **Is later this year** - Dates of the current year starting from the following month.
- **Is later this month** - Dates of the current month that follow the next week.
- **Is later this week** - Dates of the current week starting from the day after tomorrow.

- **Is next week** - Dates that belong to the following week.
- **Is tomorrow** - Tomorrow.
- **Is today** - Today.
- **Is yesterday** - Yesterday.
- **Is earlier this week** - Dates of the current week that are prior to yesterday.
- **Is last week** - Dates of the previous week.
- **Is earlier this month** - Dates of the current month that are prior to the previous week.
- **Is earlier this year** - Dates of the current year that are prior to the current month.
- **Is prior to this year** - Dates that are prior to the current year.
- **Empty** - Does not specify any condition.
- **Beyond** - Dates that belong to the month in three-months time and beyond.
- **ThisWeek** - Dates that belong to the current week.
- **ThisMonth** - Dates that belong to the current month.
- **MonthAfter1** - Dates that belong to the following month.
- **MonthAfter2** - Dates that belong to the month in two-months time.
- **MonthAgo1** - Dates that belong to the previous month.
- **MonthAgo2** - Dates that belong to the month two months ago.
- **MonthAgo3** - Dates that belong to the month three months ago.
- **MonthAgo4** - Dates that belong to the month four months ago.
- **MonthAgo5** - Dates that belong to the month five months ago.
- **MonthAgo6** - Dates that belong to the month six months ago.
- **Earlier** - Dates that belong to the month seven months ago and earlier.

# Expression

An Expression format condition allows you to use complex conditions to apply formatting.

To format values according to the Expression condition, click the menu button of the required data item and select **Add Format Rule | Expression**.



This invokes the **Expression** dialog that allows you to specify the required expression. For instance, the following image displays a **Grid** dashboard item whose rows are filled in green if the Extended Price/Quantity values are greater than 150 000 and 7 500, respectively.

The screenshot shows the 'Expression' dialog box. It contains two conditions: '[Extended Price] Is greater than 150000.0' and '[Quantity] Is greater than 7500'. The 'Icons' tab is selected, showing a color palette where the first two cells are green. A preview grid on the right shows rows for Margaret Peacock, Janet Leverling, and Nancy Davolio are highlighted in green.

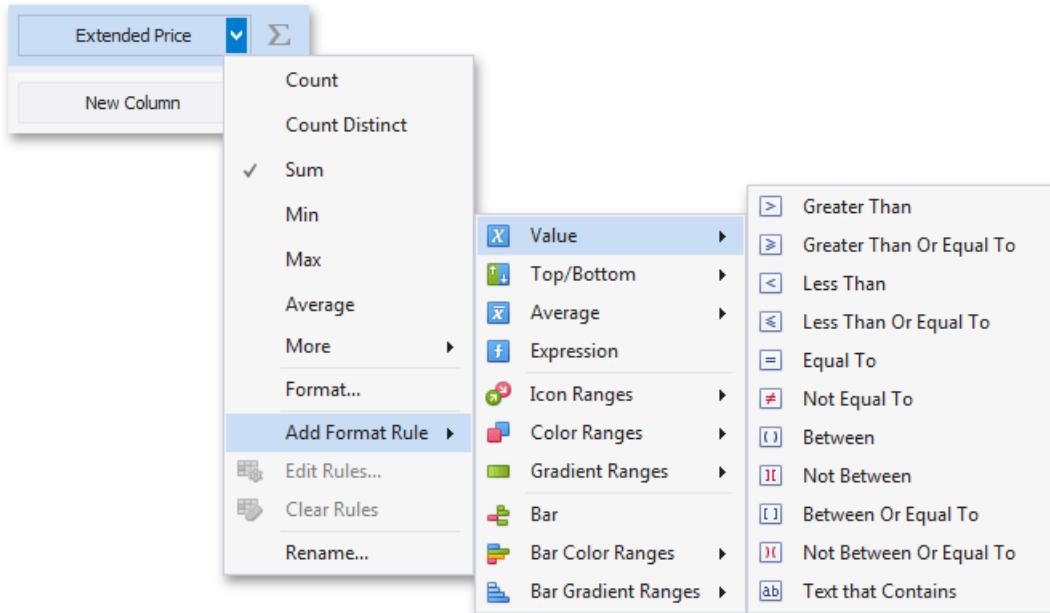
Sales Person	Extended Price	Quantity
Margaret Peacock	\$233K	9798
Janet Leverling	\$203K	7852
Nancy Davolio	\$192K	7812
Andrew Fuller	\$167K	6055
Laura Callahan	\$127K	5913
Robert King	\$125K	4654
Anne Dodsworth	\$77.3K	2670
Michael Suyama	\$73.9K	3527
Steven Buchanan	\$68.8K	3036

You can pass static values when creating conditions or pass a dashboard parameter to apply conditional formatting dynamically. To learn more, see [Passing Parameter Values](#).

# Bar

The **Bar** format condition allows you to visualize numeric values using bars. You can also paint bars corresponding to positive and negative values using different colors.

To format values according to the Bar condition, click the menu button of the required data item and select **Add Format Rule | Bar**.



This invokes the **Bar** dialog that allows you to specify the required settings. For instance, the following image displays a **Grid** dashboard item whose *Extended Price* cell contains data bars corresponding to numeric values.

The screenshot shows the "Bar" dialog box. It includes fields for "Min" and "Max" values, both set to 0 with "Automatic" dropdowns. Under "Style Settings", a color palette shows a blue square highlighted. Below it, "Custom Appearance" provides a grid of color swatches. The "Apply to" dropdown is set to "Extended Price vs Avg". At the bottom, there are checkboxes for "Allow negative axis" (checked), "Draw axis" (unchecked), and "Show bar only" (unchecked). Buttons for "OK", "Cancel", and "Apply" are at the bottom right.

Sales Person	Extended Price vs Avg
Margaret Peacock	\$92.2K
Janet Leverling	\$62.2K
Nancy Davolio	\$51.5K
Andrew Fuller	\$25.9K
Laura Callahan	(\$13.8K)
Robert King	(\$16.1K)
Anne Dodsworth	(\$63.3K)
Michael Suyama	(\$66.7K)
Steven Buchanan	(\$71.9K)

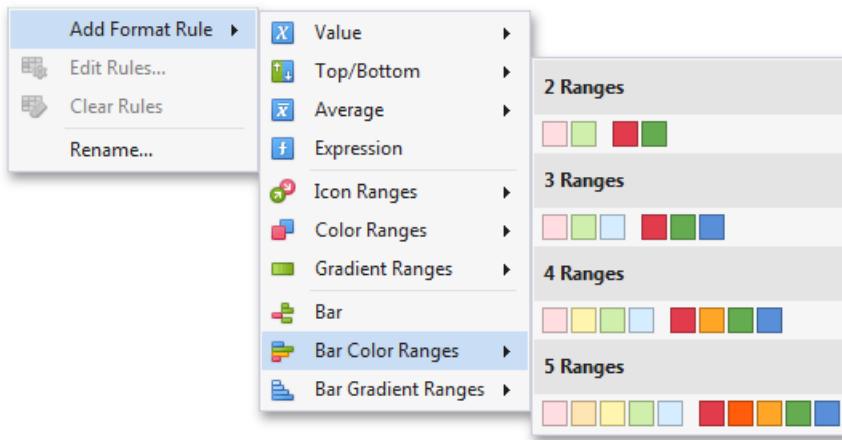
This dialog allows you to change the following options specific to the Bar format condition.

- By default, lengths of the shortest and longest bars correspond to minimum and maximum values, respectively. If necessary, you can specify values corresponding to the shortest and longest bars manually. To do this, change the type of minimum/maximum value from **Automatic** to **Number** or **Percent**, and specify the required values.
- **Style Settings** and **Negative Style Settings** allow you to specify style settings used to color data bars corresponding to positive and negative values, respectively. To learn how to specify custom style settings, see the **Specify Appearance Settings** paragraph in the [Conditional Formatting](#) topic.
- The **Allow negative axis** option allows you to specify whether negative data bars are displayed in the direction opposite to the positive data bars.
- The **Draw axis** option specifies whether to draw the vertical axis between positive and negative data bars.
- The **Show bar only** option specifies whether to show bars without corresponding values.

# Bar Color Ranges

Bar Color Ranges allow you to visualize numeric values using bars whose colors are contained in the specified color set.

To format values according the required condition, click the data item menu button, select **Add Format Rule | Bar Color Ranges** and choose the required color set.



This invokes the **Color Range Bar** dialog containing the set of value ranges and corresponding colors. The Grid dashboard item on the right displays the default formatting applied using the predefined set of 3 colors.

The dialog has a title bar 'Color Range Bar' and a close button. It contains a table of sales data with columns 'Sales Person' and 'Extended Price'. The rows are color-coded: Margaret Peacock (blue), Janet Leverling (light blue), Nancy Davolio (light blue), Andrew Fuller (green), Laura Callahan (green), Robert King (green), Anne Dodsworth (pink), Michael Suyama (pink), and Steven Buchanan (pink). On the left, there's a 'Format style' dropdown showing three colors (blue, green, pink), a 'Use % ranges' checkbox checked, and a table of three ranges: 100.00% &gt;= 67.00%, 67.00% &gt;= 33.00%, and 33.00% &gt;= 0.00%. Buttons for 'Add', 'Delete', and 'Reverse' are below. Under 'Apply to', 'Extended Price' is selected. At the bottom are checkboxes for 'Allow negative axis', 'Draw axis', and 'Show bar only', and buttons for 'OK', 'Cancel', and 'Apply'.

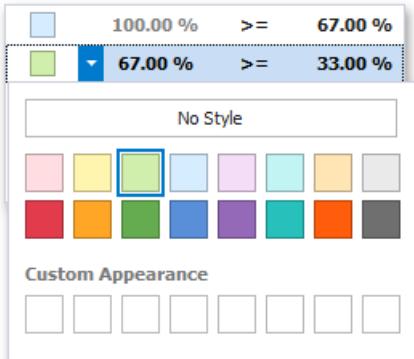
This dialog allows you to change the following options specific to Bar Color Ranges.

- The **Format Style** combo box allows you to change the color set used to apply formatting.
- The **Use % ranges** check box specifies whether the percent or absolute scale is used to generate ranges.

## NOTE

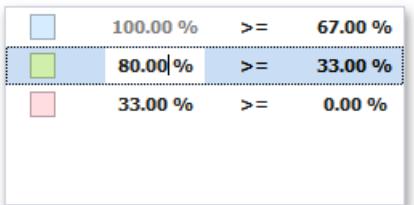
Note that this option is not available for numeric dimensions.

- To change the appearance settings applied to values corresponding to the specified range, click the button next to the required color and select a new color or specify custom appearance settings. To learn how to specify custom settings, see the **Specify Appearance Settings** paragraph in the [Conditional Formatting](#) topic.



Select **No Style** to disable the indication for the required range.

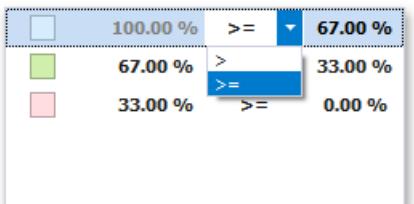
- You can change range boundaries by specifying the required values.



#### **i** NOTE

Note that a new value should fall into a range between corresponding values of the previous and next range.

- To change the comparison logic for the required range, click the comparison sign and select the required option.



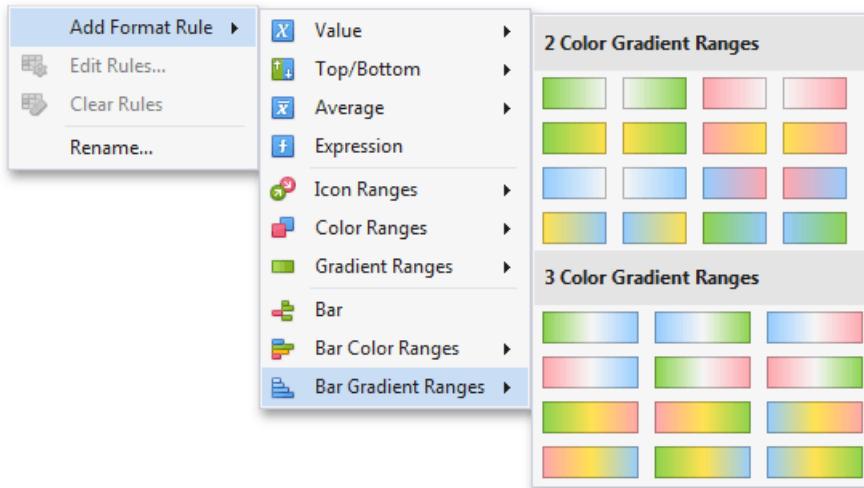
The *greater or equal* sign includes the smallest value for the current interval, while the *greater* sign excludes the smallest value from the current interval and includes it in the next interval.

- Use the **Add** and **Delete** buttons to add new ranges or delete the selected range respectively.

# Bar Gradient Ranges

The Bar Gradient Ranges allow you to visualize numeric values using bars whose colors are contained in the specified color gradient.

To format values according the required condition, click the measure menu button, select **Add Format Rule | Bar Gradient Ranges** and choose the required color gradient.



This invokes the **Bar Gradient Ranges** dialog containing the set of value ranges and corresponding appearance settings. The Grid dashboard item on the right displays the default formatting applied using the predefined Red-Blue gradient.

The 'Bar Gradient Ranges' dialog has the following configuration:

- Format Extended Price (Sum) values using range bar conditions**
- Number of ranges:** Set to 5, with a 'Generate Ranges' button below it.
- Use % ranges:** Checked, with a table below showing five ranges:

Color Range	Start (%)	End (%)
Light Blue	100.00 %	>= 80.00 %
Medium Blue	80.00 %	>= 60.00 %
Medium Purple	60.00 %	>= 40.00 %
Red	40.00 %	>= 20.00 %
Dark Red	20.00 %	>= 0.00 %
- Apply to:** Set to 'Extended Price (Sum)'.
- Options:** 'Allow negative axis' is checked, while 'Draw axis' and 'Show bar only' are unchecked.
- Buttons:** 'OK', 'Cancel', and 'Apply'.

On the right, a preview table shows sales data with bars colored according to the defined ranges:

Sales Person	Extended Price (Sum)
Margaret Peacock	\$233K
Janet Leverling	\$203K
Nancy Davolio	\$192K
Andrew Fuller	\$167K
Laura Callahan	\$127K
Robert King	\$125K
Anne Dodsworth	\$77.3K
Michael Suyama	\$73.9K
Steven Buchanan	\$68.8K

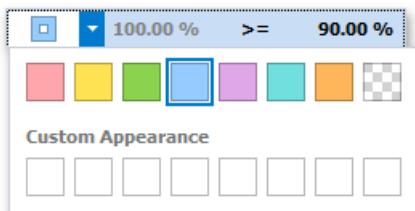
This dialog allows you to change the following options specific to Bar Gradient Ranges.

- **Number of ranges** allows you to specify the number of ranges used to classify values. Click the **Generate Ranges** button to generate a new gradient scale according to the specified number of ranges.
- The **Use % ranges** check box specifies whether the percent or absolute scale is used to generate ranges.

## NOTE

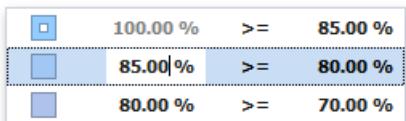
Note that this option is not available for numeric dimensions.

- To change the specific color in the gradient, click the button next to the required color and select a new color or specify a custom background color. This allows you to create a color gradient based on more than two colors. In this case, the specified colors are marked with an empty square.



To learn how to specify a custom color, see the **Specify Appearance Settings** paragraph in the [Conditional Formatting](#) topic.

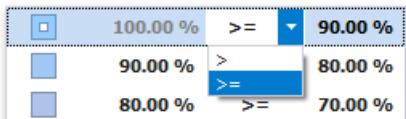
- You can change range boundaries by specifying the required values.



## NOTE

Note that a new value should fall into a range between corresponding values of the previous and next range.

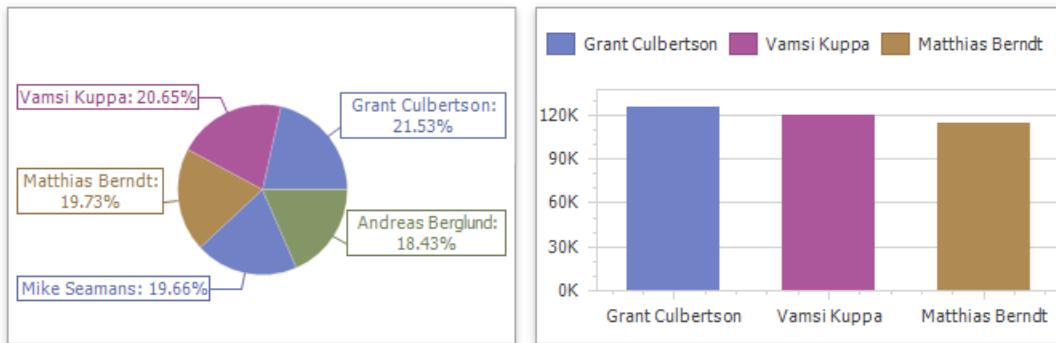
- To change the comparison logic for the required range, click the comparison sign and select the required option.



The *greater or equal* sign includes the smallest value in the current interval while the *greater* sign excludes the smallest value from the current interval and includes it in the next interval.

# Coloring

The Dashboard Designer allows you to paint dashboard item elements such as chart series points or pie segments.



## Supported Dashboard Items

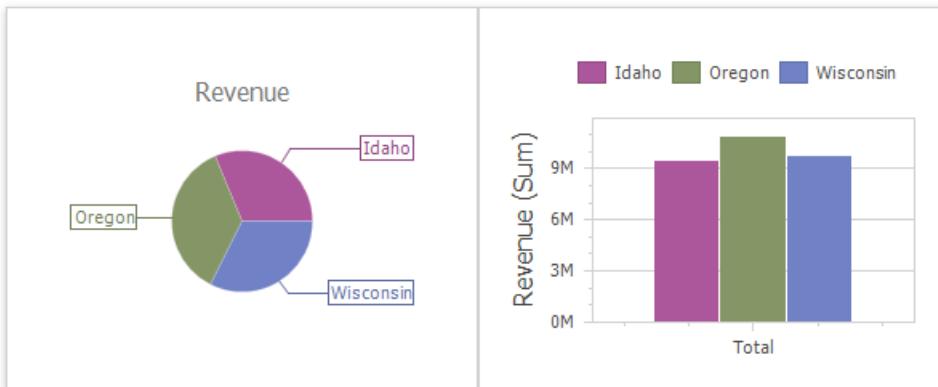
You can paint the following [dashboard items](#):

- Chart
- Scatter Chart
- Pie
- Pie Map
- Range Filter
- Treemap

## Color Scheme Overview

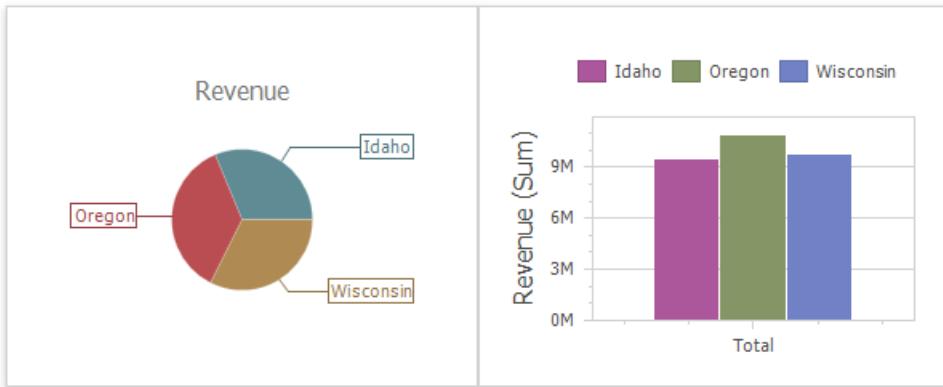
The dashboard supports two ways to color dashboard item elements:

- A **Global Color Scheme** uses consistent colors for identical values across the dashboard. The image below shows a dashboard that contains Pie and Chart dashboard items. Pie segments and chart series points that correspond to *Wisconsin*, *Oregon* and *Idaho* dimension values use identical colors from the default palette.



For a global color scheme, the dashboard reserves automatically generated colors for specific values regardless of the filter state.

- A **Local Color Scheme** uses an independent set of colors for each dashboard item. The image below shows Pie segments that use colors from a local color scheme. These colors do not affect the Chart items that use a global scheme.



For a **Local** color scheme, the dashboard reassigned palette colors when the filter state is changed.

#### **TIP**

**Local** colorization paints dashboard item elements more quickly because the control does not request all possible colors and requests only colors used in the current item.

## Color Measures and Dimensions

You can use predefined color modes to paint individual dimensions or all measures in a dashboard item.

The following color settings are available:

COLOR MODE OPTION	DESCRIPTION
<b>Default</b>	Enables or disables coloring depending on the dashboard item's type. For example, for TreeMap arguments and Chart series, <b>Default</b> means <b>Hue</b> . For Chart arguments, <b>Default</b> means <b>None</b> .
<b>Hue</b>	Elements use different colors.
<b>None</b>	Elements use the same color.

## Documentation

Refer to the following help topics for more information on how to configure color variation in the WinForms Designer:

- [Coloring Concepts](#)
- [Customizing a Color Scheme](#)

# Coloring

The Dashboard Designer associates dimension values/measures and specified colors to paint dashboard item elements. This topic describes how to configure color settings in the WinForms Designer.

## Coloring Basics

The following concepts are common to both Desktop and Web Dashboard controls:

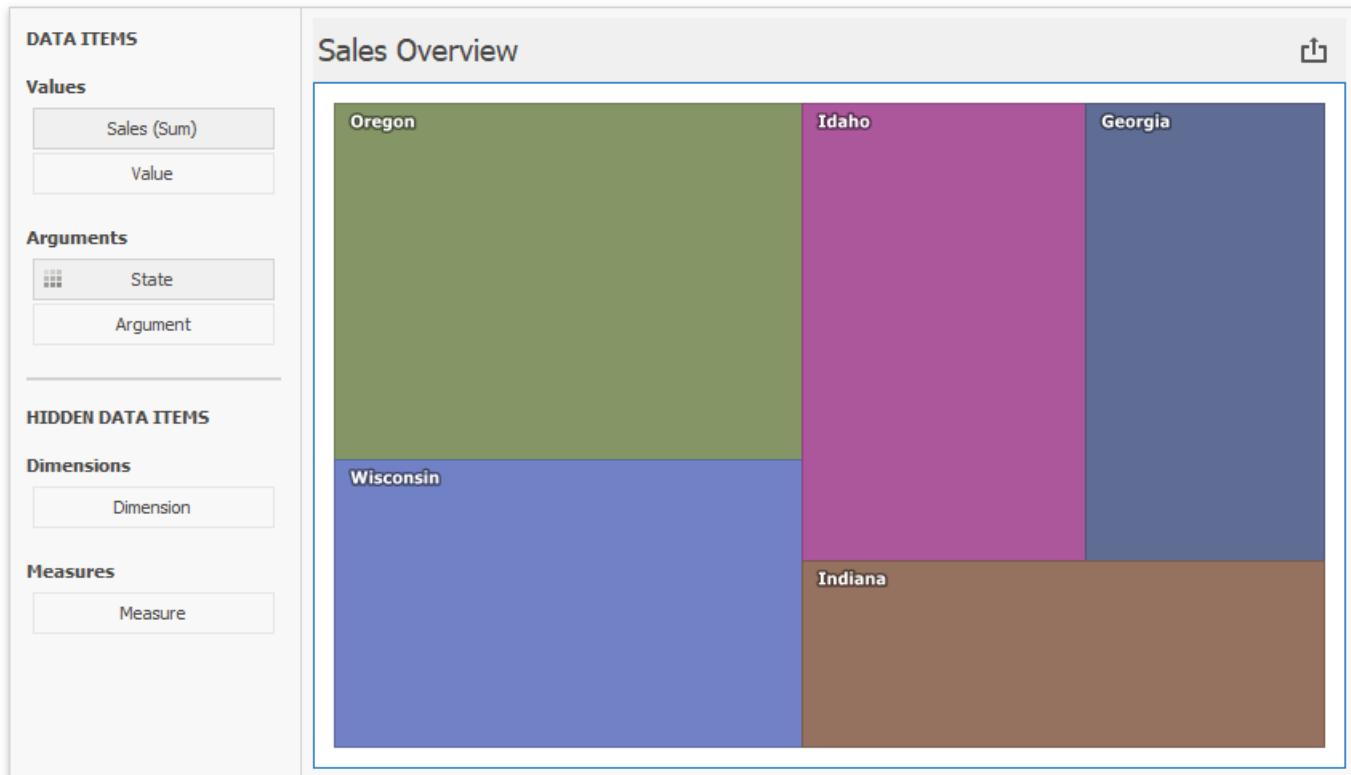
- Color Modes
- Color Schemes
- Supported Dashboard Items

Refer to the following topic for more information about common concepts: [Coloring Basics](#).

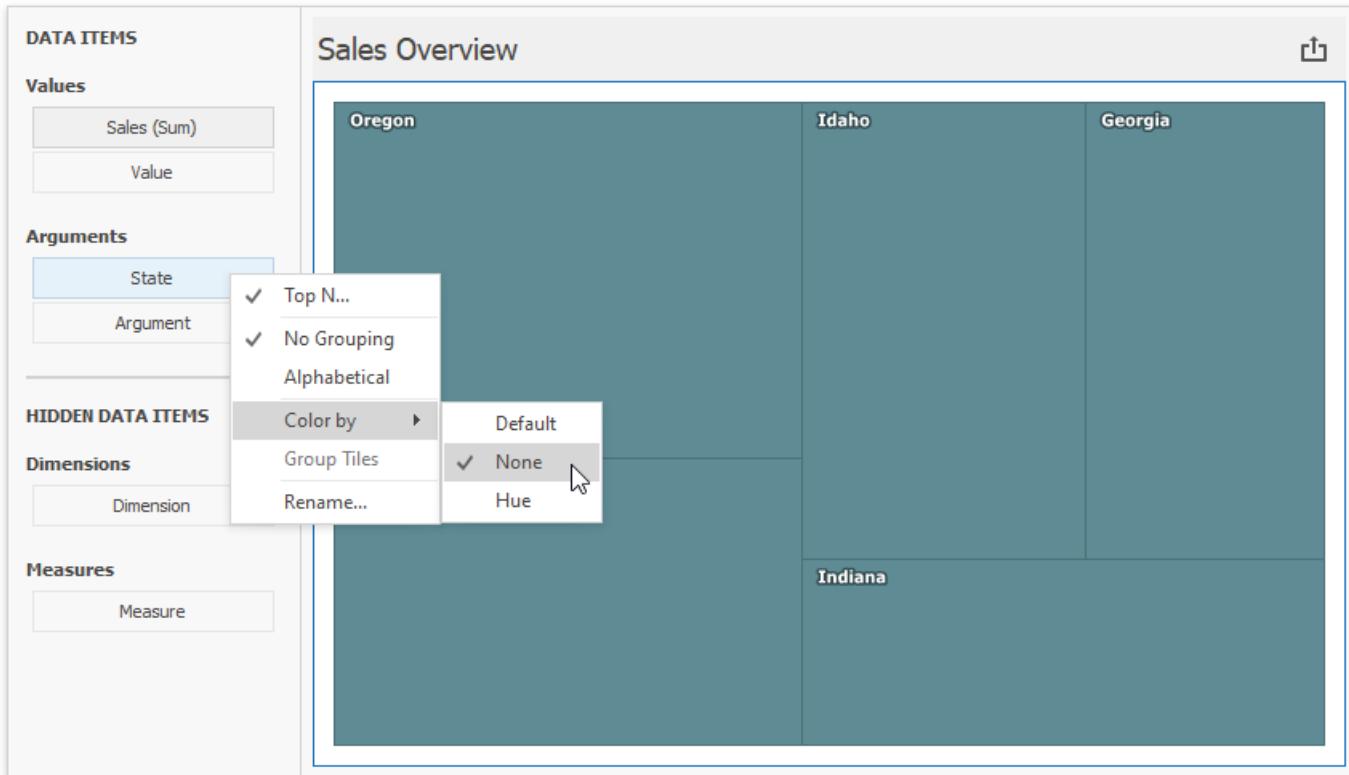
## Color Mode: None

You can disable default color variation for dashboard item elements.

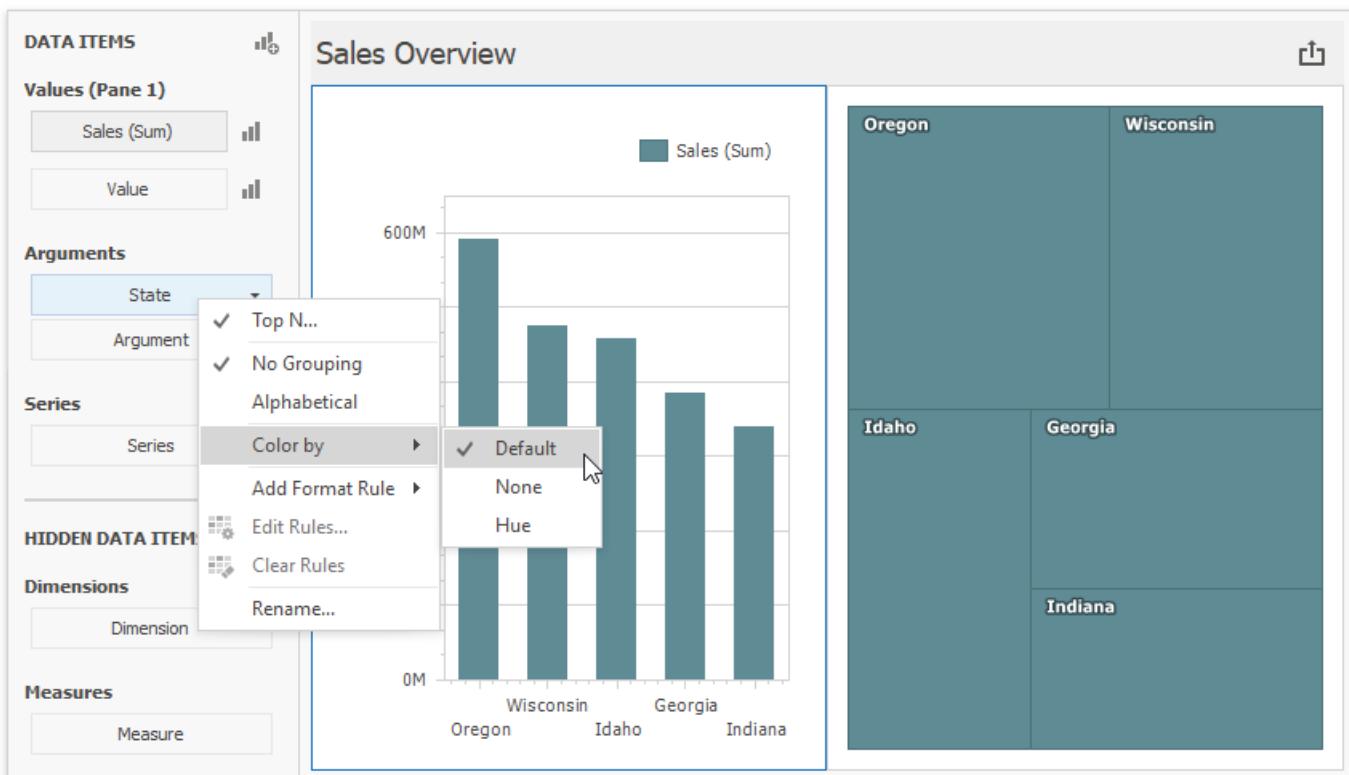
If you add a [TreeMap](#) to a dashboard, individual elements (titles) use different colors:



State values (Arguments) use different colors. To disable color variation, go to the Argument settings and select **Color by | None**.



Add a [Chart](#) with the same Argument and Value as in the TreeMap:

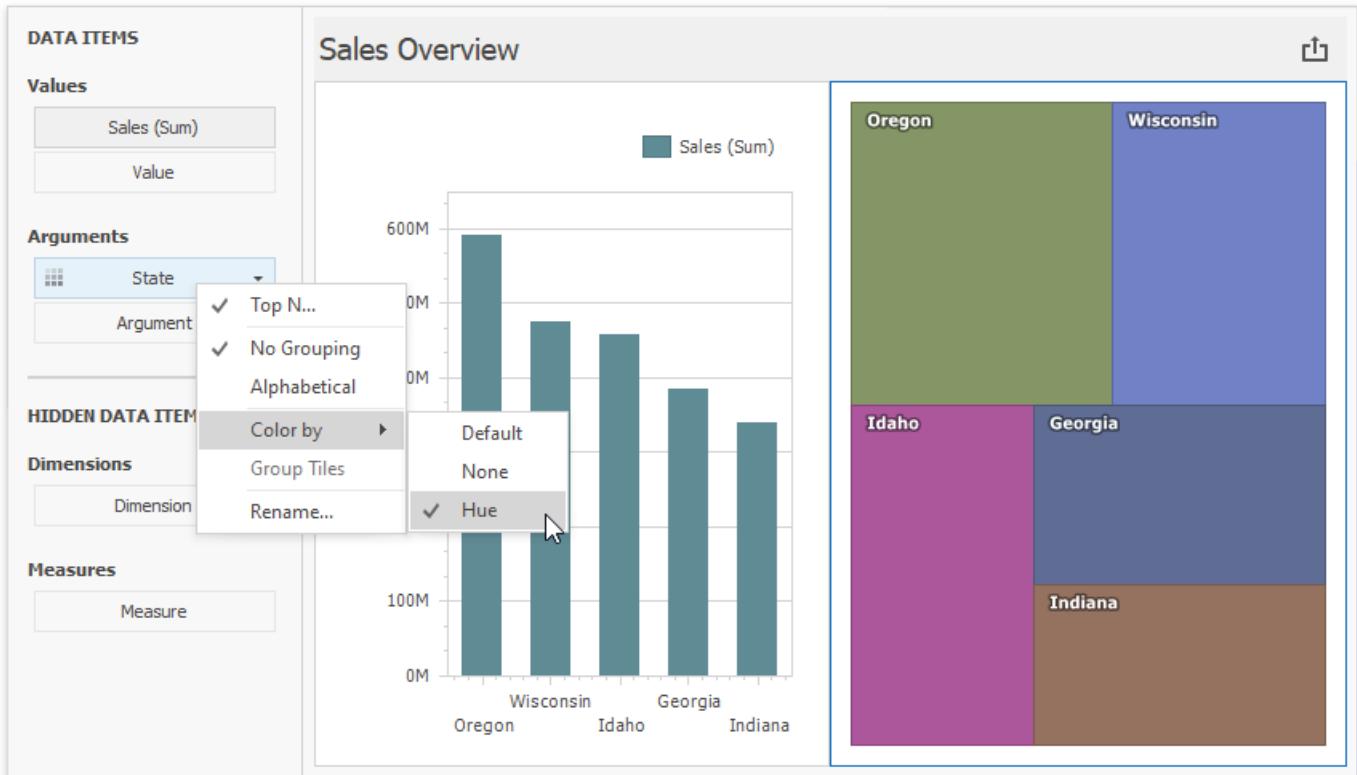


Note that **Default** means **None** for chart arguments.

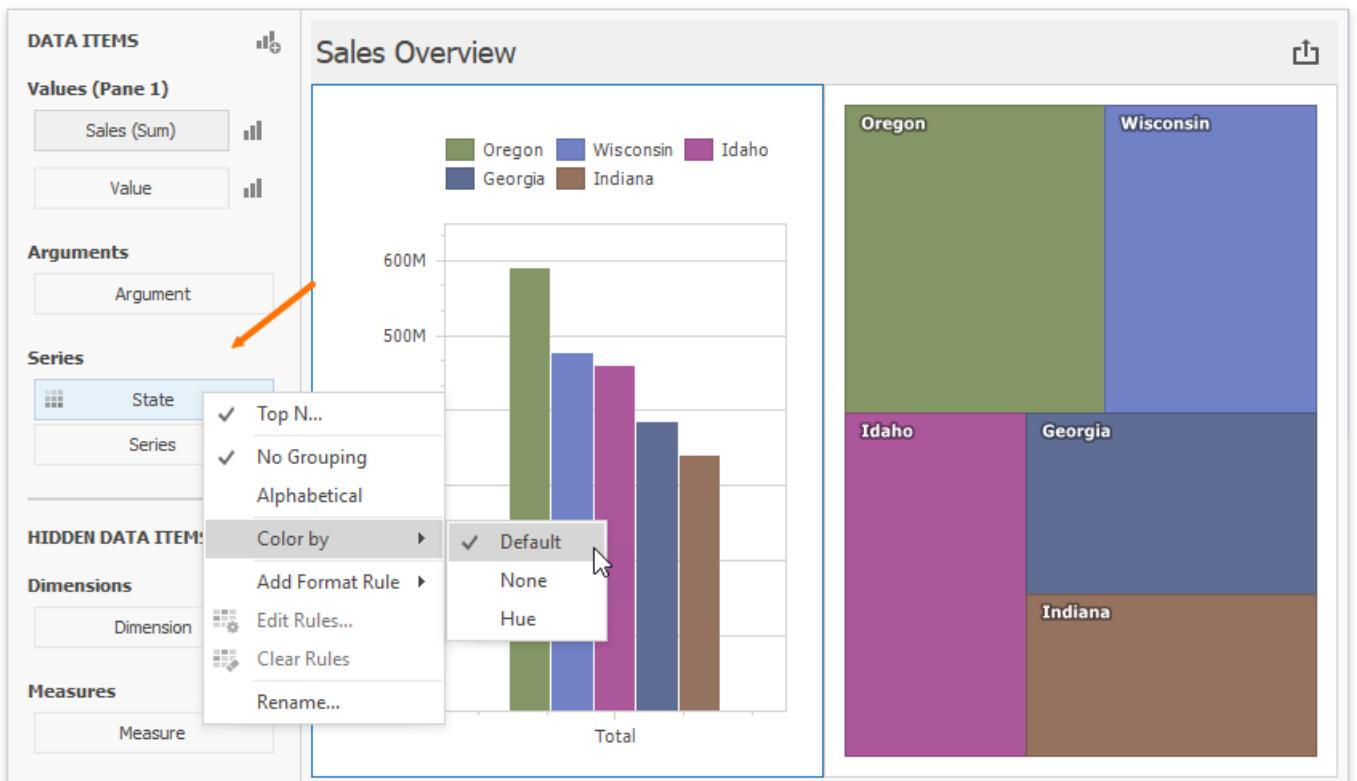
## Color Mode: Hue

You can enable colors in previously added Treemap and Chart items.

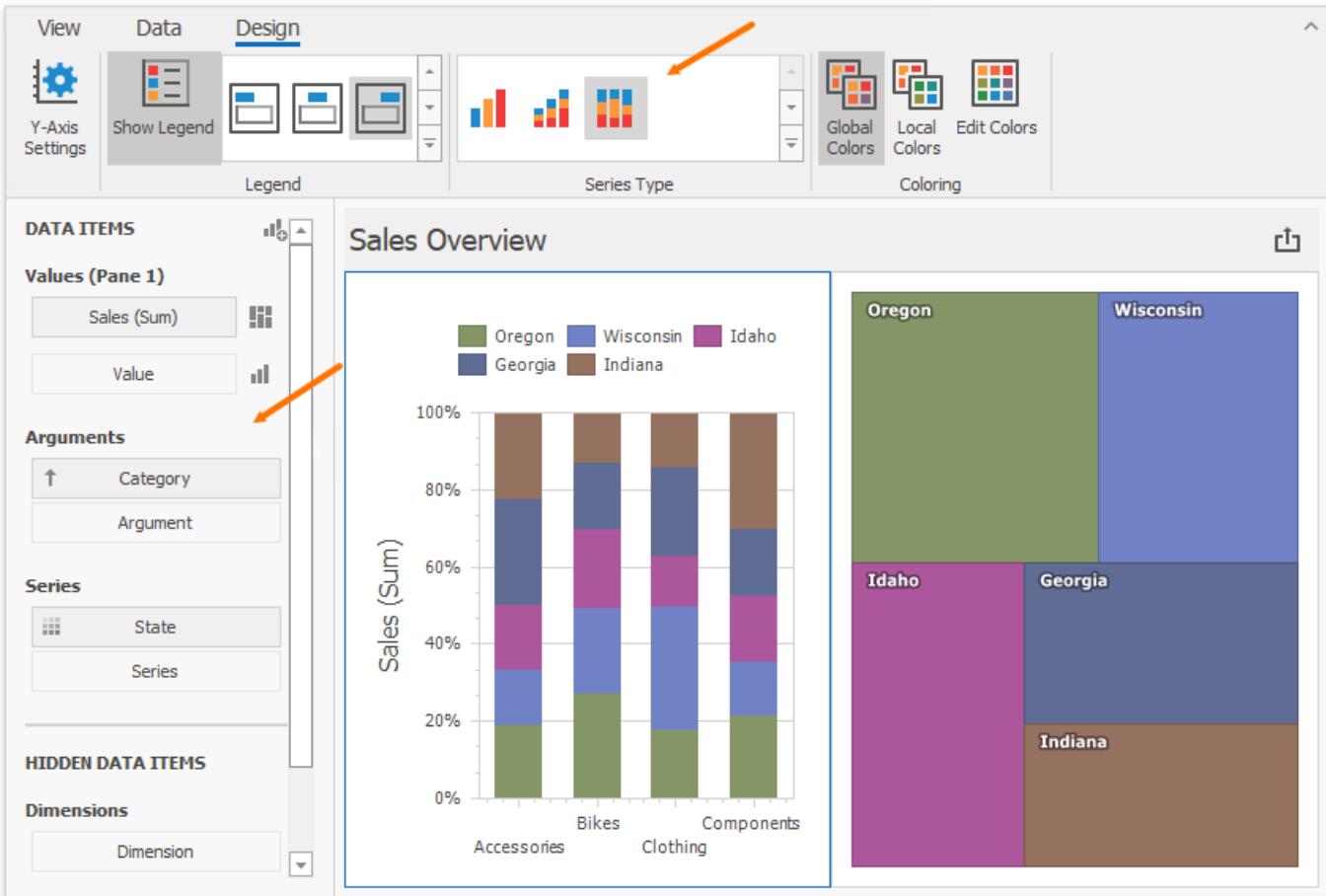
Set the TreeMap's color mode to **Default** or **Hue**:



In the Chart settings, move *State* from Arguments to Series. **Default** now means **Hue** in this new context. The coloring indicator (■) on the data item shows that color variation by hue is enabled.



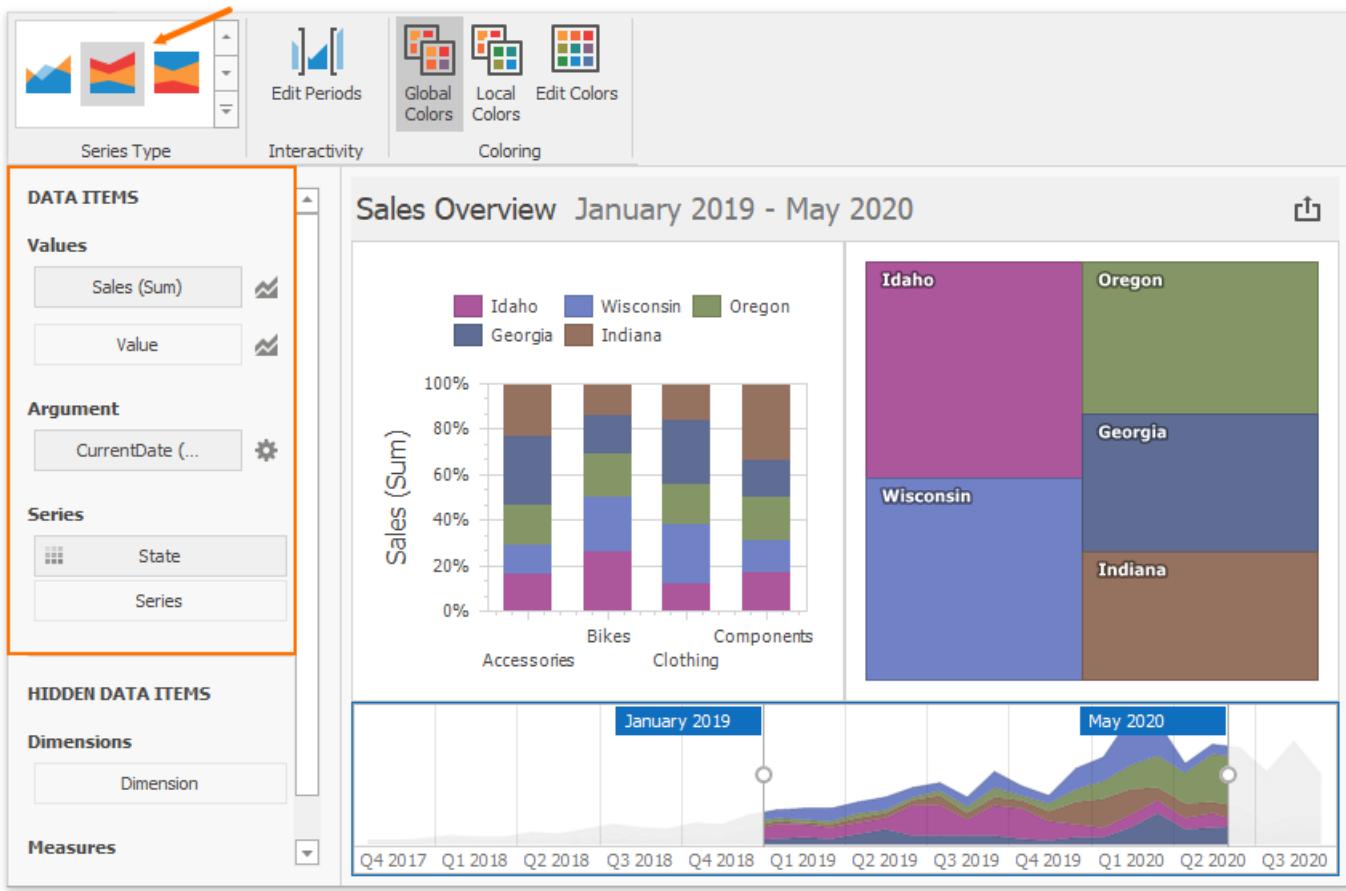
Add *Category* as a chart argument and switch to 100% Stacked View:



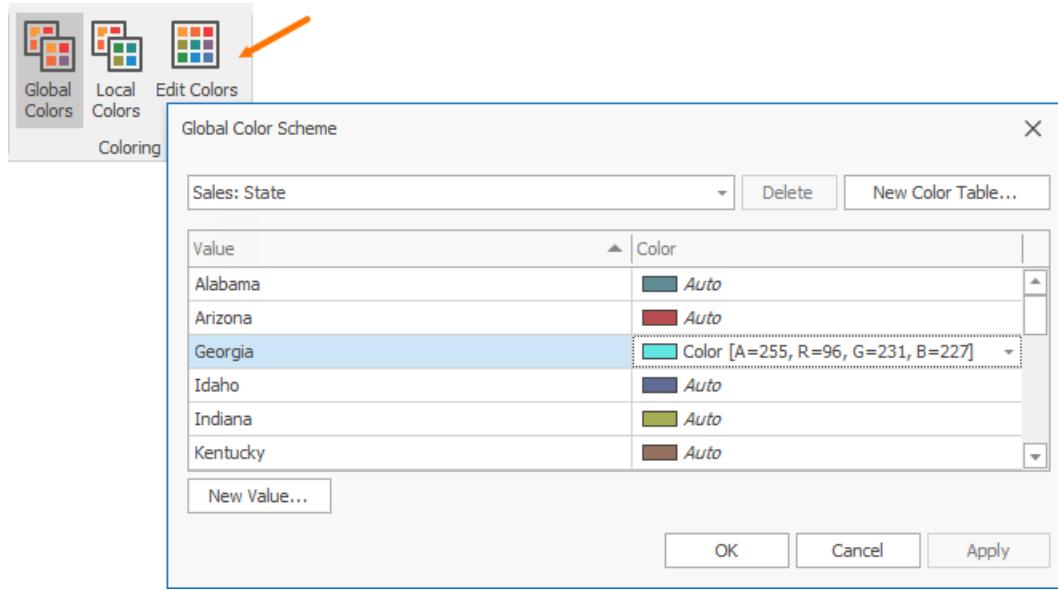
## Use Global Color Scheme

The same *State* data items use identical colors. Dashboard constructs a **Global Color Scheme** for this purpose.

Add a [Range Filter](#) with the following settings:



Corresponding *State* fields are painted with the same colors, so you can associate and compare data from all dashboard items. This happens because all items use **Global Colors** (the default setting). You can see the switch to **Global Colors** in the Ribbon. Click **Edit Colors** to modify the colors used in the palette:

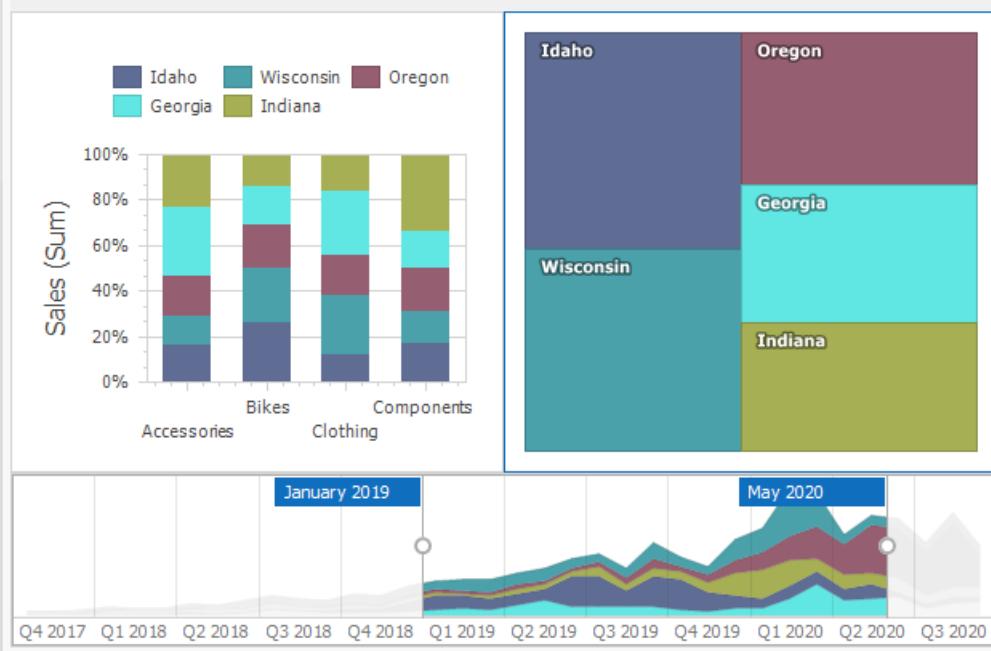


### NOTE

The dashboard uses the default palette. This palette contains 20 unique colors to paint dimension values/measures. For more information on how to change default colors or create a new color table, refer to the following help topic: [Customizing a Color Scheme](#).

This is how the Dashboard appears after you change the color for Georgia in the palette:

## Sales Overview January 2019 - May 2020



## Use Local Color Scheme

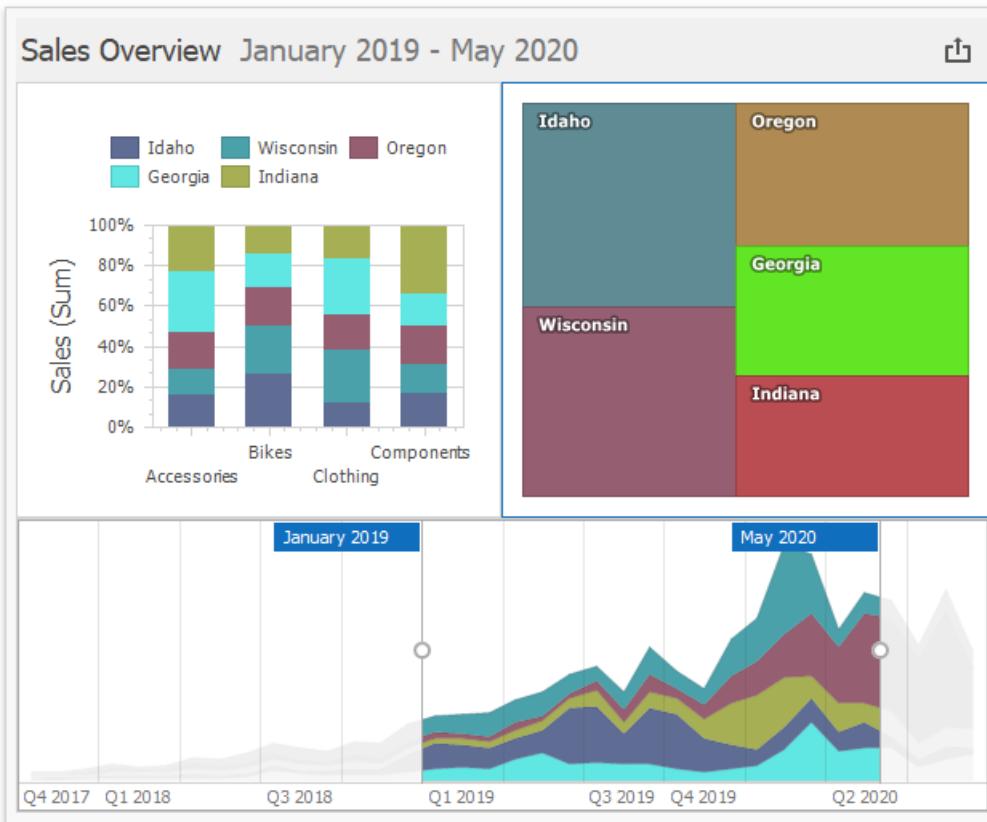
If you want to use an independent set of colors in the selected dashboard item, switch to the **Local Color Scheme**.

You can see the Treemap's arguments that use colors from the **Local Color Scheme**:

The screenshot shows the Power BI designer interface with the following details:

- Design Tab:** The "Coloring" section is highlighted with a red arrow, indicating the use of the Local Color Scheme.
- Arguments Section:** The "State" argument is selected.
- Hidden Data Items:**
  - Dimensions:** Dimension
  - Measures:** Measure
- Visualizations:**
  - Treemap:** Shows Sales (Sum) for Idaho, Oregon, Georgia, Wisconsin, and Indiana.
  - Stacked Bar Chart:** Shows Sales (Sum) for Idaho, Wisconsin, Oregon, Georgia, and Indiana across Accessories, Bikes, Components, and Clothing categories.
  - Line Chart:** Tracks Sales (Sum) over time from Q4 2017 to Q3 2020, highlighting January 2019 and May 2020.

Colors modified in the local color scheme do not affect items that use the global color scheme. The following image shows a custom color for *Georgia* in the Treemap:



## Dashboard Item Color Mode Specifics

- [Chart - Coloring](#)
- [Scatter Chart - Coloring](#)
- [Pie - Coloring](#)
- [Pie Map - Coloring](#)
- [Range Filter - Coloring](#)
- [Treemap - Coloring](#)

## How to Customize a Color Scheme

Refer to the following topic for more information on how to customize a color scheme:

- [Customizing a Color Scheme](#)

# Customizing a Color Scheme

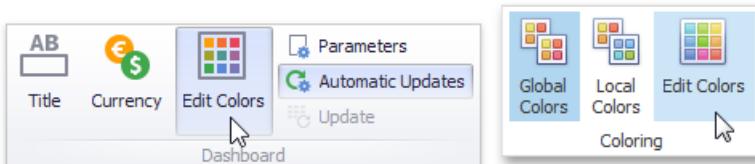
The Dashboard Designer provides the capability to edit colors contained in [global and local color schemes](#). You can select the required color from the default dashboard palette or specify a custom color.

- [Invoke a Color Scheme Dialog](#)
- [Edit Colors](#)
- [Add a New Value](#)
- [Add a New Color Table](#)

## Invoke a Color Scheme Dialog

To edit colors, use the **Color Scheme** dialog. You can invoke this dialog in the following ways.

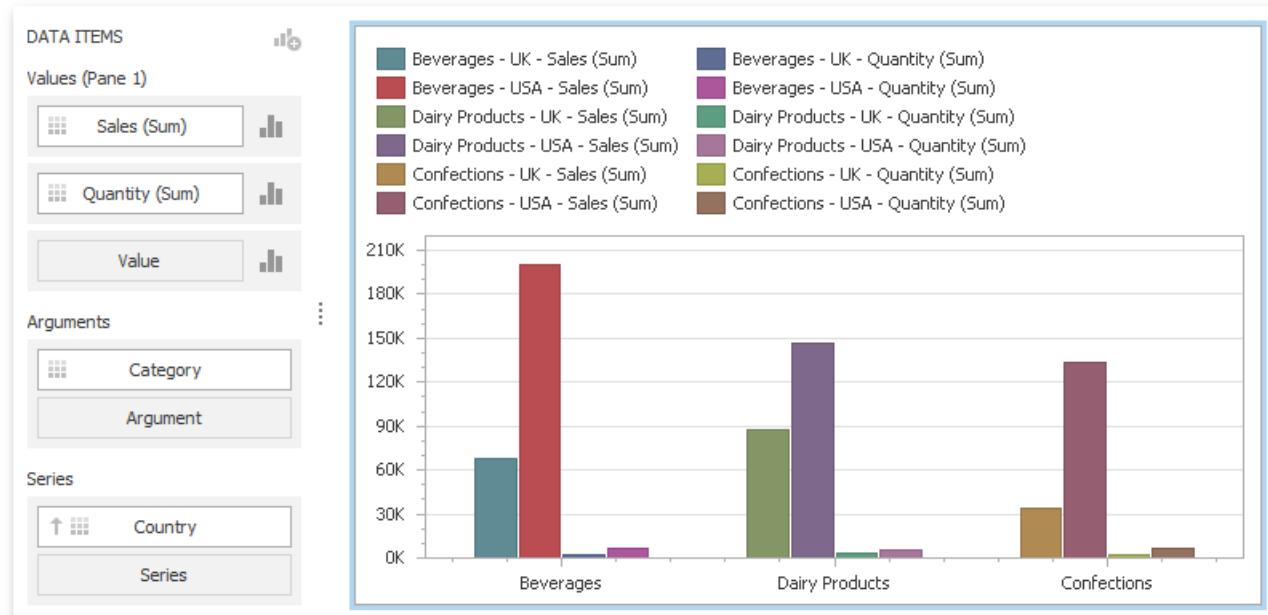
- To edit colors in a global color scheme, use the **Edit Colors** button in the **Home** ribbon tab or the **Edit Colors** button in the dashboard item's **Design** tab.



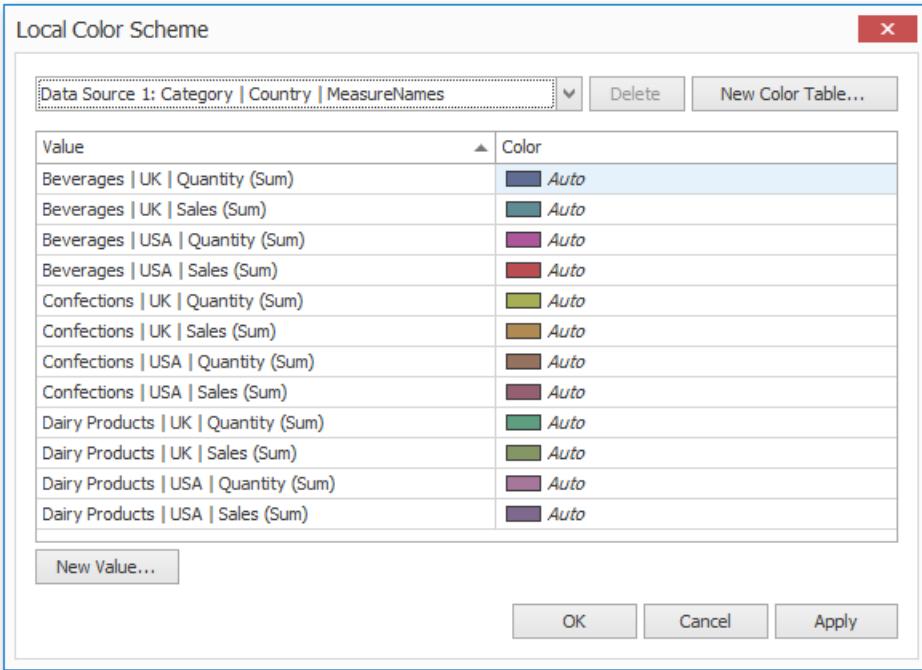
- To edit colors in a local color scheme, use the **Edit Colors** button in the contextual **Design** ribbon tab.



Lets consider a Chart dashboard item whose dimensions and measures are colored by hue using local colors.



For this dashboard item, the **Color Scheme** dialog will contain combinations of all dimension values and a specific measure.



In this dialog, you can perform the following actions.

- [Edit automatically assigned colors](#) or specify new colors.
- [Add new values](#) to a color table.
- [Add new color tables](#) containing values whose colors are not yet assigned.

## Edit Colors

You can customize automatically assigned colors in several ways.

- To retain the automatically assigned color for the selected value, right-click the required value in the **Value** column and select **Retain this color**.

Value	Color
Beverages   UK   Quantity (Sum)	Auto
Beverages   UK   Sales (Sum)	Auto
Beverages   USA   Quantity (Sum)	Auto
Beverages   USA   Sales (Sum)	Auto
Confections   UK   Quantity (Sum)	Auto
Confections   UK   Sales (Sum)	Auto

Value	Color
Beverages   UK   Quantity (Sum)	Auto
Beverages   UK   Sales (Sum)	Palette index: 0
Beverages   USA   Quantity (Sum)	Auto
Beverages   USA   Sales (Sum)	Auto
Confections   UK   Quantity (Sum)	Auto
Confections   UK   Sales (Sum)	Auto

This reserves the current palette color for the selected value.

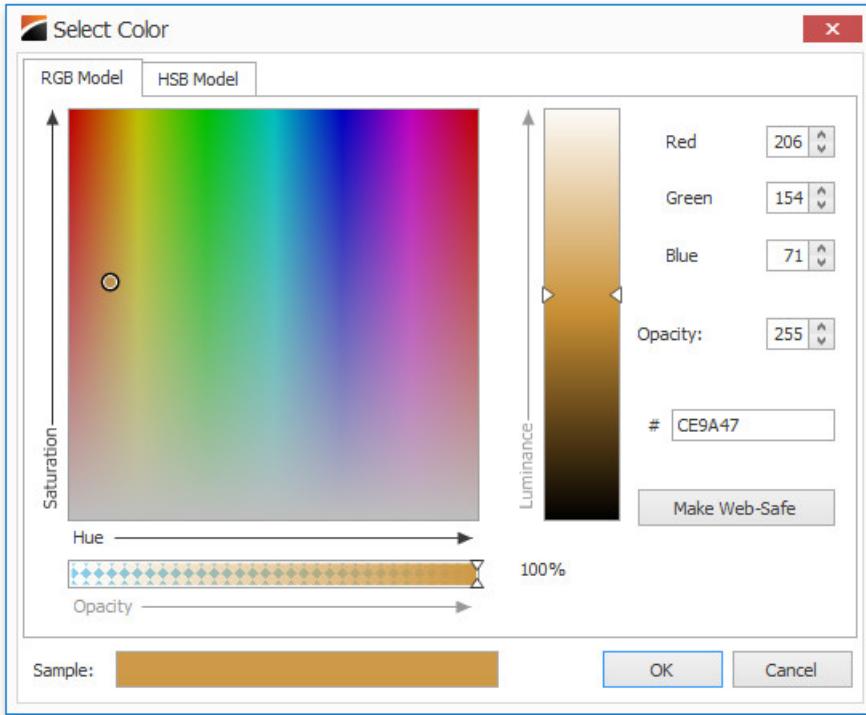
- You can select another palette color by clicking the required cell in the **Color** column.

Value	Color
Beverages   UK   Quantity (Sum)	Auto
Beverages   UK   Sales (Sum)	Auto
Beverages   USA   Quantity (Sum)	Auto
Beverages   USA   Sales (Sum)	Auto
Confections   UK   Quantity (Sum)	Auto
Confections   UK   Sales (Sum)	Auto

Value	Color
Beverages   UK   Quantity (Sum)	Auto
Beverages   UK   Sales (Sum)	Palette index: 1
Beverages   USA   Quantity (Sum)	Auto
Beverages   USA   Sales (Sum)	Auto
Confections   UK   Quantity (Sum)	Auto
Confections   UK   Sales (Sum)	Auto

- To specify a custom color, click **More Colors...** and pick any color using the RGB or HSB color model in the invoked **Select Color** dialog.



You can reset the customized color for the selected value using the **Reset** menu item.

Value	Color
Beverages   UK   Quantity (Sum)	Auto
Beverages   UK   Sales (Sum)	Palette index: 1
Beverages   USA   Quantity (Sum)	Reset
Beverages   USA   Sales (Sum)	Reset all
Confections   UK   Quantity (Sum)	Auto
Confections   UK   Sales (Sum)	Auto

## Add a New Value

The **Color Scheme** dialog allows you adding a new value with the specified color to the selected color table. To do this, click the **New Value...** button.

**New Value**

Category:	<input type="text" value="Seafood"/>	
Country:	<input type="text" value="USA"/>	
<b>Measures:</b>		
<ul style="list-style-type: none"> <li>↳ Data Source 1</li> <li>↳ SalesPerson</li> <li>↳ Category</li> <li>↳ Country</li> <li>↳ Sales Person</li> <li>↳ Quantity</li> <li>↳ Sales</li> </ul>	<input type="button" value=""/> > <input type="button" value="&lt;"/>	<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;">Sales (Sum)</div>
		Summary type: <input type="button" value="Sum"/>

**OK**   **Cancel**

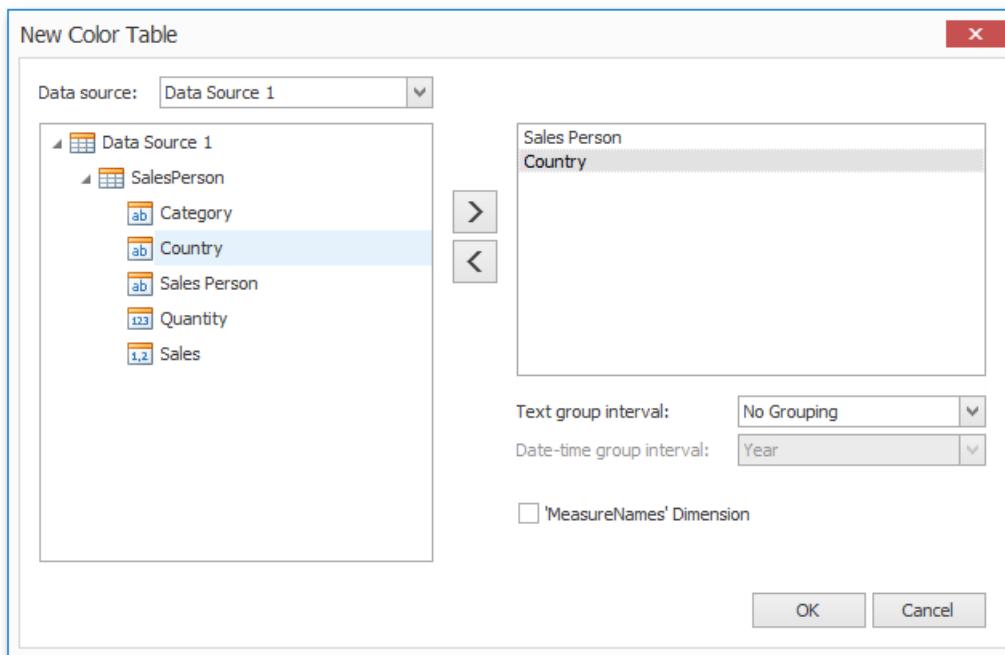
In the invoked **New Value** dialog, specify the dimension values, add the required measures and click **OK**. This creates a new value whose color can be specified as described in [Edit Colors](#).

You can remove manually added values using the **Remove** context menu item.



## Add a New Color Table

The **Color Scheme** dialog also allows you to add a new color table containing values whose colors are not yet assigned. To do this, click **New Color Table...** button.



In the invoked dialog, specify the data source, add the required dimensions and enable the '**'MeasureNames' Dimension**' checkbox if you need to add measures to a color table.

Click **OK** to add the color table to a color scheme. Then, you can add values to this table (see [Add a New Value](#)) and specify its colors (see [Edit Colors](#)).

# Data Display Format

The DevExpress Dashboard allows you to specify format settings for numeric and date-time values, as described in the [Formatting Data](#) document. However, certain data labels and delta values can be formatted independently to give you more ways to improve data readability and optimize screen space usage.

Visual elements whose format can be customized are different for different dashboard items. For more information refer to the topics listed below.

- [Chart X-Axis Format](#)
- [Chart Y-Axis Format](#)
- [Scatter X and Y Axes Formats](#)
- [Grid Delta Column Formats](#)
- [Gauge Scale Label Format](#)
- [Choropleth Map Delta Format](#)
- [Card Formats](#)

# Data Analysis

This section describes how to perform advanced data analysis using the aggregate and window functions, dashboard parameters, etc.

The section consists of the following topics.

- [Aggregations](#)
- [Window Calculations](#)
- [Using Dashboard Parameters](#)
- [Expression Constants, Operators, and Functions](#)

# Aggregations

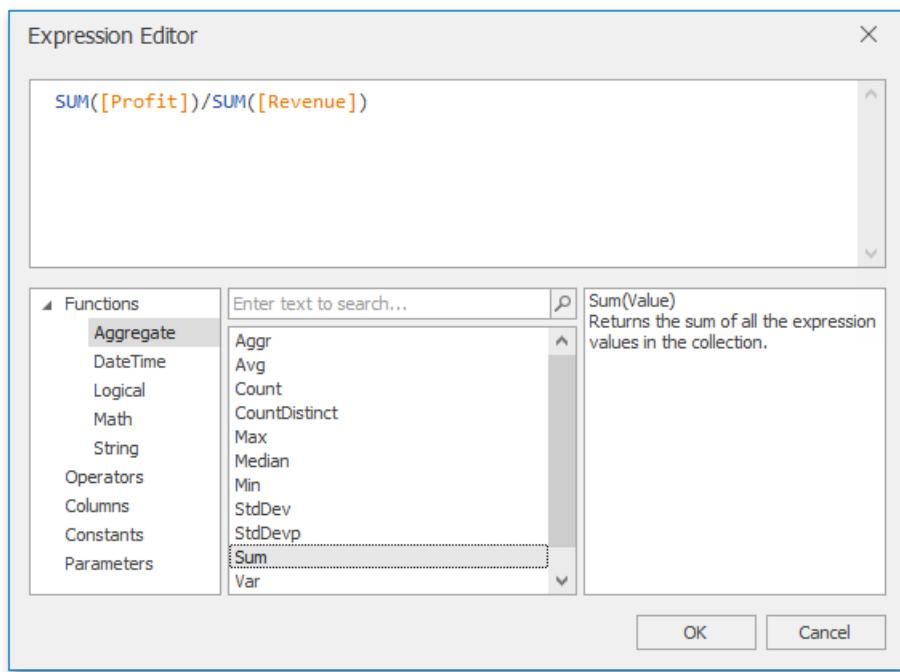
Topics in this section describe functions used to introduce additional aggregation levels to prepare underlying data.

- [Summary Level Aggregations](#)
- [Intermediate Level Aggregations](#)

# Summary Level Aggregations

The Dashboard Designer allows you to perform aggregations when constructing a [calculated field expression](#). This allows you to evaluate calculated fields on a summary level.

In the Dashboard Designer, you can use the following set of predefined aggregate functions.



FUNCTION	DESCRIPTION
Aggr(SummaryExpression, Dimensions)	Aggregates underlying data using the detail level specified by a predefined set of dimensions and a specified summary function. To learn more, see <a href="#">Intermediate Level Aggregations</a> .
Avg(Value)	Returns the average of all the values in the expression.
Count()	Returns the number of values.
CountDistinct(Value)	Returns the number of distinct values.
Max(Value)	Returns the maximum value across all records.
Min(Value)	Returns the minimum value across all records.
Median(Value)	Returns the median of the values.
Sum(Value)	Returns the sum of all values.
Var(Value)	Returns an estimate of the variance of a population where the sample is a subset of the entire population.
Varp(Value)	Returns the variance of a population where the population is the entire data to be summarized.
StdDev(Value)	Returns an estimate of the standard deviation of a population where the sample is a subset of the entire population.
StdDevp(Value)	Returns the standard deviation of a population where the population is the entire data to be summarized.

These functions can be used for all types of numeric fields. After creating such calculated fields, you can use them as measures contained in an OLAP cube.

# Intermediate Level Aggregations

The Dashboard can aggregate and summarize data on different levels.

- The [Query Builder](#) allows you to prepare an underlying data source before analyzing data. You can apply grouping, sorting, summarization and other data shaping operations during data selection.
- [Dashboard items](#) aggregate and summarize data at a visualization level using dimensions and measures, respectively. To learn more, see [Bind Dashboard Items to Data](#).
- The **Aggr** function allows you to introduce an intermediate detail level that is not related to the visualization level. This allows you to create custom aggregations at different levels and combine these aggregations with existing visualizations.

## Overview

The **Aggr** function aggregates and summarizes underlying data using the detail level specified by a predefined set of dimensions and a specified summary function. This function can be used during the creation of a new [calculated field](#) in the Expression Editor.

The **Aggr** function has the following syntax.

```
Aggr(summaryExpression, dimension1, dimension2, ...)
```

The first argument is a [summary expression](#) calculated against a specific data source field. The next arguments are the set of dimensions whose values are aggregated and used to calculate summaries specified using the first argument. For instance, the following function calculates sums of sales for each product within the specified category.

```
Aggr(Sum([Sales]), [Category], [Product])
```

If you created the calculated field that includes the **Aggr** function and dropped the created field into an existing [dashboard item](#), the Dashboard joins the resulting aggregation with the already displayed data. This means that you can add data with the increased or decreased granularity to the dashboard item. There are two main scenarios.

- In the first scenario, an aggregation has a **less detailed granularity** than visualized data.

In this scenario, an underlying data source contains the list of orders for two categories and corresponding products.

Order ID	Category	Product	Sales
1	Beverages	Chai	10
2	Beverages	Chai	15
3	Beverages	Coffee	35
4	Beverages	Coffee	20
5	Confections	Chocolate	40
6	Confections	Chocolate	55
7	Confections	Biscuits	25
8	Confections	Biscuits	35

To aggregate this data by individual categories, create a calculated field with the following expression.

```
Aggr(Sum([Sales]), [Category])
```

The following internal table will be generated for this calculated field.

Order ID	Category	Product	Sales
1	Beverages	Chai	10
2	Beverages	Chai	15
3	Beverages	Coffee	35
4	Beverages	Coffee	20
5	Confections	Chocolate	40
6	Confections	Chocolate	55
7	Confections	Biscuits	25
8	Confections	Biscuits	35



Beverages	80
Confections	155

The sample [Grid](#) dashboard item contains more detailed data and includes the following columns: *Category*, *Product* and the sum of *Sales*.

Category	Product	Sales (Sum)
Beverages	Chai	\$25
Beverages	Coffee	\$55
Confections	Biscuits	\$60
Confections	Chocolate	\$95

If you drop the created calculated field to the Grid, the sum of sales for each category will be repeated for each Grid row.

Category	Product	Sales (Sum)
Beverages	Chai	\$25
Beverages	Coffee	\$55
Confections	Biscuits	\$60
Confections	Chocolate	\$95



Category	Product	Sales (Sum)	Sales by Category (Sum)
Beverages	Chai	\$25	\$80
Beverages	Coffee	\$55	\$80
Confections	Biscuits	\$60	\$155
Confections	Chocolate	\$95	\$155

For instance, you can use these values later to calculate a contribution of each product to a category's sales.

- An aggregation has a **more detailed granularity** than visualized data.

To aggregate this data by categories and products, create a calculated field with the following expression.

```
Aggr(Sum([Sales]), [Category], [Product])
```

The following internal table will be generated for this calculated field.

Order ID	Category	Product	Sales
1	Beverages	Chai	10
2	Beverages	Chai	15
3	Beverages	Coffee	35
4	Beverages	Coffee	20
5	Confections	Chocolate	40
6	Confections	Chocolate	55
7	Confections	Biscuits	25
8	Confections	Biscuits	35



Beverages	Chai	25
Beverages	Coffee	55
Confections	Biscuits	60
Confections	Chocolate	95

Drop the created calculated field to the Grid and set its summary type to **Min**. The Grid will display minimum product sales within each category.

Category	Sales (Sum)
Beverages	\$80
Confections	\$155



Summary type = Min

Beverages	Chai	25
Beverages	Coffee	55
Confections	Biscuits	60
Confections	Chocolate	95



Category	Sales (Sum)	Sales by Product (Min)
Beverages	\$80	\$25
Confections	\$155	\$60

## Example 1 - Best/Worst Sales by Year

The following example shows how to display best and worst monthly sales for each year.

In this example, the [Chart](#) dashboard item shows the sum of sales by different years. The *Sales* field is placed in the [Values](#) section and the *OrderDate* (with the [Year group interval](#)) is placed in the [Arguments](#) section.

Values (Pane 1)

Sales (Sum)	Bar chart icon
Value	Bar chart icon

Arguments

↑ OrderDate (Year)
Argument

Series

Series
--------

**Sales by Year**

Sales (Sum)

2012	~180K
2013	~600K
2014	~500K

To display sales by the best/worst months for each year, create a new [calculated field](#) with the following expression.

```
Aggr(Sum([Sales]), GetYear([OrderDate]), GetMonth([OrderDate]))
```

Drop this field (*Sales by Year/Month* in the image below) to the Values section and set its [summary type](#) to **Max**. Then, drop this field to Values again and set its summary type to **Min**. The Chart will visualize sales by the best/worst months in a year.

Values (Pane 1)

Sales by Year/Month (Max)	Bar chart icon
Sales by Year/Month (Min)	Bar chart icon
Value	Bar chart icon

Arguments

↑ OrderDate (Year)
Argument

Series

Series
--------

**Sales by Month**

Values

2012	Max: ~55K Min: ~30K
2013	Max: ~65K Min: ~35K
2014	Max: ~140K Min: ~15K

## Example 2 - Percent of Total

This example will demonstrate how to calculate a contribution of individual quarter sales to year sales.

In this example, the [Pivot](#) dashboard item displays the sum of sales by year/quarter. The *Sales* field is placed in the [Values](#) section and the hierarchy of *OrderDate* fields (with the [Year](#) and [Quarter group intervals](#)) is placed in [Rows](#).

The screenshot shows the Tableau Data Source pane on the left and a data view on the right. The Data Source pane has sections for Values, Columns, and Rows. The Values section contains 'Sales (Sum)' and 'Value'. The Columns section contains 'Column'. The Rows section contains 'OrderDate (Year)', 'OrderDate (Quarter)', and 'Row'. The data view on the right is titled 'Sales by Year/Quarter' and displays sales data from 2012 to 2014. The table includes columns for Sales (Sum) Total and individual quarters (Q1, Q2, Q3, Q4). Grand totals are also shown.

	Sales (Sum) Total
2012 Total	\$175K
Q3	\$56.8K
Q4	\$119K
2013 Total	\$632K
Q1	\$159K
Q2	\$153K
Q3	\$145K
Q4	\$176K
2014 Total	\$547K
Q1	\$283K
Q2	\$264K
Grand Total	\$1.35M

To calculate a contribution of each quarter to a year sales, do the following.

- Calculate totals for each year using the **Aggr** function by creating the following calculated field.

```
Aggr(Sum([Sales]), GetYear([OrderDate]))
```

Set the name of the created field to *Sales by Year*.

- Calculate a contribution of each quarter to year sales by creating the following calculated field.

```
Sum([Sales]) / Max([Sales by Year])
```

Name this field *Percent of Total* and drop it to **Values** to see the result.

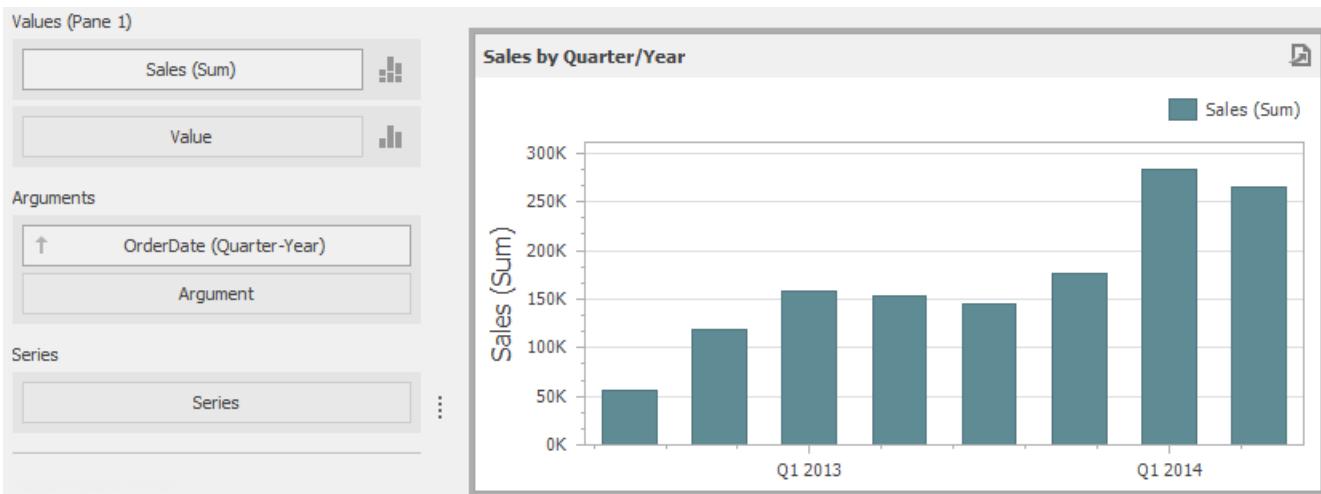
The screenshot shows the Tableau Data Source pane on the left and a data view on the right. The Data Source pane has sections for Values, Columns, and Rows. The Values section contains 'Sales (Sum)', 'Percent of Total', and 'Value'. The Columns section contains 'Column'. The Rows section contains 'OrderDate (Year)', 'OrderDate (Quarter)', and 'Row'. The data view on the right is titled 'Sales by Year/Quarter' and displays sales data from 2012 to 2014. The table includes columns for Sales (Sum), Percent of Total, and individual quarters (Q1, Q2, Q3, Q4). Grand totals are also shown.

	Sales (Sum)	Percent of Total
2012 Total	\$175K	100.00 %
Q3	\$56.8K	32.39 %
Q4	\$119K	67.61 %
2013 Total	\$632K	100.00 %
Q1	\$159K	25.14 %
Q2	\$153K	24.14 %
Q3	\$145K	22.87 %
Q4	\$176K	27.85 %
2014 Total	\$547K	100.00 %
Q1	\$283K	51.69 %
Q2	\$264K	48.31 %
Grand Total	\$1.35M	214.36 %

## Example 3 - Customer Acquisition

In this example, a customer acquisition will be evaluated by grouping customers by the quarter/year of their first purchase to compare sales contributions.

The [Chart](#) dashboard item below visualizes sales by quarter/year.



The following expression determines the minimum order date (the first purchase date) per customer.

```
Aggr(Min(GetDateQuarterYear([OrderDate])), [CustomerID])
```

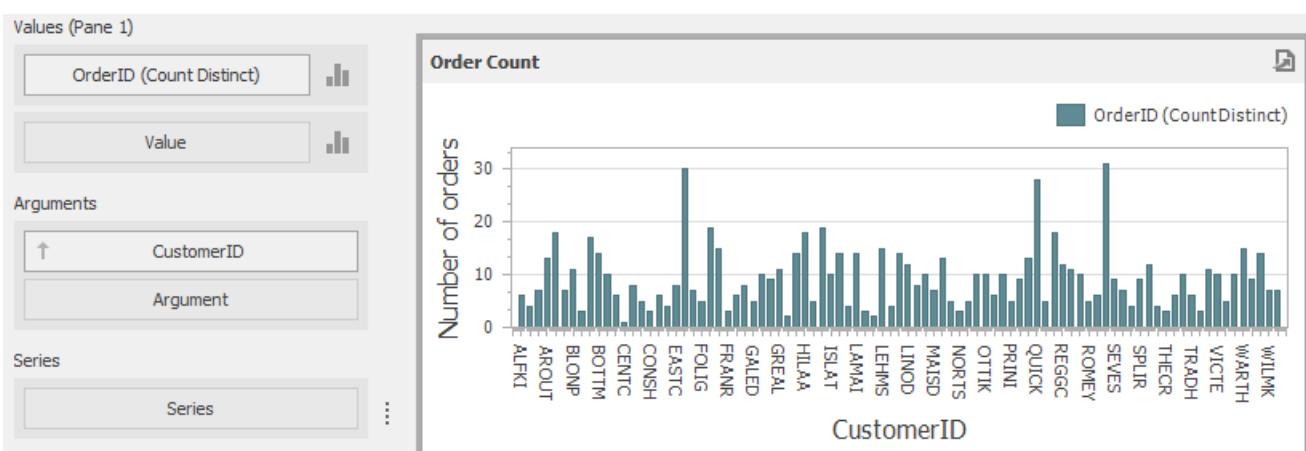
Set the name of the created field to *Customer First Order* and drop this field to the **Series** section to see the result.



## Example 4 - Customer Order Count

In this example, you will learn how to divide customers count by the number of orders they made.

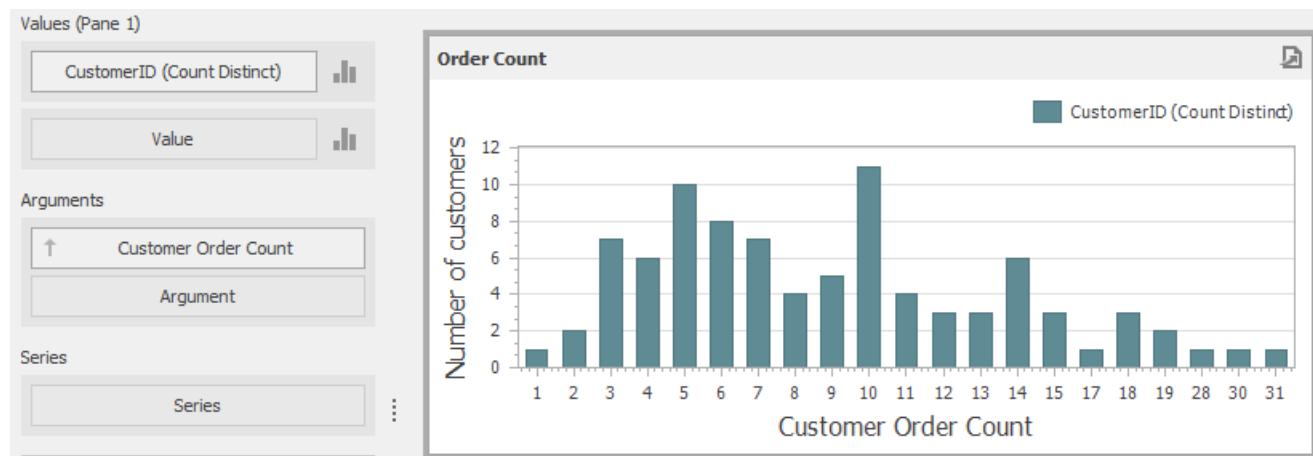
The Chart below shows the number of orders that is made by each customer.



The calculated field below evaluates the number of unique orders made by each customer.

```
Aggr(CountDistinct([OrderID]), [CustomerID])
```

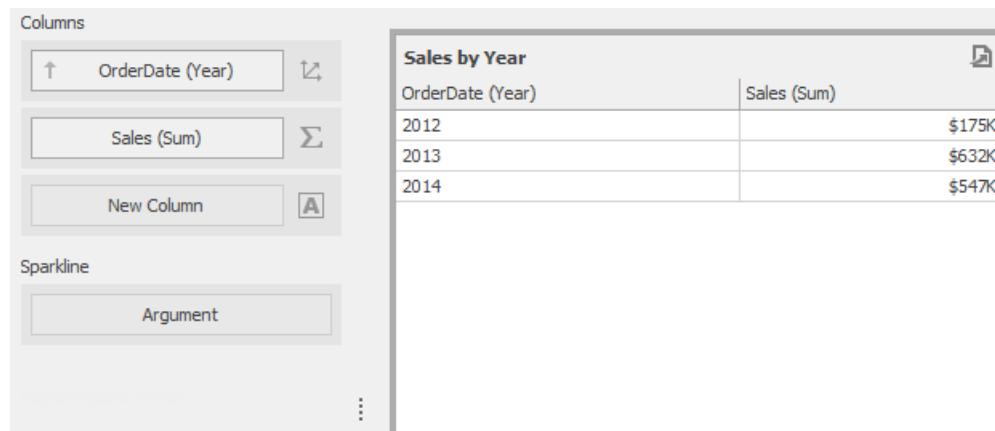
Set the name of this field to *Customer Order Count* and drop this field to arguments. Then, drop the *CustomerID* field to **Values** and change its **summary type** to **Count Distinct**.



## Example 5 - Best Product Sales by Year

This scenario requires the use of nested aggregations. In this example, the dashboard will show products with the best sales in a year along with sales values.

The initial **Grid** dashboard item shows sales of all products by year (the *OrderDate* column with the **Year** group interval and the *Sales* column). The data source also contains the *ProductName* field.



To implement this scenario, perform the following steps.

- Create the calculated field that will return product sales for individual years.

```
Aggr(Sum([Sales]), GetYear([OrderDate]), [ProductName])
```

Set its name to *Product Sales by Year*.

- Create the calculated field that will return maximum sales values.

```
Aggr(Max([Product Sales by Year]), GetYear([OrderDate]))
```

Set its name to *Max Product Sales by Year*.

- Finally, create a calculated field returning the name of the product with the best sales and a corresponding sales value.

```
if([Max Product Sales by Year] = [Product Sales by Year], [ProductName] + ' (' + [Product Sales by Year] + ')', null)
```

Specify the name as *Best Sales Product*. Then, drop this field to the **Columns** section to see the result.

Columns

↑ OrderDate (Year)	⤵
Sales (Sum)	Σ
Best Sales Product (Max)	Σ
New Column	A

Sparkline

Argument
----------

Best Sales Products

OrderDate (Year)	Sales (Sum)	Best Sales Product (Max)
2012	\$175K	Côte de Blaye (\$ 21080.0)
2013	\$632K	Côte de Blaye (\$ 56441.7)
2014	\$547K	Côte de Blaye (\$ 72462.5)

⋮

# Expression Constants, Operators, and Functions

The DevExpress Dashboard uses criteria language that you can use in various DevExpress products for building expressions. An expression is a string that evaluates some value. The criteria language is based on the cross-platform library with some additions and subtractions specific for dashboards. This topic details basic and dashboard-specific constants, operators, and functions.

The tables below contain constants, operators, and functions you can use in dashboard expressions.

## Constants

CONSTANT	DESCRIPTION	EXAMPLE
String constants	Wrap string constants in apostrophes. If a string contains an apostrophe, double the apostrophe.	[Country] == 'France' or [Name] == 'O'Neil'
Date-time constants	Wrap date-time constants in '#'.	[OrderDate] >= #2018-03-22 13:18:51.94944#
True	Represents the Boolean True value.	[InStock] == True
False	Represents the Boolean False value.	[InStock] == False
Enumeration	Specify an enumeration value using its underlying integer value. Note that you cannot specify an enumeration value using its qualified name.	[Status] == 1
Guid	Wrap a Guid constant in curly braces. Use Guid constants in a relational operation with equality or inequality operators only.	[OrderID] == {513724e5-17b7-4ec6-abc4-0eae12c72c1f}
Numeric	Specify different numeric constant types in a string form using suffixes: Int32 (int) - 1, Int16 (short) - 1s, Byte (byte) - 1b, Double (double) - 1.0, Single (float) - 1.0f, Decimal (decimal) - 1.0m,	[Price] == 25.0m
?	Represents a null reference that does not refer to any object. We recommend using the <b>IsNull</b> unary operator (for example, "[Region] is null") or the <b>IsNull</b> logical function (for example, "IsNull([Region])") instead.	[Region] != ?

You can build parameterized criteria using any number of positional parameters. To do this, add parameter placeholders (question mark characters) to a criteria expression to identify parameter positions and provide a list of parameter values. When building criteria, parameter placeholders are substituted with parameter values in values in the order they are listed.

```
CriteriaOperator.Parse("[Name] == ? and [Age] == ?", "John", 33)
```

The following two examples are identical, but the second one allows you to avoid formatting errors.

```
CriteriaOperator.Parse("[OrderDate] >= #1/1/2009#")
```

```
CriteriaOperator.Parse("[OrderDate] >= ?", new DateTime(2009, 1, 1))
```

When parameters are not specified, a parameter placeholder is substituted with null.

```
CriteriaOperator.Parse("[Region] != ?")
```

## Operators

OPERATOR	DESCRIPTION	EXAMPLE
+	Adds the value of one numeric expression to another or concatenates two strings.	[UnitPrice] + 4 or [FirstName] + '' + [LastName]
-	Finds the difference between two numbers.	[Price1] - [Price2]
*	Multiplies the value of two expressions.	[Quantity] * [UnitPrice] * (1 - [BonusAmount])
/	Divides the first operand by the second.	[Quantity] / 2
%	Returns the remainder (modulus) obtained by dividing one numeric expression by another.	[Quantity] % 3
	Performs a bitwise inclusive OR on two numeric expressions. Compares each bit of its first operand to the corresponding bit of its second operand. If either bit is 1, the corresponding resulting bit is set to 1. Otherwise, the corresponding resulting bit is set to 0.	[Flag1]
&	The bitwise AND operator. Compares each bit of its first operand to the corresponding bit of its second operand. If both bits are 1, the corresponding resulting bit is set to 1. Otherwise, the corresponding resulting bit is set to 0.	[Flag] & 10
^	Performs a bitwise exclusive OR on two numeric expressions.	[Flag1] ^ [Flag2]
==	Returns true if both operands have the same value; otherwise, it returns false.	[Quantity] == 10
=	Returns true if both operands have the same value; otherwise, it returns false.	[Quantity] = 10
!=	Returns true if the operands do not have the same value; otherwise, it returns false.	[Country] != 'France'
<	Less than operator. Used to compare expressions.	[UnitPrice] < 20
<=	Less than or equal to operator. Used to compare expressions.	[UnitPrice] <= 20
>=	Greater than or equal to operator. Used to compare expressions.	[UnitPrice] >= 30
>	Greater than operator. Used to compare expressions.	[UnitPrice] > 30
In (,,)	Tests for the existence of a property in an object.	[Country] In ('USA', 'UK', 'Italy')
Between (,)	Specifies a range to test. Returns true if a value is greater than or equal to the first operand and less than or equal to the second operand.	[Quantity] Between (10, 20)
And	Performs a logical conjunction on two Boolean expressions.	[InStock] And ([ExtendedPrice]> 100)
&&	Performs a logical conjunction on two Boolean expressions.	[InStock] && ([ExtendedPrice]> 100)

OPERATOR	DESCRIPTION	EXAMPLE
Or	Performs a logical disjunction on two Boolean expressions.	[Country]=='USA' Or [Country]=='UK'
	Performs a logical disjunction on two Boolean expressions.	[Country]=='USA'   [Country]=='UK'
~	Performs a bitwise negation on a numeric expression.	~[Roles] = 251
Not	Performs a logical negation on a Boolean expression.	Not [InStock]
!	Performs a logical negation on a Boolean expression.	![InStock]
+	Returns a numeric expression's value (a unary operator).	+ [Value] = 10
-	Returns the negative of a numeric expression's value (a unary operator).	- [Value] = 20
Is Null	Returns true if an expression is a null reference, the one that does not refer to any object.	[Region] is null

## Functions

### Advanced Functions - Intermediate Aggregation Level

FUNCTION	DESCRIPTION	EXAMPLE
aggr(SummaryExpression, Dimensions)	Uses the detail level specified by a predefined set of dimensions and a specified summary function to aggregate underlying data.	aggr(Sum([Sales]), [Category], [Product])
w(WindowExpression, partitionByFunction, orderByFunction)	Calculates aggregated values with the specified window function for the window defined by the specified partitioning and ordering.	w(RankDense(Sum([ProductSales]), 'desc'), partitionBy([CategoryName]), orderBy())
partitionBy(column1, column2, ...)	Specifies the columns by which the data rows are partitioned. The window function is applied to each partition separately. The <i>partitionBy</i> function can be used only as a <i>w function</i> argument.	partitionBy([Product])
orderBy(column1, column2, ...)	Specifies the logical order in which the window function calculation is performed on the rows in the window. The <i>orderBy</i> function can be used only as a <i>w function</i> argument.	orderBy(GetYear([Date]), desc(Sum([Sales])))
asc(column)	Specifies that the values in the specified column are sorted in ascending order. This is the default sort order. The <i>asc</i> function can be used only as a <i>w function</i> argument.	asc(Sum([Sales]))
desc(column)	Specifies that the values in the specified column are sorted in descending order. The <i>desc</i> function can be used only as a <i>w function</i> argument.	desc(Sum([Sales]))

### Aggregate Functions

FUNCTION	DESCRIPTION	EXAMPLE
Avg(Value)	Returns the average of all the values in the expression.	Avg([Profit])
Count()	Returns the number of values.	Count()
CountNotNull(Value)	Returns a number of non-null objects in a collection.	CountNotNull([Orders])
CountDistinct(Value)	Returns the number of distinct values.	CountDistinct([Orders])
Max(Value)	Returns the maximum value across all records.	Max([Profit])
Min(Value)	Returns the minimum value across all records.	Min([Profit])
Mode(Value)	Returns the mode of the values.	Mode([Profit])
Median(Value)	Returns the median of the values.	Median([Profit])
Sum(Value)	Returns the sum of all values.	Sum([Profit])
Var(Value)	Returns an estimate of the variance of a population, where the sample is a subset of the entire population.	Var([Orders])
Varp(Value)	Returns the variance of a population, where the population is the entire data to be summarized.	Varp([Orders])
StdDev(Value)	Returns an estimate of the standard deviation of a population, where the sample is a subset of the entire population.	StdDev([Orders])
StdDevp(Value)	Returns the standard deviation of a population, where the population is the entire data to be summarized.	StdDevp([Orders])

## Window Functions

FUNCTION	DESCRIPTION	EXAMPLE	IMAGE																												
Last()	Returns the number of rows from the current row to the last row in the window.	Last()	<table border="1"> <thead> <tr> <th>Order Year</th> <th>Order Quarter</th> <th>Sales</th> <th>Last()</th> </tr> </thead> <tbody> <tr> <td>2015</td> <td>Q1</td> <td>\$138K</td> <td>5</td> </tr> <tr> <td></td> <td>Q2</td> <td>\$143K</td> <td>4</td> </tr> <tr> <td></td> <td>Q3</td> <td>\$154K</td> <td>3</td> </tr> <tr> <td></td> <td>Q4</td> <td>\$182K</td> <td>2</td> </tr> <tr> <td>2016</td> <td>Q1</td> <td>\$298K</td> <td>1</td> </tr> <tr> <td></td> <td>Q2</td> <td>\$142K</td> <td>0</td> </tr> </tbody> </table>	Order Year	Order Quarter	Sales	Last()	2015	Q1	\$138K	5		Q2	\$143K	4		Q3	\$154K	3		Q4	\$182K	2	2016	Q1	\$298K	1		Q2	\$142K	0
Order Year	Order Quarter	Sales	Last()																												
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	Q2	\$142K	0																												
First()	Returns the number of rows from the current row to the first row in the window.	First()	<table border="1"> <thead> <tr> <th>Order Year</th> <th>Order Quarter</th> <th>Sales</th> <th>First()</th> </tr> </thead> <tbody> <tr> <td>2015</td> <td>Q1</td> <td>\$138K</td> <td>0</td> </tr> <tr> <td></td> <td>Q2</td> <td>\$143K</td> <td>-1</td> </tr> <tr> <td></td> <td>Q3</td> <td>\$154K</td> <td>-2</td> </tr> <tr> <td></td> <td>Q4</td> <td>\$182K</td> <td>-3</td> </tr> <tr> <td>2016</td> <td>Q1</td> <td>\$298K</td> <td>-4</td> </tr> <tr> <td></td> <td>Q2</td> <td>\$142K</td> <td>-5</td> </tr> </tbody> </table>	Order Year	Order Quarter	Sales	First()	2015	Q1	\$138K	0		Q2	\$143K	-1		Q3	\$154K	-2		Q4	\$182K	-3	2016	Q1	\$298K	-4		Q2	\$142K	-5
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2016	Q1	\$298K	-4																												
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Index()	Returns the index of the current row in the window.	Index()	<table border="1"> <thead> <tr> <th>Order Year</th> <th>Order Quarter</th> <th>Sales</th> <th>Index()</th> </tr> </thead> <tbody> <tr> <td>2015</td> <td>Q1</td> <td>\$138K</td> <td>1</td> </tr> <tr> <td></td> <td>Q2</td> <td>\$143K</td> <td>2</td> </tr> <tr> <td></td> <td>Q3</td> <td>\$154K</td> <td>3</td> </tr> <tr> <td></td> <td>Q4</td> <td>\$182K</td> <td>4</td> </tr> <tr> <td>2016</td> <td>Q1</td> <td>\$298K</td> <td>5</td> </tr> <tr> <td></td> <td>Q2</td> <td>\$142K</td> <td>6</td> </tr> </tbody> </table>	Order Year	Order Quarter	Sales	Index()	2015	Q1	\$138K	1		Q2	\$143K	2		Q3	\$154K	3		Q4	\$182K	4	2016	Q1	\$298K	5		Q2	\$142K	6
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Size()	Returns the number of rows in the window.	Size()	<table border="1"> <thead> <tr> <th>Order Year</th> <th>Order Quarter</th> <th>Sales</th> <th>Size()</th> </tr> </thead> <tbody> <tr> <td>2015</td> <td>Q1</td> <td>\$138K</td> <td>6</td> </tr> <tr> <td></td> <td>Q2</td> <td>\$143K</td> <td>6</td> </tr> <tr> <td></td> <td>Q3</td> <td>\$154K</td> <td>6</td> </tr> <tr> <td></td> <td>Q4</td> <td>\$182K</td> <td>6</td> </tr> <tr> <td>2016</td> <td>Q1</td> <td>\$298K</td> <td>6</td> </tr> <tr> <td></td> <td>Q2</td> <td>\$142K</td> <td>6</td> </tr> </tbody> </table>	Order Year	Order Quarter	Sales	Size()	2015	Q1	\$138K	6		Q2	\$143K	6		Q3	\$154K	6		Q4	\$182K	6	2016	Q1	\$298K	6		Q2	\$142K	6
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Function	Description	Example	Image																												
Lookup(SummaryExpression, Position)	Returns the value of the expression in a target position specified as a relative offset from the current position.	Lookup(Sum([Sales]), 3)	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>Lookup(Sum([Sales]), 3)</th></tr> </thead> <tbody> <tr> <td>2015</td><td>Q1</td><td>\$138K</td><td>\$138K</td></tr> <tr> <td></td><td>Q2</td><td>\$143K</td><td>\$143K</td></tr> <tr> <td></td><td>Q3</td><td>\$154K</td><td>\$154K</td></tr> <tr> <td></td><td>Q4</td><td>\$182K</td><td>\$182K</td></tr> <tr> <td>2016</td><td>Q1</td><td>\$298K</td><td>\$298K</td></tr> <tr> <td></td><td>Q2</td><td>\$142K</td><td>\$142K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	Lookup(Sum([Sales]), 3)	2015	Q1	\$138K	\$138K		Q2	\$143K	\$143K		Q3	\$154K	\$154K		Q4	\$182K	\$182K	2016	Q1	\$298K	\$298K		Q2	\$142K	\$142K
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RankCompetition(SummaryExpression, [ 'asc' ])	'desc' ])	Returns the standard competition rank for the current row in the window.	RankCompetition(Sum([Sales]), 'asc')																												
RankDense(SummaryExpression, [ 'asc'	'desc' ])	Returns the dense rank for the current row in the window.	RankDense(Sum([Sales]), 'asc')																												
RankUnique(SummaryExpression, [ 'asc'	'desc' ])	Returns the unique rank for the current row in the window.	RankUnique(Sum([Sales]), 'asc')																												
RankModified(SummaryExpression, [ 'asc'	'desc' ])	Returns the modified competition rank for the current row in the window.	RankModified(Sum([Sales]), 'asc')																												
RankPercentile(SummaryExpression, [ 'asc'	'desc' ])	Returns the percentile rank for the current row in the window.	RankPercentile(Sum([Sales]), 'desc')																												
RunningAvg(SummaryExpression)	Returns the running average of the specified expression from the first row in the window to the current row.	RunningAvg(Sum([Sales]))	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>RunningAvg(Sum([Sales]))</th></tr> </thead> <tbody> <tr> <td>2015</td><td>Q1</td><td>\$138K</td><td>\$138K</td></tr> <tr> <td></td><td>Q2</td><td>\$143K</td><td>\$141K</td></tr> <tr> <td></td><td>Q3</td><td>\$154K</td><td>\$145K</td></tr> <tr> <td></td><td>Q4</td><td>\$182K</td><td>\$154K</td></tr> <tr> <td>2016</td><td>Q1</td><td>\$298K</td><td>\$183K</td></tr> <tr> <td></td><td>Q2</td><td>\$142K</td><td>\$179K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	RunningAvg(Sum([Sales]))	2015	Q1	\$138K	\$138K		Q2	\$143K	\$141K		Q3	\$154K	\$145K		Q4	\$182K	\$154K	2016	Q1	\$298K	\$183K		Q2	\$142K	\$179K
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	Q2	\$142K	\$179K																												
RunningCount(SummaryExpression)	Returns the running count of the specified expression from the first row in the window to the current row.	RunningCount(Sum([Sales]))	-																												
RunningMax(SummaryExpression)	Returns the running maximum of the specified expression from the first row in the window to the current row.		RunningMax(Sum([Sales]))																												
RunningMin(SummaryExpression)	Returns the running minimum of the specified expression from the first row in the window to the current row.	RunningMin(Sum([Sales]))	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>RunningMin(Sum([Sales]))</th></tr> </thead> <tbody> <tr> <td>2015</td><td>Q1</td><td>\$138K</td><td>\$138K</td></tr> <tr> <td></td><td>Q2</td><td>\$143K</td><td>\$138K</td></tr> <tr> <td></td><td>Q3</td><td>\$154K</td><td>\$138K</td></tr> <tr> <td></td><td>Q4</td><td>\$182K</td><td>\$138K</td></tr> <tr> <td>2016</td><td>Q1</td><td>\$298K</td><td>\$138K</td></tr> <tr> <td></td><td>Q2</td><td>\$142K</td><td>\$138K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	RunningMin(Sum([Sales]))	2015	Q1	\$138K	\$138K		Q2	\$143K	\$138K		Q3	\$154K	\$138K		Q4	\$182K	\$138K	2016	Q1	\$298K	\$138K		Q2	\$142K	\$138K
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WindowAvg(SummaryExpression, StartOffset, EndOffset)	Returns the average of the expression within the window, which is defined using offsets from the current row.	WindowAvg(Sum([Sales]), First(), Last())	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>WindowAvg()</th></tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>\$179K</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>\$179K</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>\$179K</td></tr> <tr><td></td><td>Q4</td><td>\$162K</td><td>\$179K</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>\$179K</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>\$179K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	WindowAvg()	2015	Q1	\$138K	\$179K		Q2	\$143K	\$179K		Q3	\$154K	\$179K		Q4	\$162K	\$179K	2016	Q1	\$298K	\$179K		Q2	\$142K	\$179K
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WindowCountDistinct(SummaryExpression, StartOffset, EndOffset)	Returns the distinct count of the expression within the window.	WindowCountDistinct(Sum([Sales]), First(), Last())	-																												
WindowMax(SummaryExpression, StartOffset, EndOffset)	Returns the maximum of the expression within the window.	WindowMax(Sum([Sales]), First(), Last())	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>WindowMax()</th></tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>\$298K</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>\$298K</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>\$298K</td></tr> <tr><td></td><td>Q4</td><td>\$162K</td><td>\$298K</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>\$298K</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>\$298K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	WindowMax()	2015	Q1	\$138K	\$298K		Q2	\$143K	\$298K		Q3	\$154K	\$298K		Q4	\$162K	\$298K	2016	Q1	\$298K	\$298K		Q2	\$142K	\$298K
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WindowMode(SummaryExpression, StartOffset, EndOffset)	Returns the mode of the expression within the window.	WindowMode(Sum([Sales]), First(), Last())	-																												
WindowMedian(SummaryExpression, StartOffset, EndOffset)	Returns the median of the expression within the window.	WindowMedian(Sum([Sales]), First(), Last())	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>WindowMedian()</th></tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>\$149K</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>\$149K</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>\$149K</td></tr> <tr><td></td><td>Q4</td><td>\$162K</td><td>\$149K</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>\$149K</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>\$149K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	WindowMedian()	2015	Q1	\$138K	\$149K		Q2	\$143K	\$149K		Q3	\$154K	\$149K		Q4	\$162K	\$149K	2016	Q1	\$298K	\$149K		Q2	\$142K	\$149K
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WindowSum(SummaryExpression, StartOffset, EndOffset)	Returns the sum of the expression within the window.	WindowSum(Sum([Sales]), First() + 2, Last())	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>WindowSum()</th></tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>\$779K</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>\$779K</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>\$779K</td></tr> <tr><td></td><td>Q4</td><td>\$162K</td><td>\$779K</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>\$779K</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>\$779K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	WindowSum()	2015	Q1	\$138K	\$779K		Q2	\$143K	\$779K		Q3	\$154K	\$779K		Q4	\$162K	\$779K	2016	Q1	\$298K	\$779K		Q2	\$142K	\$779K
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FUNCTION	DESCRIPTION	EXAMPLE	IMAGE																												
WindowVar(SummaryExpression, StartOffset, EndOffset)	Returns the variance of the expression within the window.	WindowVar(Sum([Sales]), First(), Last())	-																												
WindowVarp(SummaryExpression, StartOffset, EndOffset)	Returns the biased variance of the expression within the window.	WindowVarp(Sum([Sales]), First(), Last())	-																												
WindowStdDev(SummaryExpression, StartOffset, EndOffset)	Returns the sample standard deviation of the expression within the window.	WindowStdDev(Sum([Sales]), First(), Last())	-																												
WindowStdDevp(SummaryExpression, StartOffset, EndOffset)	Returns the biased standard deviation of the expression within the window.	WindowStdDevp(Sum([Sales]), First(), Last())	-																												
Total(SummaryExpression)	Returns the total based on values from the underlying data source for the specified expression in a calculation window.	Total(Sum([Sales]))	<table border="1"> <thead> <tr> <th>Order Year</th> <th>Order Quarter</th> <th>Sales</th> <th>Total(Sum([Sales]))</th> </tr> </thead> <tbody> <tr> <td>2015</td> <td>Q1</td> <td>\$138K</td> <td>\$1.06M</td> </tr> <tr> <td></td> <td>Q2</td> <td>\$143K</td> <td></td> </tr> <tr> <td></td> <td>Q3</td> <td>\$154K</td> <td>\$1.06M</td> </tr> <tr> <td></td> <td>Q4</td> <td>\$182K</td> <td></td> </tr> <tr> <td>2016</td> <td>Q1</td> <td>\$298K</td> <td>\$1.06M</td> </tr> <tr> <td></td> <td>Q2</td> <td>\$142K</td> <td></td> </tr> </tbody> </table>	Order Year	Order Quarter	Sales	Total(Sum([Sales]))	2015	Q1	\$138K	\$1.06M		Q2	\$143K			Q3	\$154K	\$1.06M		Q4	\$182K		2016	Q1	\$298K	\$1.06M		Q2	\$142K	
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## ⚠️ IMPORTANT

Note that window functions cannot be used inside [Aggr](#).

## Date-time Functions

FUNCTION	DESCRIPTION	EXAMPLE
AddDays(DateTime, DaysCount)	Returns a date-time value that is the specified number of days from the specified DateTime.	AddDays([OrderDate], 30)
AddHours(DateTime, HoursCount)	Returns a date-time value that is the specified number of hours from the specified DateTime.	AddHours([StartTime], 2)
AddMilliSeconds(DateTime, MilliSecondsCount)	Returns a date-time value that is the specified number of milliseconds from the specified DateTime.	AddMilliSeconds(([StartTime], 5000))
AddMinutes(DateTime, MinutesCount)	Returns a date-time value that is the specified number of minutes from the specified DateTime.	AddMinutes([StartTime], 30)
AddMonths(DateTime, MonthsCount)	Returns a date-time value that is the specified number of months from the specified DateTime.	AddMonths([OrderDate], 1)
AddSeconds(DateTime, SecondsCount)	Returns a date-time value that is the specified number of seconds from the specified DateTime.	AddSeconds([StartTime], 60)

FUNCTION	DESCRIPTION	EXAMPLE
AddTicks(DateTime, TicksCount)	Returns a date-time value that is the specified number of ticks from the specified DateTime.	AddTicks([StartTime], 5000)
AddTimeSpan(DateTime, TimeSpan)	Returns a date-time value that is from the specified DateTime for the given TimeSpan.	AddTimeSpan([StartTime], [Duration])
AddYears(DateTime, YearsCount)	Returns a date-time value that is the specified number of years from the specified DateTime.	AddYears([EndDate], -1)
DateDiffDay(startDate, endDate)	Returns the number of day boundaries between two non-nullable dates.	DateDiffDay([StartTime], Now())
DateDiffHour(startDate, endDate)	Returns the number of hour boundaries between two non-nullable dates.	DateDiffHour([StartTime], Now())
DateDiffMillisecond(startDate, endDate)	Returns the number of millisecond boundaries between two non-nullable dates.	DateDiffMillisecond([StartTime], Now())
DateDiffMinute(startDate, endDate)	Returns the number of minute boundaries between two non-nullable dates.	DateDiffMinute([StartTime], Now())
DateDiffMonth(startDate, endDate)	Returns the number of month boundaries between two non-nullable dates.	DateDiffMonth([StartTime], Now())
DateDiffSecond(startDate, endDate)	Returns the number of second boundaries between two non-nullable dates.	DateDiffSecond([StartTime], Now())
DateDiffTick(startDate, endDate)	Returns the number of tick boundaries between two non-nullable dates.	DateDiffTick([StartTime], Now())
DateDiffYear(startDate, endDate)	Returns the number of year boundaries between two non-nullable dates.	DateDiffYear([StartTime], Now())
GetDate(DateTime)	Extracts a date from the defined DateTime.	GetDate([OrderDateTime])
GetDateHour(DateTime)	Extracts the date part with the hour value from the defined DateTime.	GetDateHour([OrderDate])
GetDateHourMinute(DateTime)	Extracts the date part with the hour and minute values from the defined DateTime.	GetDateHourMinute([OrderDate])
GetDateHourMinuteSecond(DateTime)	Extracts the date part with the hour, minute, and second values from the defined DateTime.	GetDateHourMinuteSecond([OrderDate])
GetDateMonthYear(DateTime)	Extracts the date with the month and year from the defined DateTime.	GetDateMonthYear([OrderDate])
GetDateQuarterYear(DateTime)	Extracts the date with the quarter and year from the defined DateTime.	GetDateQuarterYear([OrderDate])
GetDateWeekYear()	Returns the date of the first day of the week for a given DateTime (uses culture settings).	GetDateWeekYear()

FUNCTION	DESCRIPTION	EXAMPLE
GetDay(DateTime)	Extracts a day from the defined DateTime.	GetDay([OrderDate])
GetDayOfWeek(DateTime)	Extracts a day of the week from the defined DateTime.	GetDayOfWeek([OrderDate])
GetDayOfYear(DateTime)	Extracts a day of the year from the defined DateTime.	GetDayOfYear([OrderDate])
GetHour(DateTime)	Extracts an hour from the defined DateTime.	GetHour([StartTime])
GetMillisecond(DateTime)	Extracts milliseconds from the defined DateTime.	GetMillisecond([StartTime])
GetMinute(DateTime)	Extracts minutes from the defined DateTime.	GetMinute([StartTime])
GetMonth(DateTime)	Extracts a month from the defined DateTime.	GetMonth([StartTime])
GetSecond(DateTime)	Extracts seconds from the defined DateTime.	GetSecond([StartTime])
GetTimeOfDay(DateTime)	Extracts the time of the day from the defined DateTime in ticks.	GetTimeOfDay([StartTime])
GetWeekOfMonth(DateTime)	Extracts the week of the month from the defined DateTime.	GetWeekOfMonth([OrderDate])
GetWeekOfYear(DateTime)	Extracts the week of the year from the defined DateTime.	GetWeekOfYear([OrderDate])
GetYear(DateTime)	Extracts a year from the defined DateTime.	GetYear([StartTime])
IsApril(DateTime)	Returns True if the specified date falls within April.	IsApril([OrderDate])
IsAugust(DateTime)	Returns True if the specified date falls within August.	IsAugust([OrderDate])
IsDecember(DateTime)	Returns True if the specified date falls within December.	IsDecember([OrderDate])
IsFebruary(DateTime)	Returns True if the specified date falls within February.	IsFebruary([OrderDate])
IsJanuary(DateTime)	Returns True if the specified date falls within January.	IsJanuary([OrderDate])
IsJuly(DateTime)	Returns True if the specified date falls within July.	IsJuly([OrderDate])
IsJune(DateTime)	Returns True if the specified date falls within June.	IsJune([OrderDate])
IsLastMonth(DateTime)	Returns True if the specified date falls within the previous month.	IsLastMonth([OrderDate])

FUNCTION	DESCRIPTION	EXAMPLE
IsLastYear(DateTime)	Returns True if the specified date falls within the previous year.	IsLastYear([OrderDate])
IsMarch(DateTime)	Returns True if the specified date falls within March.	IsMarch([OrderDate])
IsMay(DateTime)	Returns True if the specified date falls within May.	IsMay([OrderDate])
IsNextMonth(DateTime)	Returns True if the specified date falls within the next month.	IsNextMonth([OrderDate])
IsNextYear(DateTime)	Returns True if the specified date falls within the next year.	IsNextYear([OrderDate])
IsNovember(DateTime)	Returns True if the specified date falls within November.	IsNovember([OrderDate])
IsOctober(DateTime)	Returns True if the specified date falls within October.	IsOctober([OrderDate])
IsSameDay(DateTime)	Returns True if the specified date/time values fall within the same day.	IsSameDay([OrderDate])
IsSeptember(DateTime)	Returns True if the specified date falls within September.	IsSeptember([OrderDate])
IsThisMonth(DateTime)	Returns True if the specified date falls within the current month.	IsThisMonth([OrderDate])
IsThisWeek(DateTime)	Returns True if the specified date falls within the current week.	IsThisWeek([OrderDate])
IsYearToDate(DateTime)	Returns True if the specified date falls within the year-to-date period. This period starts from the first day of the current year and continues to the current date (including the current date).	IsYearToDate([OrderDate])
IsThisYear(DateTime)	Returns True if the specified date falls within the current year.	IsThisYear([OrderDate])
LocalDateTimeDayAfterTomorrow()	Returns a date-time value corresponding to the day after Tomorrow.	AddDays(LocalDateTimeDayAfterTomorrow(), 5)
LocalDateTimeLastMonth()	Returns the DateTime value corresponding to the first day of the previous month.	AddMonths(LocalDateTimeLastMonth(), 5)
LocalDateTimeLastWeek()	Returns a date-time value corresponding to the first day of the previous week.	AddDays(LocalDateTimeLastWeek(), 5)
LocalDateTimeLastYear()	Returns the DateTime value corresponding to the first day of the previous year.	AddYears(LocalDateTimeLastYear(), 5)

FUNCTION	DESCRIPTION	EXAMPLE
LocalDateTimeNextMonth()	Returns a date-time value corresponding to the first day of the next month.	AddMonths(LocalDateTimeNextMonth(), 5)
LocalDateTimeNextWeek()	Returns a date-time value corresponding to the first day of the following week.	AddDays(LocalDateTimeNextWeek(), 5)
LocalDateTimeNextYear()	Returns a date-time value corresponding to the first day of the following year.	AddYears(LocalDateTimeNextYear(), 5)
LocalDateTimeNow()	Returns a date-time value corresponding to the current moment in time.	AddDays(LocalDateTimeNow(), 5)
LocalDateTimeThisMonth()	Returns a date-time value corresponding to the first day of the current month.	AddMonths(LocalDateTimeThisMonth(), 5)
LocalDateTimeThisWeek()	Returns a date-time value corresponding to the first day of the current week.	AddDays(LocalDateTimeThisWeek(), 5)
LocalDateTimeThisYear()	Returns a date-time value corresponding to the first day of the current year.	AddYears(LocalDateTimeThisYear(), 5)
LocalDateTimeToday()	Returns a date-time value corresponding to Today.	AddDays(LocalDateTimeToday(), 5)
LocalDateTimeTomorrow()	Returns a date-time value corresponding to Tomorrow.	AddDays(LocalDateTimeTomorrow(), 5)
LocalDateTimeTwoMonthsAway()	Returns the DateTime value corresponding to the first day of the following month.	AddMonths(LocalDateTimeTwoMonthAway(), 5)
LocalDateTimeTwoWeeksAway()	Returns the DateTime value corresponding to the first day of the following week.	AddDays(LocalDateTimeTwoWeeksAway(), 5)
LocalDateTimeTwoYearsAway()	Returns the DateTime value corresponding to the first day of the following year.	AddYears(LocalDateTimeTwoYearsAway(), 5)
LocalDateTimeYearBeforeToday()	Returns the DateTime value corresponding to the day one year ago.	AddYears(LocalDateTimeYearBeforeToday(), 5)
LocalDateTimeYesterday()	Returns a date-time value corresponding to Yesterday.	AddDays(LocalDateTimeYesterday(), 5)
MakeDateTime(Year, Month, Day)	Returns a date value constructed from the specified Year, Month and Day.	MakeDateTime(2018, 5, 5)
MakeDateTime(Year, Month, Day, Hour)	Returns a date value constructed from the specified Year, Month, Day and Hour.	MakeDateTime(2018, 5, 5, 20)
MakeDateTime(Year, Month, Day, Hour, Minute)	Returns a date value constructed from the specified Year, Month, Day, Hour and Minute.	MakeDateTime(2018, 5, 5, 20, 18)
MakeDateTime(Year, Month, Day, Hour, Minute, Second)	Returns a date value constructed from the specified Year, Month, Day, Hour, Minute and Second.	MakeDateTime(2018, 5, 5, 20, 18, 30)

FUNCTION	DESCRIPTION	EXAMPLE
Now()	Returns the current system date and time.	AddDays(Now(), 5)
ToDateTime(Value)	Converts Value to a DateTime value.	ToDateTime([Orders])
Today()	Returns the current date. Regardless of the actual time, this function returns midnight of the current date.	AddMonths(Today(), 1)
UtcNow()	Returns the current system date and time, expressed as Coordinated Universal Time (UTC).	AddDays(UtcNow(), 7)

## Logical Functions

{| |-

! Function ! Description ! Example |-

| **lif(Expression1, True_Value1, ..., ExpressionN, True_ValueN, False_Value)** | Returns one of several specified values depending upon the values of logical expressions.

The function can take  $2N+1$  arguments ( $N$  - the number of specified logical expressions):

- Each odd argument specifies a logical expression;
- Each even argument specifies the value that is returned if the previous expression evaluates to **true**;
- ...
- The last argument specifies the value that is returned if the previously evaluated logical expressions yielded **false**. | **lif(Name = 'Bob', 1, 0)"**

**lif(Name = 'Bob', 1, Name = 'Dan', 2, Name = 'Sam', 3, 0)**

|-

| **IsNull(Value)** | Returns True if the specified Value is NULL.

<b>ISNULL([ORDERDATE])</b>

| **IsNull(Value1, Value2)** | Returns Value1 if it is not set to NULL; otherwise, Value2 is returned.

<b>ISNULL([SHIPDATE], [REQUIREDDATE])</b>

| **IsNullOrEmpty(String)** | Returns True if the specified String object is NULL or an empty string; otherwise, False is returned.

<b>ISNULLOREMPTY([PRODUCTNAME])</b>

| **ToBoolean(Value)** | Converts Value to an equivalent Boolean value. | **ToBoolean([Value])** |}

## Math Functions

FUNCTION	DESCRIPTION	EXAMPLE
Abs(Value)	Returns the given numeric expression's absolute, positive value.	Abs(1 - [Discount])
Acos(Value)	Returns a number's arccosine (the angle in radians, whose cosine is the given float expression).	Acos([Value])
Asin(Value)	Returns a number's arcsine (the angle in radians, whose sine is the given float expression).	Asin([Value])
Atn(Value)	Returns a number's arctangent (the angle in radians, whose tangent is the given float expression).	Atn([Value])
Atn2(Value1, Value2)	Returns the angle whose tangent is the quotient of two specified numbers in radians.	Atn2([Value1], [Value2])
BigMul(Value1, Value2)	Returns an Int64 containing the full product of two specified 32-bit numbers.	BigMul([Amount], [Quantity])
Ceiling(Value)	Returns the smallest integer that is greater than or equal to the numeric expression.	Ceiling([Value])
Cos(Value)	Returns the angle's cosine, in radians.	Cos([Value])
Cosh(Value)	Returns the angle's hyperbolic cosine, in radians.	Cosh([Value])
Exp(Value)	Returns the float expression's exponential value.	Exp([Value])
Floor(Value)	Returns the largest integer less than or equal to the numeric expression.	Floor([Value])
Log(Value)	Returns a specified number's natural logarithm.	Log([Value])
Log(Value, Base)	Returns the logarithm of a specified number in a specified Base.	Log([Value], 2)
Log10(Value)	Returns a specified number's base 10 logarithm.	Log10([Value])
Max(Value1, Value2)	Returns the maximum value from the specified values.	Max([Value1], [Value2])
Min(Value1, Value2)	Returns the minimum value from the specified values.	Min([Value1], [Value2])
Power(Value, Power)	Returns a specified number raised to a specified power.	Power([Value], 3)
Rnd()	Returns a random number that is less than 1, but greater than or equal to zero.	Rnd()*100
Round(Value)	Rounds the given value to the nearest integer.	Round([Value])
Round(Value, Precision)	Rounds the given value to the nearest integer, or to a specified number of decimal places.	Round([Value], 2)
Sign(Value)	Returns the positive (+1), zero (0), or negative (-1) sign of the given expression.	Sign([Value])
Sin(Value)	Returns the sine of the angle defined in radians.	Sin([Value])

FUNCTION	DESCRIPTION	EXAMPLE
Sinh(Value)	Returns the hyperbolic sine of the angle defined in radians.	Sinh([Value])
Sqr(Value)	Returns the square root of a given number.	Sqr([Value])
Tan(Value)	Returns the tangent of the angle defined in radians.	Tan([Value])
Tanh(Value)	Returns the hyperbolic tangent of the angle defined in radians.	Tanh([Value])
ToDecimal(Value)	Converts Value to an equivalent decimal number.	ToDecimal([Value])
ToDouble(Value)	Converts Value to an equivalent 64-bit double-precision floating-point number.	ToDouble([Value])
ToFloat(Value)	Converts Value to an equivalent 32-bit single-precision floating-point number.	ToFloat([Value])
ToInt(Value)	Converts Value to an equivalent 32-bit signed integer.	ToInt([Value])
ToLong(Value)	Converts Value to an equivalent 64-bit signed integer.	ToLong([Value])

## String Functions

FUNCTION	DESCRIPTION	EXAMPLE
Ascii(String)	Returns the ASCII code value of the leftmost character in a character expression.	Ascii('a')
Char(Number)	Converts an integerASCIICode to a character.	Char(65) + Char(51)
CharIndex(String1, String2)	Returns the starting position of String1 within String2, beginning from the zero character position to the end of a string.	CharIndex('e', 'devexpress')
CharIndex(String1, String2, StartLocation)	Returns the starting position of String1 within String2, beginning from the StartLocation character position to the end of a string.	CharIndex('e', 'devexpress', 2)
Concat(String1, ..., StringN)	Returns a string value containing the concatenation of the current string with any additional strings.	Concat('A', ',' , [ProductName])
EndsWith(String1, SubString1)	Returns True if the end of String1 matches SubString1; otherwise, False is returned.	EndsWith([Description], 'The end.')
Insert(String1, StartPosition, String2)	Inserts String2 into String1 at the position specified by StartPositon	Insert([Name], 0, 'ABC-')
Len(Value)	Returns an integer containing either the number of characters in a string or the nominal number of bytes required to store a variable.	Len([Description])
Lower(String)	Returns String in lowercase.	Lower([ProductName])
PadLeft(String, Length)	Left-aligns the defined string's characters, padding its left side with white space characters up to a specified total length.	PadLeft([Name], 30)
PadLeft(String, Length, Char)	Left-aligns the defined string's characters, padding its left side with the specified Char up to a specified total length.	PadLeft([Name], 30, '<')

FUNCTION	DESCRIPTION	EXAMPLE
PadRight(String, Length)	Right-aligns the defined string's characters, padding its left side with empty space characters up to a specified total length.	PadRight([Name], 30)
PadRight(String, Length, Char)	Right-aligns the defined string's characters, padding its left side with the specified Char up to a specified total length.	PadRight([Name], 30, '>')
Remove(String, StartPosition)	Deletes all the characters from this instance, beginning at a specified position.	Remove([Name], 3)
Remove(String, StartPosition, Length)	Deletes a specified number of characters from this instance, beginning at a specified position.	Remove([Name], 0, 3)
Replace(String, SubString2, String3)	Returns a copy of String1, in which SubString2 has been replaced with String3.	Replace([Name], 'The ', '')
Reverse(String)	Reverses the order of elements within String.	Reverse([Name])
StartsWith(String1, SubString1)	Returns True if the beginning of String1 matches SubString1; otherwise, False.	StartsWith([Title], 'The best')
Substring(String, StartPosition, Length)	Retrieves a substring from String. The substring starts at StartPosition and has a specified Length.	Substring([Description], 2, 3)
Substring(String, StartPosition)	Retrieves a substring from String. The substring starts at StartPosition.	Substring([Description], 2)
ToStr(Value)	Returns a string representation of an object.	ToStr([ID])
Trim(String)	Removes all leading and trailing SPACE characters from String.	Trim([ProductName])
Upper(String)	Returns String in uppercase.	Upper([ProductName])

## Operator Precedence

When an expression contains multiple operators, their precedence controls the order in which expression elements are evaluated.

- Literal values
- Parameters
- Identifiers
- OR (left-associative)
- AND (left-associative)
- ==, !=
- <, >, <=, >=
- -, + (left-associative)
- *, /, % (left-associative)
- NOT
- unary -
- In
- lif
- Trim(), Len(), Substring(), IsNull()
- '[]' (for set-restriction)
- '()' (for function)

The default precedence can be changed by grouping elements with parentheses. For instance, the operators are performed in a default order in the first of the following two code samples. In the second code sample, the addition operation is performed first, because its associated elements are grouped with parentheses, and the multiplication operation is performed last.

```
Amount == 2 + 48 * 2
```

```
Amount == (2 + 48) * 2
```

## Case Sensitivity

Operators are case insensitive. Although field values' case sensitivity depends on the data source.

### NOTE

A data source affects certain operators' behavior. For instance, by default, the SQL Server Express 2005 is configured as case insensitive. In this case, the following expression always evaluates to **true**:

```
Lower(Name) == Upper(Name)
```

## Escape Keywords

You can mark a keyword-like field name with an escape character (@ sign). In the expression below, the **CriteriaOperator.Parse** method interprets @Or as the field named "Or", not the logical operator OR.

```
@Or = 'value'
```

## Escape Characters

Use a backslash () as an escape character for characters in expressions. Examples:

- \[
- \\
- \'

# Window Calculations

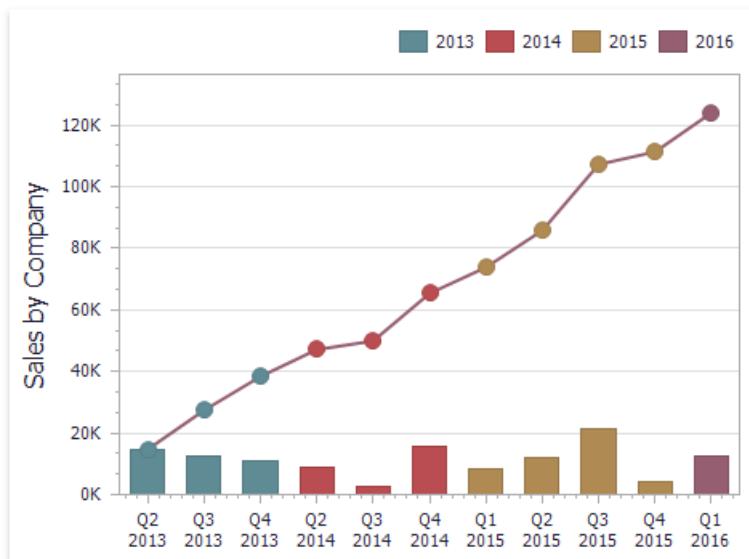
Window calculations provide the capability to apply specific computations to measure values and allow you to perform different analytical tasks such as to compute running totals, percentages of totals, differences, etc.

Topics in this section.

- [Window Calculations Overview](#)
- [Window Definition](#)
- [Creating Window Calculations](#)
- [Calculation Functions Reference](#)
- [Window Calculation Limitations](#)

# Window Calculations Overview

Window calculations provide the capability to apply specific computations to measure values and allow you to perform different analytical tasks such as to compute running totals, percentages of totals, differences, etc.



The Dashboard Designer allows you to apply window calculations to values of the specified [measure](#). The following calculation types are supported.

- **Running Total** - Allows you to calculate a cumulative total for a set of measure values.

Sales	Running Total
10	10
20	30
25	55
25	80
20	100

- **Moving Calculation** - Allows you to apply a moving calculation, which uses neighboring values to calculate a total. Note that neighboring values are specified using offsets from the currently processed value.

Sales	Moving	StartOffset=-1; EndOffset=1
10	30	0+10+20
20	55	10+20+25
25	70	20+25+25
25	70	25+25+20
20	45	25+20+0

- **Difference** - Allows you to compute differences between measure values.

Sales	Difference
10	0
20	10
25	5
25	0
20	-5

- **Percent of Total** - Allows you to calculate a contribution of individual measure values to a total.

Sales	Percent
10	10.00 %
20	20.00 %
25	25.00 %
25	25.00 %
20	20.00 %

$10/100*100\%$   
 $20/100*100\%$   
 $25/100*100\%$   
 $25/100*100\%$   
 $20/100*100\%$

- **Rank** - Allows you to rank values of the specified measure.

Sales	Rank	Competition rank
10	1	10 20 20 25 25
20	2	1 2 2 4 4
25	4	
25	4	
20	2	

Note that the computing of calculations depends on two factors.

- The type of the [dashboard item](#).

In this case, you need to specify a calculation *direction* that depends on the dashboard item type. For instance, the [Pivot](#) dashboard item provides the capability to apply calculations along with its columns or rows.

- The set of dimensions that are used to calculate measure values.

In this case, a calculation *direction* depends on the dimensions' order.

In both cases, measure values participating in a calculation fall into a specified *window*. To learn more, see [Window Definition](#).

To learn how to create a calculation in the Dashboard Designer, see [Creating Window Calculations](#).

# Window Definition

A *window definition* specifies a window that limits measure values participating in a calculation. To learn more, see [Window Calculations Overview](#).

## Dashboard Item Window Definition

The following table lists window definitions in terms of the [Pivot](#) dashboard item. A calculation is performed using the [Index](#) function along the following *directions*.

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Columns / Rows within Groups	A calculation is performed horizontally through Pivot columns then rows within <i>groups</i> .	<table border="1"> <thead> <tr> <th></th> <th colspan="4">2015</th> <th colspan="2">2016</th> </tr> <tr> <th></th> <th>Q1</th> <th>Q2</th> <th>Q3</th> <th>Q4</th> <th>Q1</th> <th>Q2</th> </tr> </thead> <tbody> <tr> <td>UK</td> <td>Beverages</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>1</td> </tr> <tr> <td></td> <td>Condiments</td> <td>9</td> <td>10</td> <td>11</td> <td>12</td> <td>5</td> </tr> <tr> <td></td> <td>Confections</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>1</td> </tr> <tr> <td>USA</td> <td>Beverages</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>3</td> </tr> <tr> <td></td> <td>Condiments</td> <td>9</td> <td>10</td> <td>11</td> <td>12</td> <td>5</td> </tr> <tr> <td></td> <td>Confections</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>1</td> </tr> </tbody> </table>		2015				2016			Q1	Q2	Q3	Q4	Q1	Q2	UK	Beverages	1	2	3	4	1		Condiments	9	10	11	12	5		Confections	1	2	3	4	1	USA	Beverages	5	6	7	8	3		Condiments	9	10	11	12	5		Confections	1	2	3	4	1	In this example, a window is a combination of <i>Country/Year</i> dimensions.
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* *Group* - an area that is limited by a set of values corresponding to the bottommost partitioning dimensions.

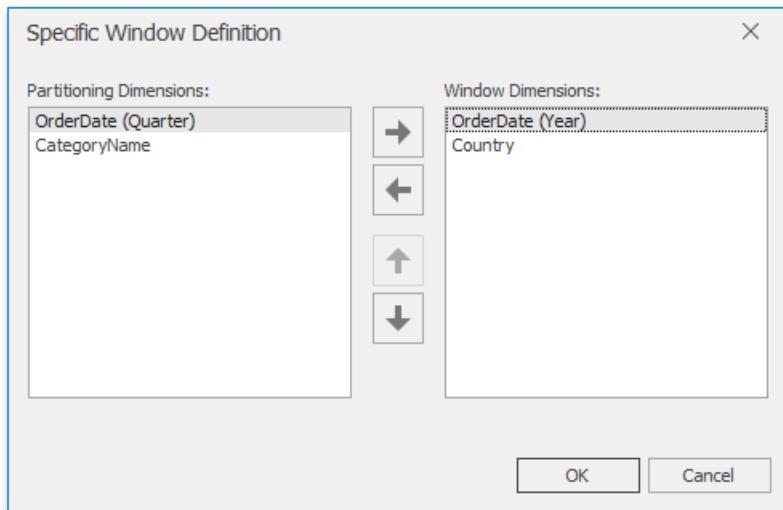
## Specific Window Definition

If necessary, you can manually specify the set of dimensions that fall into the *window*. These dimensions are called *window dimensions*.

For instance, the **Index** function is applied to measure values of the pivot table below using the *OrderDate (Year)* and *Country* window dimensions.

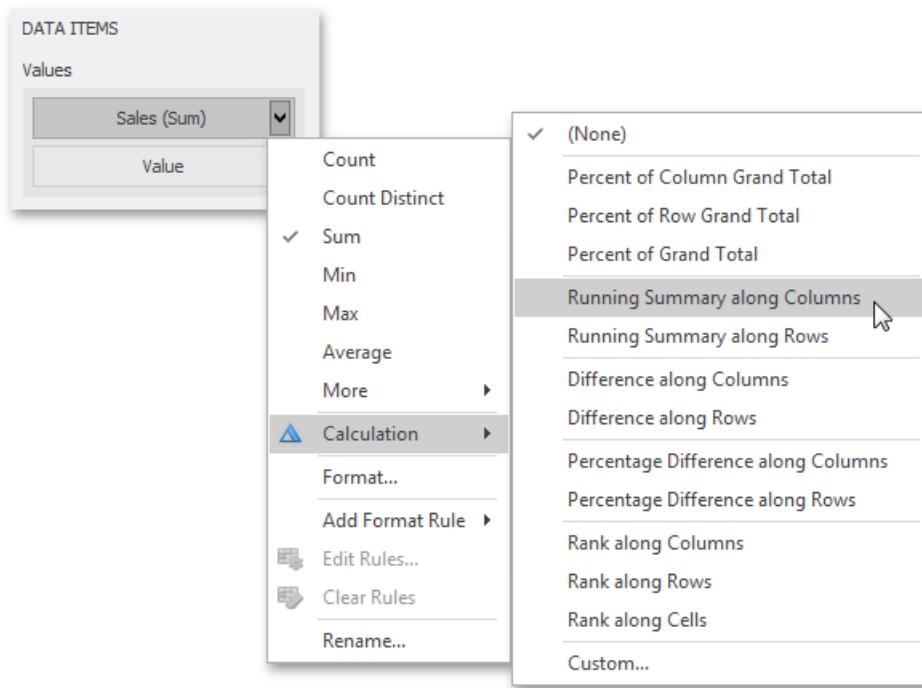
		▲ 2015				▲ 2016	
		Q1	Q2	Q3	Q4	Q1	Q2
▲ UK	Beverages	1	1	1	1	3	3
	Condiments	1	1	1	1	3	3
	Confections	1	1	1	1	3	3
▲ USA	Beverages	2	2	2	2	4	4
	Condiments	2	2	2	2	4	4
	Confections	2	2	2	2	4	4

The **Specific Window Definition** dialog allows you to do this.



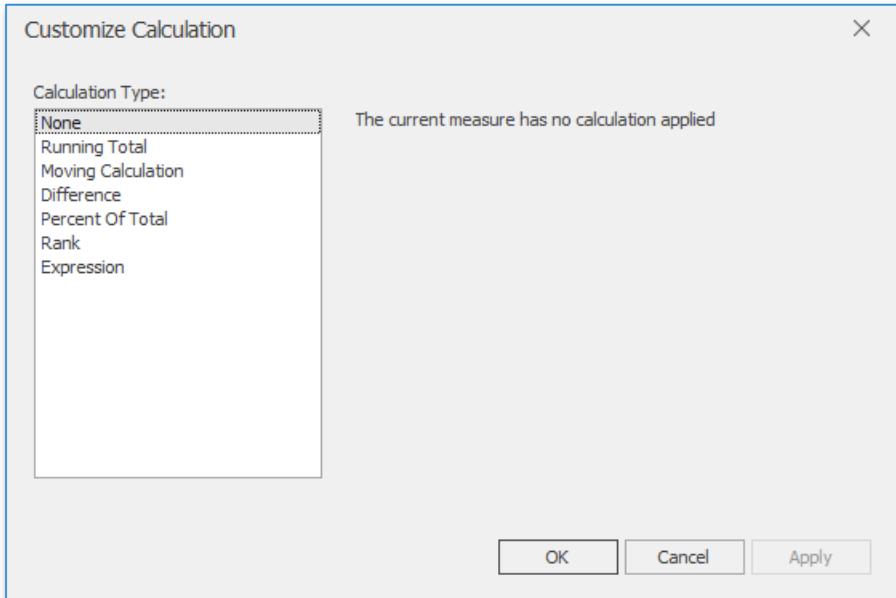
# Creating Window Calculations

The Dashboard Designer allows you to add a [window calculation](#) for numeric measures. To do this, invoke the [data item menu](#) and select the required calculation type.



The image above shows a calculation menu of the [Pivot](#) dashboard item. The following items are available.

- **Percent of Column Grand Total** - Calculates a contribution of individual measure values to a column grand total.
- **Percent of Row Grand Total** - Calculates a contribution of individual measure values to a row grand total.
- **Percent of Grand Total** - Calculates a contribution of individual measure values to a grand total.
- **Running Summary along Columns** - Calculates a cumulative total for measure values along columns (horizontally).
- **Running Summary along Rows** - Calculates a cumulative total for measure values along rows (vertically).
- **Difference along Columns** - Calculates differences between measure values along columns (horizontally).
- **Difference along Rows** - Calculates differences between measure values along rows (vertically).
- **Percent Difference along Columns** - Calculates percentage differences between measure values along columns (horizontally).
- **Percent Difference along Rows** - Calculates percentage differences between measure values along rows (vertically).
- **Rank along Columns** - Ranks measure values along columns (horizontally).
- **Rank along Rows** - Ranks measure values along rows (vertically).
- **Rank along Cells** - Ranks measure values along cells (throughout the entire pivot table).
- **Custom...** - Allows you to create a custom calculation by specifying various settings. Clicking this item invokes the **Customize Calculation** dialog that allows you to add additional customizations to calculations.



To learn more, see descriptions of the available calculations below.

**NOTE**

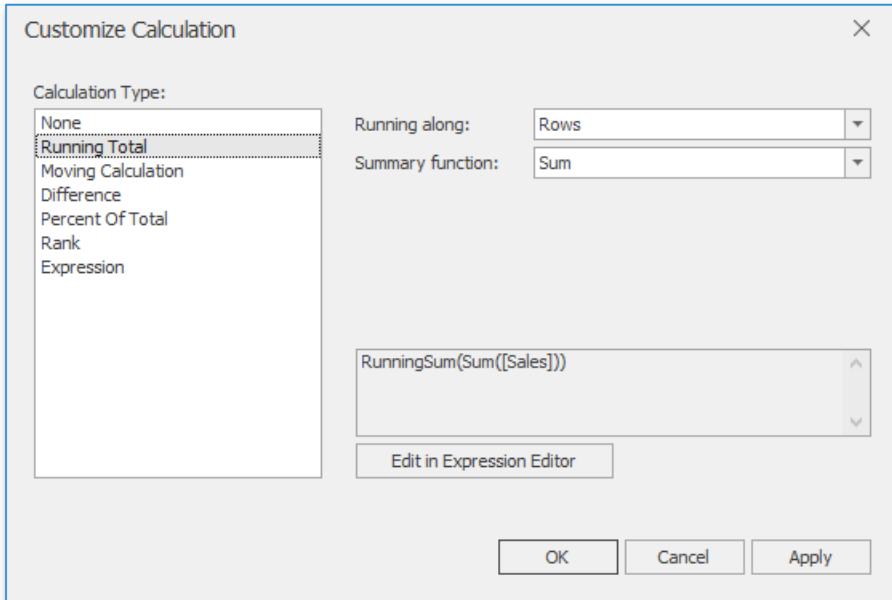
Note that the list of available items in this menu can be changed by the Dashboard Designer dynamically. For instance, if the Pivot dashboard item does not contain dimensions in the **Rows** section, menu items related to rows will be disabled.

## Running Total

The Running Total calculation can be used to compute a cumulative total for the specified measure across a [window](#). For example, the Grid below displays cumulative sales across all quarters.

Order Year	Order Quarter	Sales	Running Total
2015	Q1	\$138K	\$138K
	Q2	\$143K	\$281K
	Q3	\$154K	\$435K
	Q4	\$182K	\$617K
2016	Q1	\$298K	\$916K
	Q2	\$142K	\$1.06M

The Customize Calculation dialog provides the following settings for the Running Total calculation.



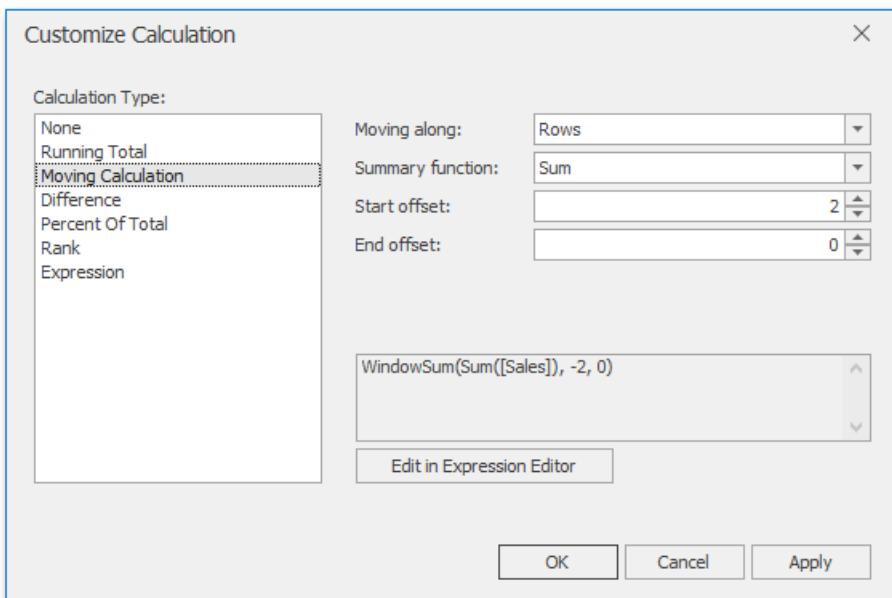
- **Running along** - Specifies a [window and direction](#) used to calculate running totals.
- **Summary function** - Specifies a summary function used to apply calculation. To learn more about the available summary functions, see the **Summary Function Types** in the [summary function](#) topic.

## Moving Calculation

The Moving calculation uses neighboring values to calculate a total. For example, the Grid below shows a moving average across all quarters.

Order Year	Order Quarter	Sales	Moving Average
2015	Q1	\$138K	\$138K
	Q2	\$143K	\$141K
	Q3	\$154K	\$145K
	Q4	\$182K	\$160K
2016	Q1	\$298K	\$211K
	Q2	\$142K	\$207K

The Customize Calculation dialog provides the following settings for the Moving calculation.



- **Moving along** - Specifies a [window and direction](#) used to apply a calculation.

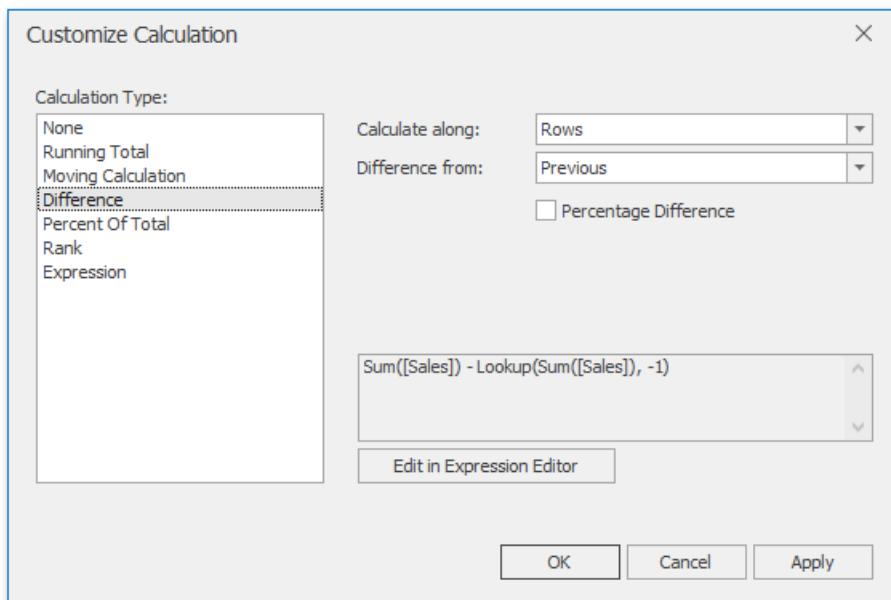
- **Summary function** - Specifies a summary function used to apply a calculation. To learn more about the available summary functions, see the **Summary Function Types** in the [summary function](#) topic.
- **Start offset / End offset** - Specify start/end offsets from the currently processed value. For instance, if you specified offsets as 1/1, the previous and next values will be used along with the current value to apply the Moving calculation.

## Difference

The Difference calculation can be used to compute the difference between measure values across a [window](#). For example, the Grid below shows absolute differences between quarterly sales.

Order Year	Order Quarter	Sales	Difference
2015	Q1	\$138K	
	Q2	\$143K	\$4.89K
	Q3	\$154K	\$10.8K
	Q4	\$182K	\$27.7K
2016	Q1	\$298K	\$117K
	Q2	\$142K	(\$156K)

The Customize Calculation dialog provides the following settings for the Difference calculation.



- **Calculate along** - Specifies a [window and direction](#) used to calculate differences.
- **Difference from** - Specifies the value used to calculate the difference. The following values are available: *Previous*, *Next*, *First* and *Last*.

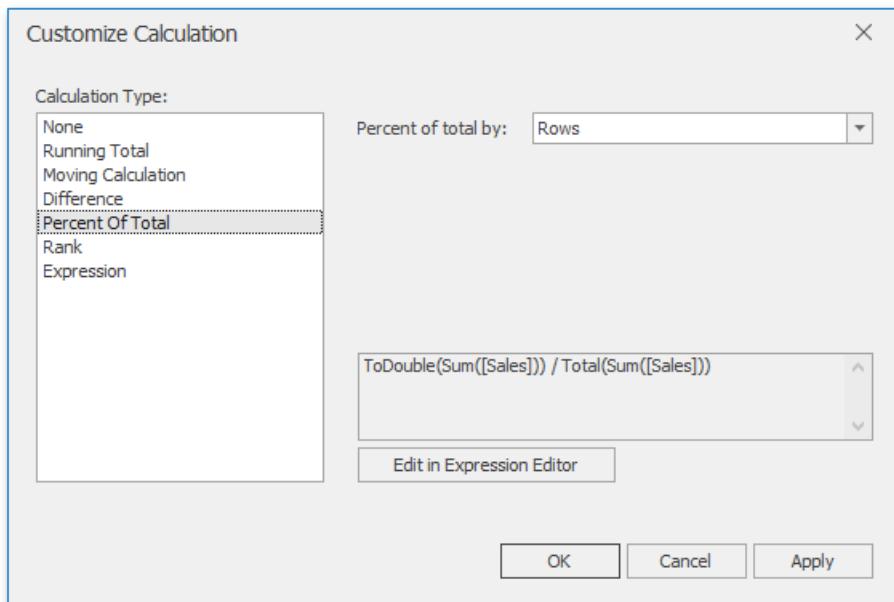
You can also use the **Percent Difference** option to specify whether the absolute or percentage difference is displayed.

## Percent of Total

A calculation is used to compute a percentage of the total for the specified measure across a [window](#). For example, the Grid below shows a contribution of individual quarterly sales to total sales.

Order Year	Order Quarter	Sales	Percent of Total
2015	Q1	\$138K	13.07 %
	Q2	\$143K	13.54 %
	Q3	\$154K	14.55 %
	Q4	\$182K	17.18 %
2016	Q1	\$298K	28.22 %
	Q2	\$142K	13.44 %

The Customize Calculation dialog provides the following settings for the Percent of Total calculation.



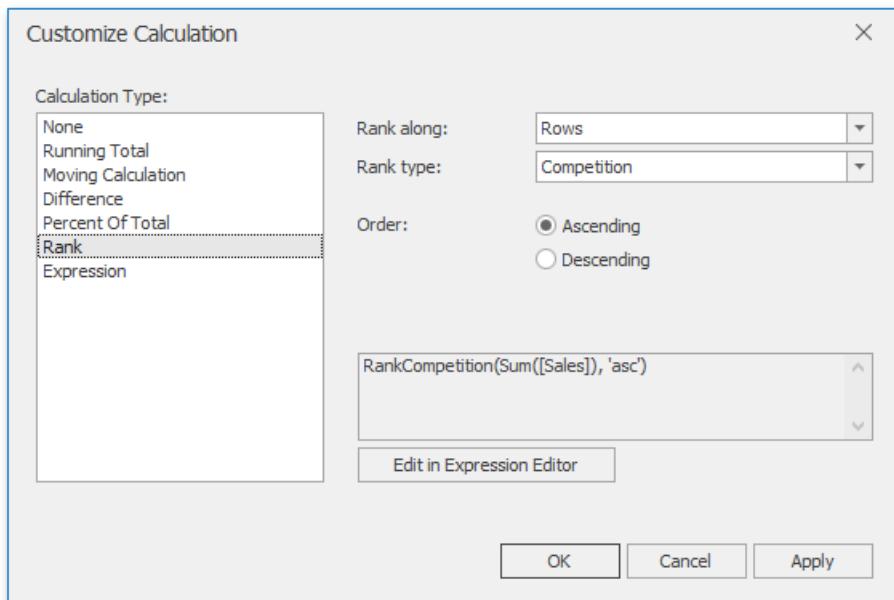
- **Percent of Total** - Specifies a [window](#) and [direction](#) used to apply a Percent of Total calculation.

## Rank

Use the Rank calculation to compute rankings for the specified measure across a [window](#). For example, the Grid below shows a ranking of sales for individual quarters.

Order Year	Order Quarter	Sales	Rank
2015	Q1	\$138K	6
	Q2	\$143K	4
	Q3	\$154K	3
	Q4	\$182K	2
2016	Q1	\$298K	1
	Q2	\$142K	5

The Customize Calculation dialog provides the following settings for the Rank calculation.



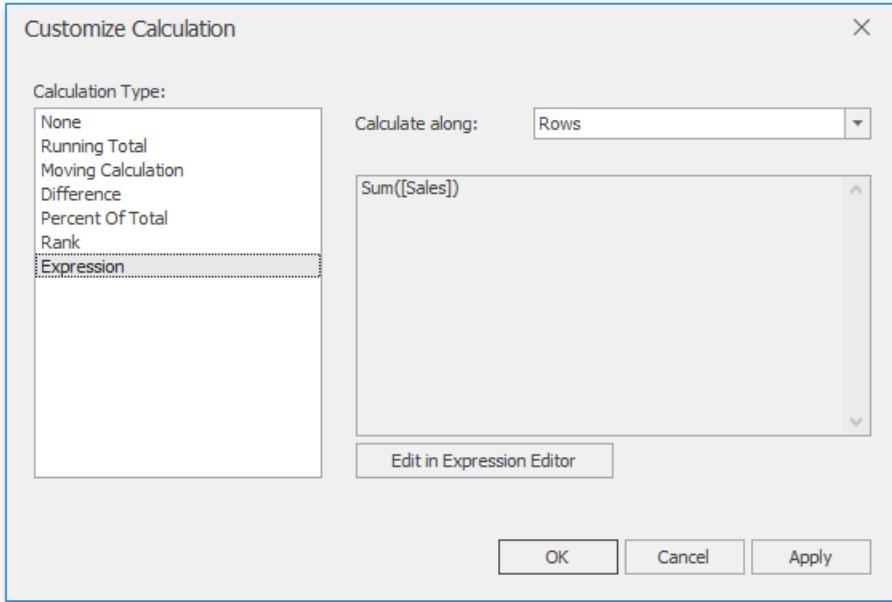
- **Rank along** - Specifies a [window](#) and [direction](#) used to rank values.
- **Rank type** - Specifies the type of ranking. The following rank types are available: *Unique*, *Competition*, *Dense*, *Modified* and

*Percentile.*

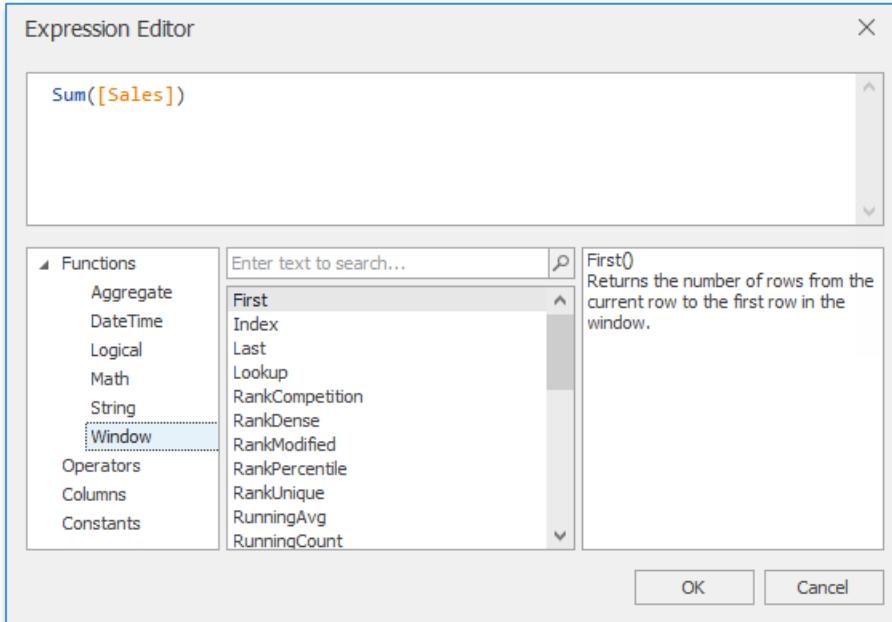
- **Order** - Specifies the order of ranking. You can select *Ascending* or *Descending*.

## Expression

Use Expression to specify a custom calculation by adding the required [calculation functions](#) inside the measure expression.



Click the **Edit in Expression Editor** button to invoke the **Expression Editor** and specify the required [expression](#).



The Expression type provides the **Calculate along** option that specifies the [window and direction](#) used to calculate differences. Note that this option is in effect if the expression contains a [calculation function](#).

# Calculation Functions Reference

This topic contains the descriptions of window functions that can be used to specify measure expressions.

FUNCTION	DESCRIPTION	EXAMPLE	IMAGE																												
Last()	Returns the number of rows from the current row to the last row in the window.	Last()	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>Last()</th></tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>5</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>4</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>3</td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td>2</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>1</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>0</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	Last()	2015	Q1	\$138K	5		Q2	\$143K	4		Q3	\$154K	3		Q4	\$182K	2	2016	Q1	\$298K	1		Q2	\$142K	0
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First()	Returns the number of rows from the current row to the first row in the window.	First()	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>First()</th></tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>0</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>-1</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>-2</td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td>-3</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>-4</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>-5</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	First()	2015	Q1	\$138K	0		Q2	\$143K	-1		Q3	\$154K	-2		Q4	\$182K	-3	2016	Q1	\$298K	-4		Q2	\$142K	-5
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Index()	Returns the index of the current row in the window.	Index()	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>Index()</th></tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>1</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>2</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>3</td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td>4</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>5</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>6</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	Index()	2015	Q1	\$138K	1		Q2	\$143K	2		Q3	\$154K	3		Q4	\$182K	4	2016	Q1	\$298K	5		Q2	\$142K	6
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Size()	Returns the number of rows in the window.	Size()	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>Size()</th></tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>6</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>6</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>6</td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td>6</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>6</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>6</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	Size()	2015	Q1	\$138K	6		Q2	\$143K	6		Q3	\$154K	6		Q4	\$182K	6	2016	Q1	\$298K	6		Q2	\$142K	6
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	Q2	\$142K	6																												
Lookup(SummaryExpression, Position)	Returns the value of the expression in a target position specified as a relative offset from the current position.	Lookup(Sum([Sales]), 3)	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>Lookup(Sum([Sales]), 3)</th></tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>\$182K</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>\$298K</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td></td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td></td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td></td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td></td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	Lookup(Sum([Sales]), 3)	2015	Q1	\$138K	\$182K		Q2	\$143K	\$298K		Q3	\$154K			Q4	\$182K		2016	Q1	\$298K			Q2	\$142K	
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RankCompetition(SummaryExpression, [ 'asc' ])	'desc' ])	Returns the standard competition rank for the current row in the window.	RankCompetition(Sum([Sales]), 'asc')																												
RankDense(SummaryExpression, [ 'asc' ])	'desc' ])	Returns the dense rank for the current row in the window.	RankDense(Sum([Sales]), 'asc')																												
RankUnique(SummaryExpression, [ 'asc' ])	'desc' ])	Returns the unique rank for the current row in the window.	RankUnique(Sum([Sales]), 'asc')																												
RankModified(SummaryExpression, [ 'asc' ])	'desc' ])	Returns the modified competition rank for the current row in the window.	RankModified(Sum([Sales]), 'asc')																												
RankPercentile(SummaryExpression, [ 'asc' ])	'desc' ])	Returns the percentile rank for the current row in the window.	RankPercentile(Sum([Sales]), 'desc')																												
RunningAvg(SummaryExpression)	Returns the running average of the specified expression from the first row in the window to the current row.	RunningAvg(Sum([Sales]))	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>RunningAvg(Sum([Sales]))</th></tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>\$138K</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>\$141K</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>\$149K</td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td>\$154K</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>\$183K</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>\$170K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	RunningAvg(Sum([Sales]))	2015	Q1	\$138K	\$138K		Q2	\$143K	\$141K		Q3	\$154K	\$149K		Q4	\$182K	\$154K	2016	Q1	\$298K	\$183K		Q2	\$142K	\$170K
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Function	Description	Example	Image																												
RunningCount(SummaryExpression)	Returns the running count of the specified expression from the first row in the window to the current row.	RunningCount(Sum([Sales]))	-																												
RunningMax(SummaryExpression)	Returns the running maximum of the specified expression from the first row in the window to the current row.	RunningMax(Sum([Sales]))	<table border="1"> <thead> <tr> <th>Order Year</th> <th>Order Quarter</th> <th>Sales</th> <th>RunningMax(Sum([Sales]))</th> </tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>\$138K</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>\$143K</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>\$154K</td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td>\$182K</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>\$298K</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>\$298K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	RunningMax(Sum([Sales]))	2015	Q1	\$138K	\$138K		Q2	\$143K	\$143K		Q3	\$154K	\$154K		Q4	\$182K	\$182K	2016	Q1	\$298K	\$298K		Q2	\$142K	\$298K
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RunningMin(SummaryExpression)	Returns the running minimum of the specified expression from the first row in the window to the current row.	RunningMin(Sum([Sales]))	<table border="1"> <thead> <tr> <th>Order Year</th> <th>Order Quarter</th> <th>Sales</th> <th>RunningMin(Sum([Sales]))</th> </tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>\$138K</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>\$138K</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>\$138K</td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td>\$138K</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>\$138K</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>\$138K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	RunningMin(Sum([Sales]))	2015	Q1	\$138K	\$138K		Q2	\$143K	\$138K		Q3	\$154K	\$138K		Q4	\$182K	\$138K	2016	Q1	\$298K	\$138K		Q2	\$142K	\$138K
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WindowAvg(SummaryExpression, StartOffset, EndOffset)	Returns the average of the expression within the window, which is defined using offsets from the current row.	WindowAvg(Sum([Sales]), First(), Last())	<table border="1"> <thead> <tr> <th>Order Year</th> <th>Order Quarter</th> <th>Sales</th> <th>WindowAvg()</th> </tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>\$179K</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>\$179K</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>\$179K</td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td>\$179K</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>\$179K</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>\$179K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	WindowAvg()	2015	Q1	\$138K	\$179K		Q2	\$143K	\$179K		Q3	\$154K	\$179K		Q4	\$182K	\$179K	2016	Q1	\$298K	\$179K		Q2	\$142K	\$179K
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WindowCount(SummaryExpression, StartOffset, EndOffset)	Returns the count of the expression within the window.	WindowCount(Sum([Sales]), First() + 2, Last())	<table border="1"> <thead> <tr> <th>Order Year</th> <th>Order Quarter</th> <th>Sales</th> <th>WindowCount()</th> </tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>4</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>4</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>4</td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td>4</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>4</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>4</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	WindowCount()	2015	Q1	\$138K	4		Q2	\$143K	4		Q3	\$154K	4		Q4	\$182K	4	2016	Q1	\$298K	4		Q2	\$142K	4
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WindowCountDistinct(SummaryExpression, StartOffset, EndOffset)	Returns the distinct count of the expression within the window.	WindowCountDistinct(Sum([Sales]), First(), Last())	-																												
WindowMax(SummaryExpression, StartOffset, EndOffset)	Returns the maximum of the expression within the window.	WindowMax(Sum([Sales]), First(), Last())	<table border="1"> <thead> <tr> <th>Order Year</th> <th>Order Quarter</th> <th>Sales</th> <th>WindowMax()</th> </tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>\$298K</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>\$298K</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>\$298K</td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td>\$298K</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>\$298K</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>\$298K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	WindowMax()	2015	Q1	\$138K	\$298K		Q2	\$143K	\$298K		Q3	\$154K	\$298K		Q4	\$182K	\$298K	2016	Q1	\$298K	\$298K		Q2	\$142K	\$298K
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WindowMin(SummaryExpression, StartOffset, EndOffset)	Returns the minimum of the expression within the window.	WindowMin(Sum([Sales]), First(), Last())	<table border="1"> <thead> <tr> <th>Order Year</th> <th>Order Quarter</th> <th>Sales</th> <th>WindowMin()</th> </tr> </thead> <tbody> <tr><td>2015</td><td>Q1</td><td>\$138K</td><td>\$138K</td></tr> <tr><td></td><td>Q2</td><td>\$143K</td><td>\$138K</td></tr> <tr><td></td><td>Q3</td><td>\$154K</td><td>\$138K</td></tr> <tr><td></td><td>Q4</td><td>\$182K</td><td>\$138K</td></tr> <tr><td>2016</td><td>Q1</td><td>\$298K</td><td>\$138K</td></tr> <tr><td></td><td>Q2</td><td>\$142K</td><td>\$138K</td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	WindowMin()	2015	Q1	\$138K	\$138K		Q2	\$143K	\$138K		Q3	\$154K	\$138K		Q4	\$182K	\$138K	2016	Q1	\$298K	\$138K		Q2	\$142K	\$138K
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FUNCTION	DESCRIPTION	EXAMPLE	IMAGE																												
WindowMedian(SummaryExpression, StartOffset, EndOffset)	Returns the median of the expression within the window.	WindowMedian(Sum([Sales]), First(), Last())	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>WindowMedian()</th></tr> </thead> <tbody> <tr> <td>2015</td><td>Q1</td><td>\$138K</td><td>\$149K</td></tr> <tr> <td></td><td>Q2</td><td>\$143K</td><td></td></tr> <tr> <td></td><td>Q3</td><td>\$154K</td><td>\$149K</td></tr> <tr> <td></td><td>Q4</td><td>\$182K</td><td></td></tr> <tr> <td>2016</td><td>Q1</td><td>\$298K</td><td>\$149K</td></tr> <tr> <td></td><td>Q2</td><td>\$142K</td><td></td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	WindowMedian()	2015	Q1	\$138K	\$149K		Q2	\$143K			Q3	\$154K	\$149K		Q4	\$182K		2016	Q1	\$298K	\$149K		Q2	\$142K	
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WindowSum(SummaryExpression, StartOffset, EndOffset)	Returns the sum of the expression within the window.	WindowSum(Sum([Sales]), First() + 2, Last())	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>WindowSum()</th></tr> </thead> <tbody> <tr> <td>2015</td><td>Q1</td><td>\$138K</td><td>\$776K</td></tr> <tr> <td></td><td>Q2</td><td>\$143K</td><td></td></tr> <tr> <td></td><td>Q3</td><td>\$154K</td><td>\$776K</td></tr> <tr> <td></td><td>Q4</td><td>\$182K</td><td></td></tr> <tr> <td>2016</td><td>Q1</td><td>\$298K</td><td>\$776K</td></tr> <tr> <td></td><td>Q2</td><td>\$142K</td><td></td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	WindowSum()	2015	Q1	\$138K	\$776K		Q2	\$143K			Q3	\$154K	\$776K		Q4	\$182K		2016	Q1	\$298K	\$776K		Q2	\$142K	
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WindowVar(SummaryExpression, StartOffset, EndOffset)	Returns the variance of the expression within the window.	WindowVar(Sum([Sales]), First(), Last())	-																												
WindowVarp(SummaryExpression, StartOffset, EndOffset)	Returns the biased variance of the expression within the window.	WindowVarp(Sum([Sales]), First(), Last())	-																												
WindowStdDev(SummaryExpression, StartOffset, EndOffset)	Returns the sample standard deviation of the expression within the window.	WindowStdDev(Sum([Sales]), First(), Last())	-																												
WindowStdDevp(SummaryExpression, StartOffset, EndOffset)	Returns the biased standard deviation of the expression within the window.	WindowStdDevp(Sum([Sales]), First(), Last())	-																												
Total(SummaryExpression)	Returns the total for the specified expression in a calculation window. Note that the <b>Total</b> function calculates the total based on values from the <a href="#">underlying data source</a> .	Total(Sum([Sales]))	<table border="1"> <thead> <tr> <th>Order Year</th><th>Order Quarter</th><th>Sales</th><th>Total(Sum([Sales]))</th></tr> </thead> <tbody> <tr> <td>2015</td><td>Q1</td><td>\$138K</td><td>\$1.06M</td></tr> <tr> <td></td><td>Q2</td><td>\$143K</td><td></td></tr> <tr> <td></td><td>Q3</td><td>\$154K</td><td>\$1.06M</td></tr> <tr> <td></td><td>Q4</td><td>\$182K</td><td></td></tr> <tr> <td>2016</td><td>Q1</td><td>\$298K</td><td>\$1.06M</td></tr> <tr> <td></td><td>Q2</td><td>\$142K</td><td></td></tr> </tbody> </table>	Order Year	Order Quarter	Sales	Total(Sum([Sales]))	2015	Q1	\$138K	\$1.06M		Q2	\$143K			Q3	\$154K	\$1.06M		Q4	\$182K		2016	Q1	\$298K	\$1.06M		Q2	\$142K	
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## IMPORTANT

Note that window functions cannot be used inside **Aggr**.

# Window Calculation Limitations

## Supported Dashboard Items

Window calculations can be applied to measures of the following dashboard items.

- [Chart](#)
- [Grid](#)
- [Pies](#)
- [Cards](#)
- [Gauges](#)
- [Pivot](#)
- [Range Filter](#)

## Data Shaping Limitations

The use of calculations imposes the following limitations related to [data shaping](#) features.

- [Sorting by measure](#) cannot be applied if the target measure has a calculation applied.
- [Top N](#) cannot be applied if its target measure has a calculation.

# Using Dashboard Parameters

You can use **dashboard parameters** when it is necessary to pass data of a certain type to a dashboard (e.g., to pass a specific value to the data source filter string or a calculated field).

The topics in this section describe how to use dashboard parameters.

- [Creating Parameters](#)
- [Passing Parameter Values](#)
- [Requesting Parameter Values](#)

# Creating Parameters

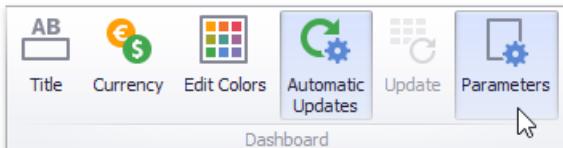
This topic explains how to create a new dashboard parameter and specify its settings.

- [Creating Parameters in the Dashboard Designer](#)
- [Look-Up Editor Settings](#)

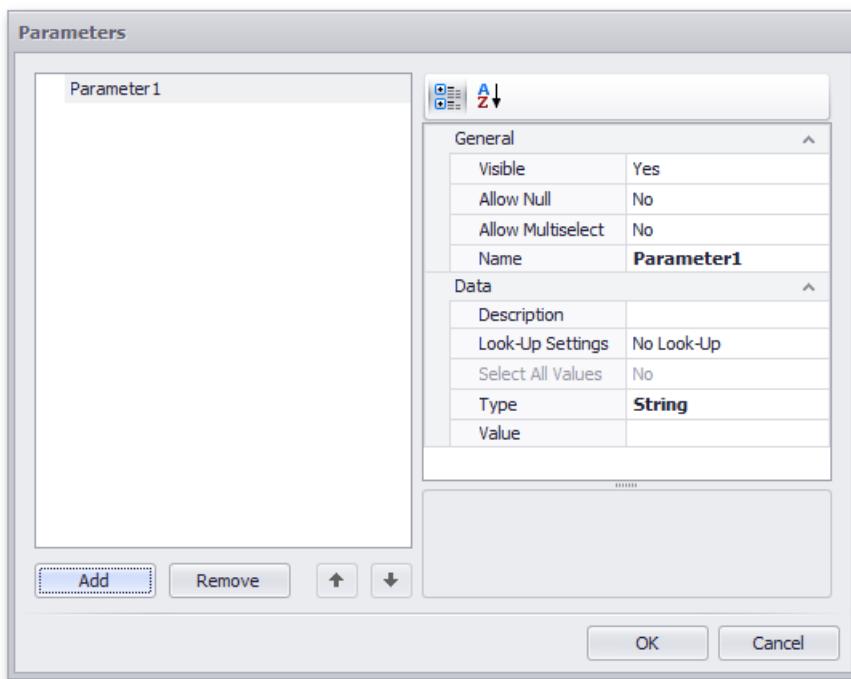
## Creating Parameters in the Dashboard Designer

To create dashboard parameters in the Dashboard Designer, do the following:

1. Click the **Parameters** button on the Ribbon's **Data Source** tab.



2. In the invoked dialog, click the **Add** button to add a new parameter.



3. Specify the following settings.

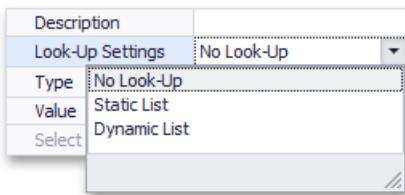
- **Visible** - Specifies whether or not the parameter editor is visible in the [Dashboard Parameters](#) dialog.
- **Allow Null** - Specifies whether or not null value can be passed as a parameter value.
- **Allow Multiselect** - Specifies whether or not multi-selection is enabled for the current parameter. The following limitations are applied to parameters with multi-selection enabled.
  - Use the **is any of** or **is none of** operators to pass a multi-select parameter to a [filter](#) criteria or to the [Expression](#) format condition.
  - Use the **In** or **Not In** operators to pass a multi-select parameter to a [calculated field](#) expression.
  - Stored procedures used in the [SQL](#) data source do not support multi-select parameters.
- **Name** - Specifies the parameter name. When creating and modifying parameter names, follow the rules below.
  - A name can contain letters, numbers and underscores.
  - A name cannot contain spaces.
  - A name cannot be an empty string.

- The dashboard cannot contain parameters with the same name.
  - Names are case-sensitive. For example, you can create the names *Parameter* and *PARAMETER*.
  - **Description** - Specifies the parameter's description. The parameter's description is the value displayed in the **Parameter Name** column of the [Dashboard Parameters](#) dialog.
  - **Look-Up Settings** - Specifies the parameter's [look-up editor settings](#).
  - **Select All Values** - Specifies whether or not all parameter values should be selected in the initial state of the Dashboard Viewer.
- Note that this option is in effect when **Allow Multiselect** is set to **true**.
- **Type** - Specifies the parameter type.
  - **Value** - Specifies the default parameter's value. Note that when **Allow Multiselect** is set to **true**, the **Value** option allows you to select multiple parameter values.

Then, click **OK** to add the created parameters to the dashboard.

## Look-Up Editor Settings

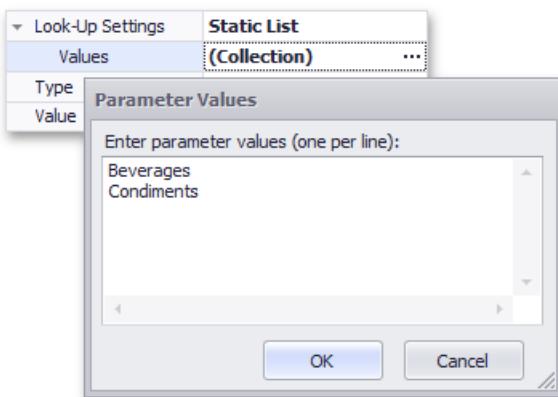
There are three types of look-up editor settings that can be specified for a parameter. Select the required type from the **LookUpSettings** drop-down list.



- **No Look-Up** - set the **Value** to use a static value as a parameter.

Look-Up Settings	No Look-Up
Type	String
Value	Beverages

- **Static List** - click the ellipsis button to add static values for the current dashboard parameter.



In this case, the **Value** specifies the default parameter's value.

- **Dynamic List** - allows you to use a list of values from the existing data source as a parameter. You need to select the required **Data Source** from the list of available data sources and data members for the dashboard parameter's display name and value, respectively.

Look-Up Settings	<b>Dynamic List</b>
Data Source	<b>SQL Data Source 1</b>
Data Member	<b>Categories</b>
Value Member	<b>CategoryID</b>
Display Member	<b>CategoryName</b>
Sort By	
Sort Order	Ascending
Type	<b>String</b>
Value	<b>1</b>

1. First, select the required **Data Source** from the list of available data sources. For the **SQL** data source, select the required **Data Member** that specifies the query from the selected **Data Source**.
2. Then, specify data members for the dashboard parameter's value and display name using **Value Member** and **Display Member**, respectively.
3. If necessary, specify the data member used to sort parameter values using the **Sort By** option. **Sort Order** specifies the required sort order.

**NOTE**

To learn how to create a data source for a dashboard parameter, see [Provide Data](#).

Note that you cannot specify an **OLAP** data source as the data source for the dashboard parameter in the Dashboard Designer.

# Passing Parameter Values

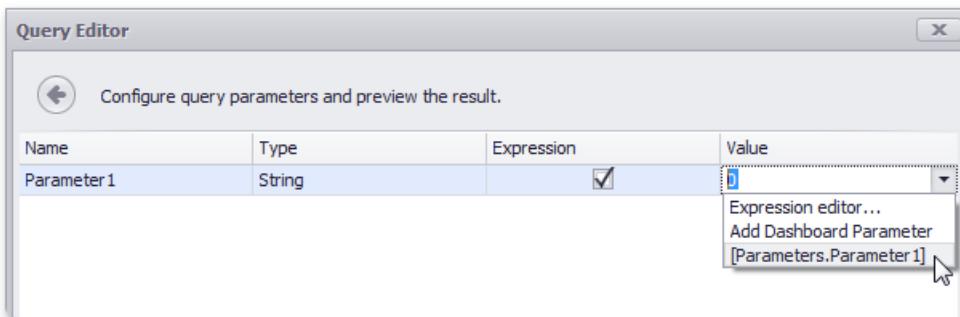
In this topic, you will learn how to pass parameter values to a dashboard.

- [SQL Queries](#)
- [Filtering](#)
- [Conditional Formatting](#)
- [Calculated Fields](#)
- [Window Calculations](#)

## SQL Queries

The Dashboard Designer provides the capability to use a dashboard parameter as an SQL query/stored procedure parameter. To pass a dashboard parameter to an [SQL query/stored procedure](#) in the [Data Source](#) wizard or [Query Editor](#), do the following.

- Create a [query parameter](#) or select the required [stored procedure](#) parameter.
- Enable the **Expression** checkbox for this parameter and select the required dashboard parameter in the **Value** column.



If necessary, you can select **Expression editor...** and specify an [expression](#) to bind a query parameter to a dashboard parameter using custom logic.

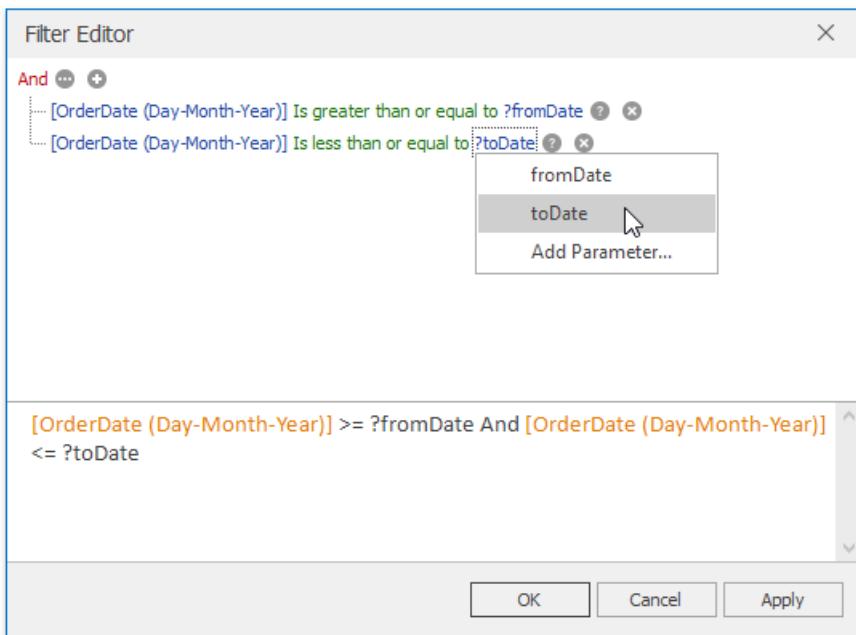
## Filtering

You can filter the specified [query](#) of the [SQL Data Source](#) or [apply filtering](#) to a specific dashboard item according to the current parameter value(s) using the [Filter Editor](#).

In the Filter Editor, you can compare a field value with the following objects.

- A *static value* (represented by the icon). Click this button to switch to the next item mode ("another field value"), to compare the field value with another field value.
- *Another field value* (represented by the icon). Click this button to switch to the next item mode ("parameter value"), to compare the field value with a parameter value.
- *A parameter value* (represented by the icon). Click this button to switch back to the initial mode ("static value"), to compare the field value with a static value.

Thus, to compare a field value with a parameter value, click the button, then click the button.



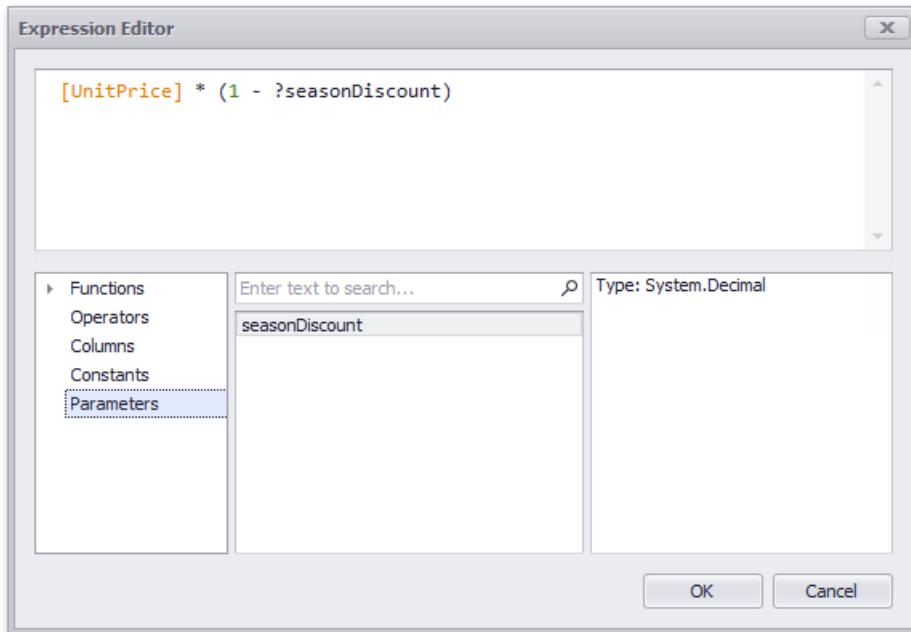
## Conditional Formatting

You can apply conditional formatting to a specific dashboard item according to the current parameter value when creating the [Expression](#) format condition. In the **Expression** dialog, you can compare a field value with parameter values in the same manner as in the **Filter Editor** dialog.

## Calculated Fields

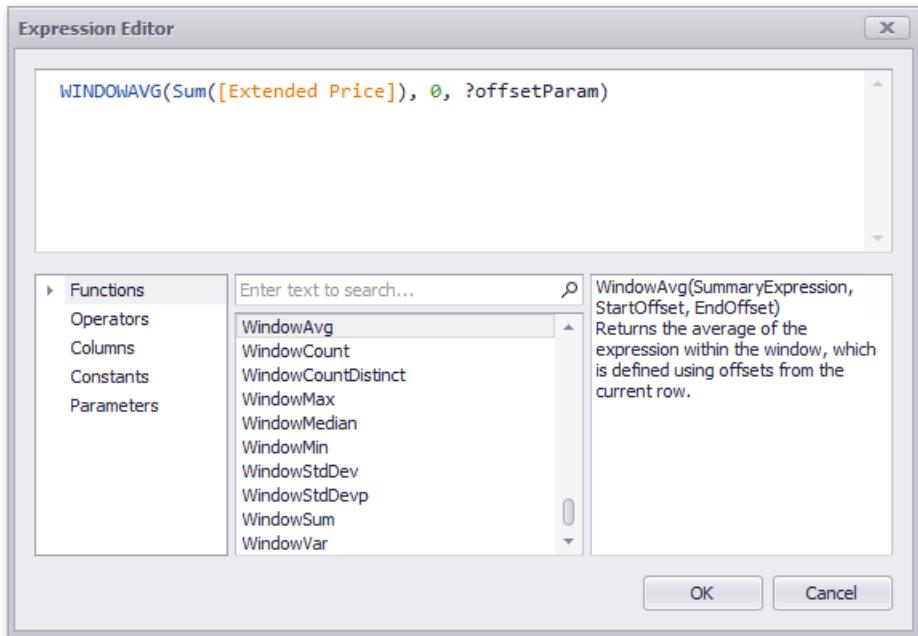
You can use parameters when constructing expressions for [calculated fields](#). This allows you to dynamically evaluate values of the calculated field depending on the current parameter value.

To include the required parameter in the calculated field expression, click **Parameters** in the Expression Editor dialog and double-click the required parameter.



## Window Calculations

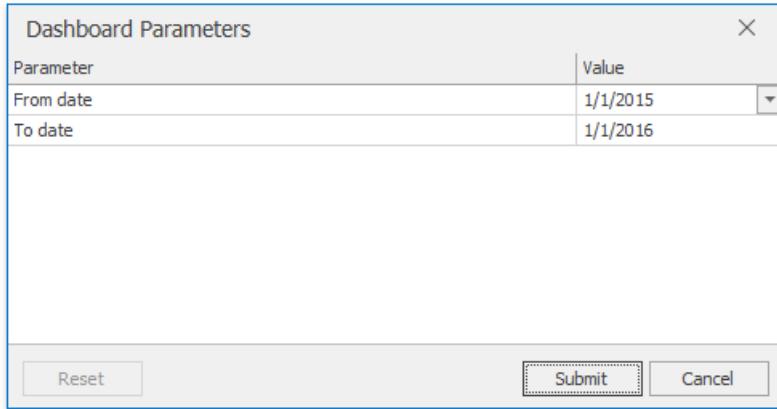
You can use parameters when customizing expressions for [window calculations](#). This allows you to apply a calculation dynamically, depending on the current parameter value.



# Requesting Parameter Values

The dashboard provides a built-in **Dashboard Parameters** dialog, which provides the capability to change dashboard parameter values. This dialog is created automatically, depending on the parameter type and visibility settings.

To invoke the **Dashboard Parameters** dialog in the Dashboard Designer, click the **Parameters**  button in the [dashboard title](#). Depending on the visibility state of the [created](#) dashboard parameters, this invokes the following dialog.



The screenshot shows a modal dialog titled "Dashboard Parameters". It contains two rows of parameter settings:

Parameter	Value
From date	1/1/2015
To date	1/1/2016

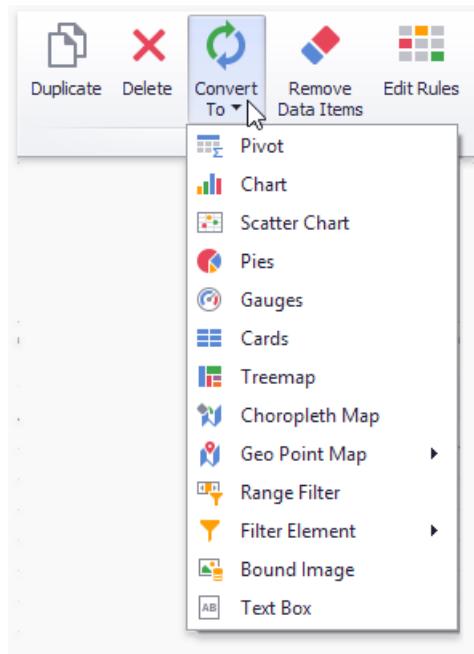
At the bottom of the dialog are three buttons: "Reset", "Submit" (which is highlighted with a dashed border), and "Cancel".

Select the required parameter values in the **Dashboard Parameters** dialog and click the **Submit** button to apply the changes.

To reset the changes to the default values, click the **Reset** button.

# Convert Dashboard Items

The Dashboard Designer provides the capability to convert data-bound dashboard items to another type. To convert the selected dashboard item to another type, use the **Convert** button in the ribbon's **Home** tab or the corresponding command in the item's context menu.



The Dashboard Designer always preserves the following settings for data-bound dashboard items.

- The set of [data items](#) used to bind the dashboard item to data.
- [Data shaping](#) settings of data items and their names.
- A custom name displayed within the dashboard item [caption](#).

The following settings are kept if the dashboard item is being converted to an item that also supports this feature.

- [Master Filtering](#) settings (e.g., the specified master filter mode) and [Drill-Down](#) settings (e.g., the target dimension).
- [Conditional Formatting](#) settings.
- [Coloring](#) settings.
- [Calculation](#) settings.

For different types of dashboard items, some specific settings can be preserved. For example, the following settings are preserved.

- Legend settings for the [Chart/Scatter Chart](#) dashboard items.
- Series types for the [Chart/Range Filter](#) dashboard items.
- Element arrangement settings for the [Pie/Card/Gauge](#) dashboard items.
- Caption settings for the [Pie/Gauge](#) dashboard items.
- Navigation settings for [Choropleth Map/Geo Point Maps](#).
- The attribute whose values are displayed within shape titles for [Choropleth Map/Geo Point Maps](#).
- Legend settings for the [Choropleth Map/Geo Point Maps](#).
- [Clustering](#) settings for [Geo Point Maps](#).

# Dashboard Layout

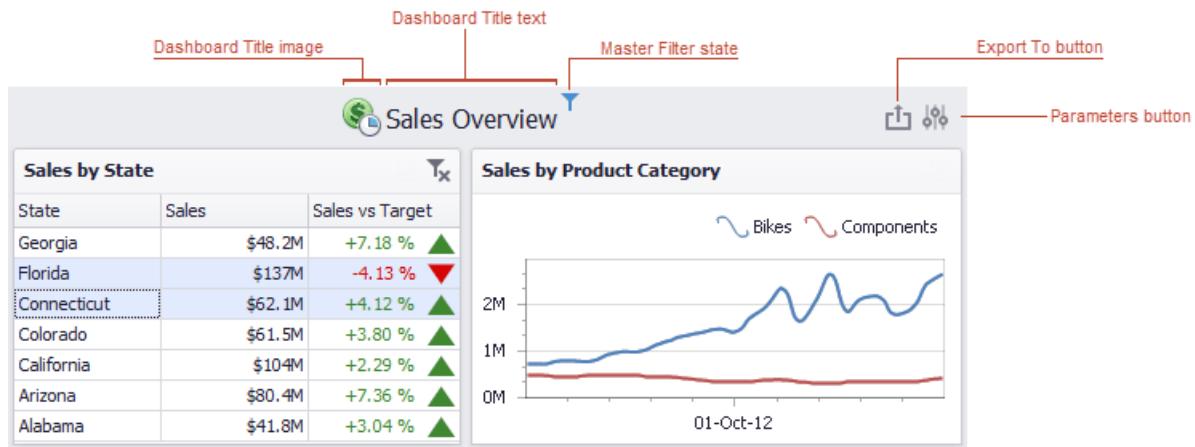
This section describes the features related to the Dashboard layout.

The section consists of the following topics.

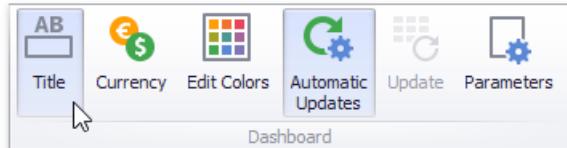
- [Dashboard Title](#)
- [Dashboard Item Caption](#)
- [Dashboard Items Layout](#)

# Dashboard Title

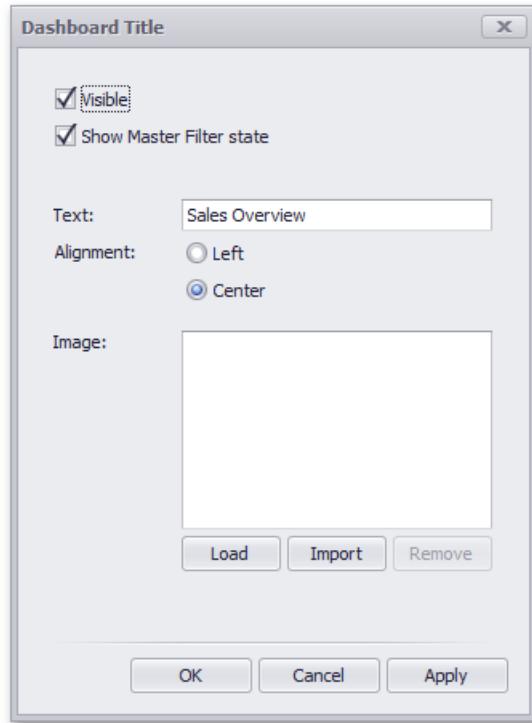
The **Dashboard Title** is located at the top of the dashboard surface. It can contain text or image content.



If you are using the Ribbon menu in the **Dashboard Designer**, you can change title settings by clicking the **Title** button.



This invokes the **Dashboard Title** dialog, which allows you to change the text within the dashboard title, add an image, etc.



This dialog allows you to specify the following options.

- **Visible** - Specifies whether or not the dashboard title is visible.
- **Show Master Filter state** - Specifies whether or not to show the state of master filter items in the dashboard title.

When you hover over the filter icon (▼), all master filters applied to the dashboard are displayed in the invoked popup.

<b>Date</b>
April, 2012 - July, 2013
<b>State</b>
Florida
Connecticut

- **Alignment** - Specifies the alignment of the dashboard title.
- **Load** button - Allows you to specify the image displayed within the dashboard title. In this case, the dashboard definition will contain the URL to access the image.
- **Import** button - Allows you to specify the image displayed within the dashboard title. In this case, the dashboard definition will contain an image as a byte array.

The dashboard title can contain command buttons.

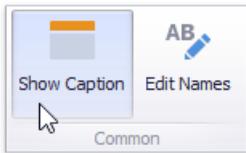
- **Export To** button - allows you to print/export the dashboard. To learn more about printing and exporting, see the [Printing and Exporting](#) topic.
- **Parameters** button - allows you to modify dashboard parameter values. To learn more about parameters, see the [Using Dashboard Parameters](#) topic.

# Dashboard Item Caption

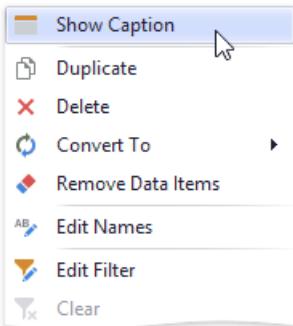
Each dashboard item has a caption that is displayed at the top of the item. The caption contains static text along with other information, as well as command buttons.



To show or hide the caption of a dashboard item, click the **Show Caption** button in the **Design** Ribbon tab...



...or right-click the item when designing the dashboard, and click the **Show Caption** menu item.



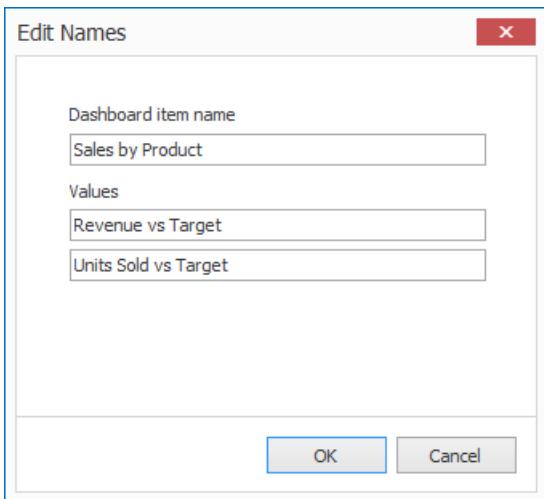
## NOTE

The caption of the Range Filter dashboard item is not visible by default.

The caption of the Dashboard item contains the following information and buttons, depending on the dashboard item type:

- **Dashboard Item Name** - represents the static text within a dashboard item's caption.
- **Data Item Container Name** - represents the name of the **data item container**. To learn more about data item containers, see the **Providing Data** topic for the corresponding dashboard item.

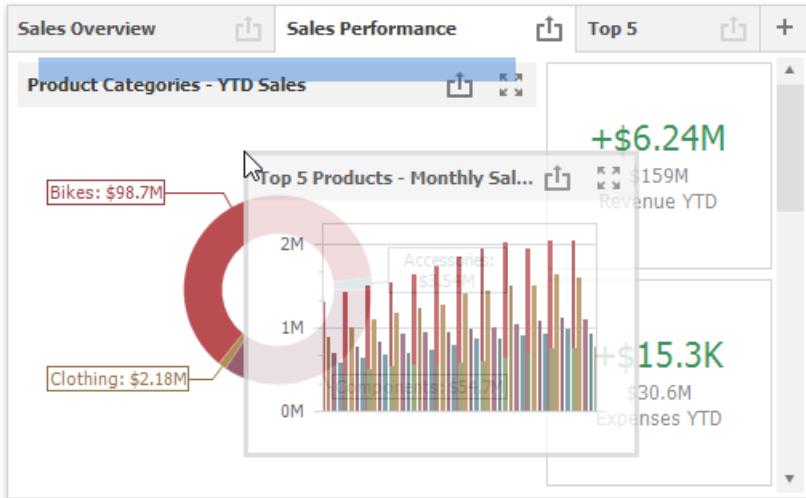
You can change the default name of the dashboard item or data item container using the **Edit Names** dialog. To invoke this dialog, right-click the item when designing the dashboard, and click the **Edit Names...** menu item (alternatively, you can use the **Edit Names** button in the **Design** Ribbon tab).



- **Drill-Down** value - shows the value or values from the current drill-down hierarchy. To learn more, see the [Drill-Down](#) topic.
- **Export to** button - allows you to print or export a dashboard item. To learn how to print individual dashboard items, see the [Printing and Exporting](#) topic.
- **Values** button - invokes a drop-down menu that allows you to switch between the provided values (in the pie, card, gauge and map dashboard items). To learn more, see the [Providing Data](#) topic for the corresponding dashboard item.
- **Clear Master Filter** button - allows you to reset filtering when a dashboard item acts as the [Master Filter](#). To learn more, see the [Master Filtering](#) topic in the [Interactivity](#) section for the corresponding dashboard item.
- **Drill Up** button - allows you to return to the previous detail level when the [drill-down](#) capability is enabled for this item. To learn more, see the [Drill-Down](#) topic in the [Interactivity](#) section for the corresponding dashboard item.
- **Clear Selection** button - allows you to clear the selection inside an item.
- **Initial Extent** button - restores the Map dashboard items' default size and position.
- **Select Date Time Periods** button / menu - allows you to select date-time periods for the Range Filter.
- **Multiselection** button - allows you to filter data by selecting multiple elements in dashboard items.
- **Maximize** button - expands any dashboard item into the whole dashboard size to examine data in greater detail. Refer to [Dashboard Items Layout](#) for more information.
- **Restore** button - restores the expanded item to its initial state.

# Dashboard Items Layout

The **Dashboard Designer** provides the capability to arrange and resize dashboard items and **groups** in various ways, using simple drag-and-drop operations.



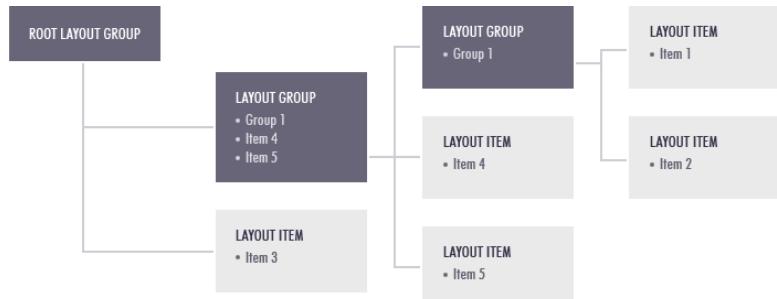
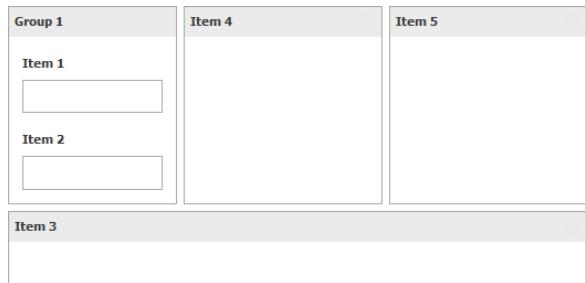
- [Layout Concepts](#)
- [Item Resizing](#)
- [Maximize and Restore Item](#)
- [Item Positioning](#)

## Layout Concepts

The dashboard arranges dashboard items and **groups** using *layout items* and *layout groups*. They are special containers that are used to present a dashboard layout as a hierarchical structure.

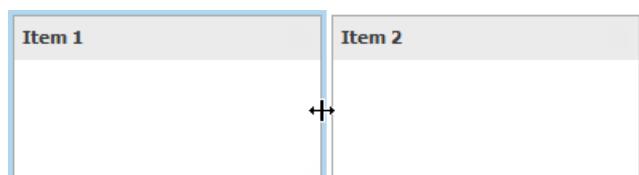
- A layout item is used as a container that displays an individual dashboard item.
- A layout group is used as a container that is used to arrange layout items (or other layout groups) either horizontally or vertically. At the same time, layout groups are used as containers that display **dashboard item groups**.

Thus, a dashboard layout is hierarchically arranged from the root layout group to bottommost layout items, which display individual dashboard items.

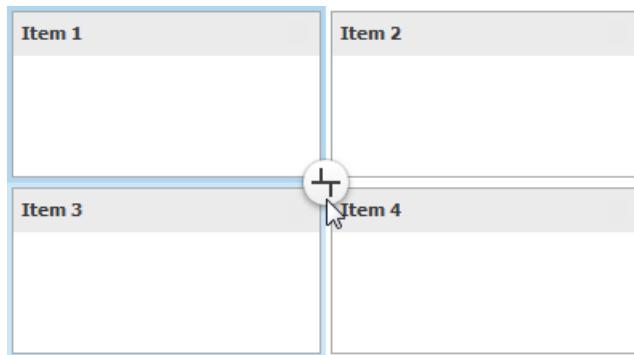


## Item Resizing

You can resize individual items/groups of items by dragging their edges.



By default, a 2x2 layout group of dashboard items is horizontally oriented and contains two child layout groups. This arranges dashboard items in two 'columns' and allows you to set a different height for items in different columns. You can switch the orientation of the 2x2 group to **Vertical** using the indicator at the group intersection.



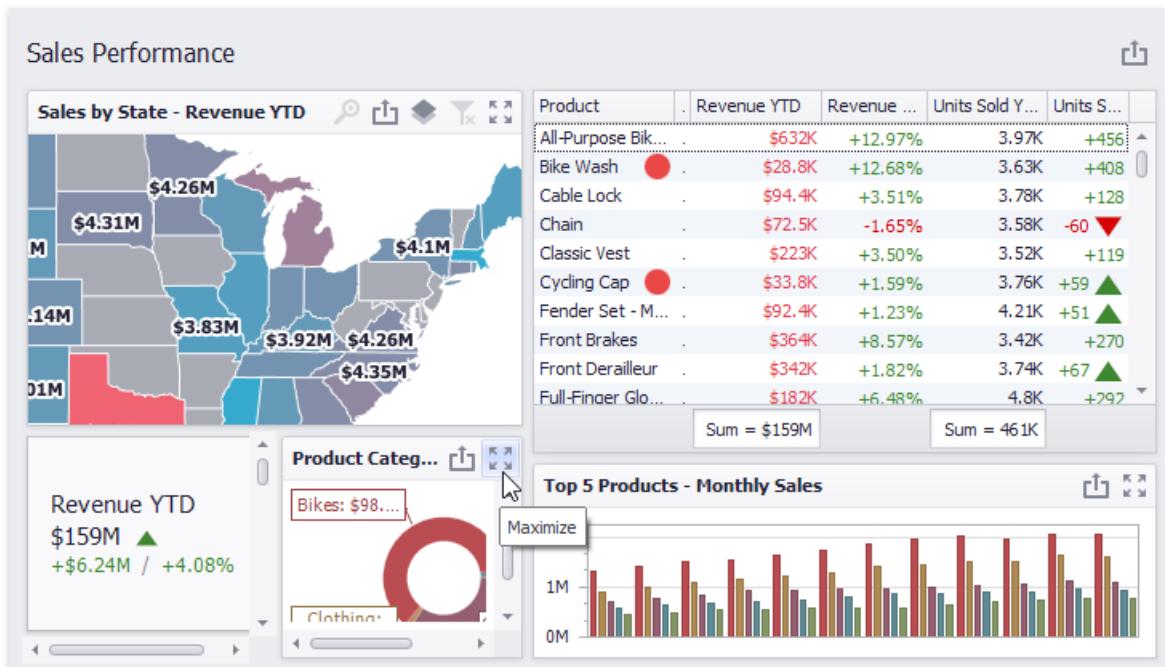
This allows you to specify different widths for dashboard items in different 'rows'. The table below lists and describes different modes.

INDICATOR	RESULT	DESCRIPTION
		Orients the layout group horizontally and allows you to change the height of individual items and the width of 'columns'.
		Orients the layout group vertically and allows you to change the width of individual items and the height of 'rows'.

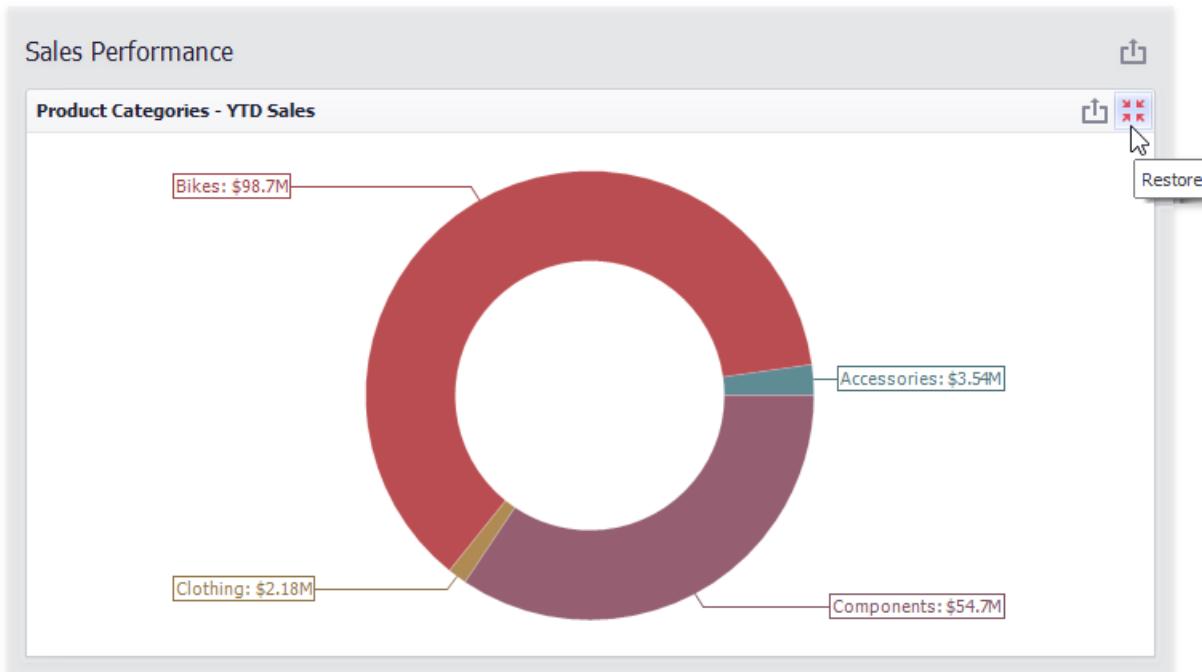
## Maximize and Restore Item

You can expand any dashboard item into the whole dashboard size to examine data in greater detail. The expanded dashboard item size in this case is the same as the root layout group.

- To maximize a dashboard item, click the **Maximize** button in the [dashboard item caption](#).



- To restore the item size, click **Restore**.



## Item Positioning

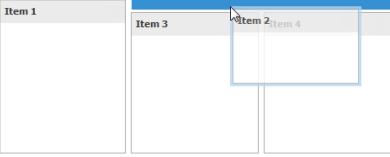
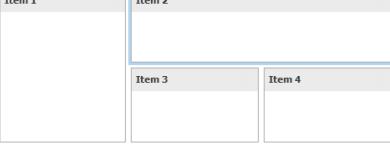
You can change the position of a dashboard item by using drag-and-drop and one of the following approaches.

- If the **caption** of the dashboard item is visible, click it and hold down the left mouse button while dragging the item.
- If the caption of the dashboard item is not visible, click the icon in the top left corner, and hold down the left mouse button while dragging the item.

Depending on the required dashboard item position, a new layout group is created (if required) to maintain the arrangement of items. Thus, the dashboard item can be inserted to the desired area of a new or existing dashboard layout group.

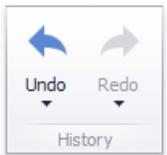
The following table illustrates how a dashboard item is dragged.

ACTION	DESCRIPTION
	Select the required dashboard item.
	Drag the dashboard item to the expected area. The <i>drag indicator</i> (  ) will show possible positions for the dashboard item.
	Move the mouse cursor to the required position. The <i>drop indicator</i> (   ) highlights the hovered position.

ACTION	DESCRIPTION
	<p>Then, the <i>drop indicator</i> sequentially displays areas that can be occupied by the dashboard item. Release the left mouse button when the drop indicator displays the required area.</p>
	<p>The dashboard item is moved to a new position.</p>

# Undo and Redo Operations

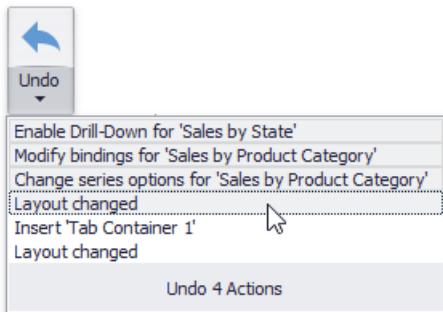
The **Dashboard Designer** keeps track of all user actions, and allows you to undo or repeat them using the **Undo/Redo** buttons.



To undo/redo the last action, use the following buttons.



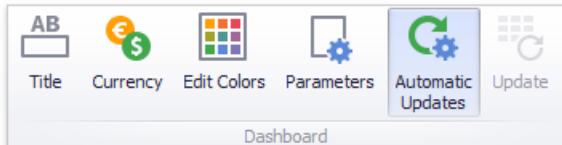
To undo/redo several actions at once, click the arrow next to **Undo/Redo** button and select the actions in the list that you want to undo/redo.



# Automatic and Manual Updates

When you perform a data-aware operation in the Dashboard Designer (for instance, [change the binding](#) of a specified dashboard item or apply [filtering](#)), the dashboard sends a query to a data source and updates itself automatically according to the returned data. If the dashboard is bound to a large data source, updating the dashboard according to each change can consume a significant amount of time. In this case, you can disable automatic updates and update the dashboard manually when needed.

Automatic updates are enabled by default and can be managed using the **Automatic Updates** button in the **Home** ribbon tab.



Click this button to disable automatic updates. In this case, the dashboard item will not be updated automatically according to each change. Imagine that you have a Grid dashboard item containing the [dimension](#) and [measure](#) columns. If you change the [sort order](#) of the *Sales Person* column or change the [summary type](#) of the *Extended Price* column, the Grid will be shaded and will display the icon within its caption.

A screenshot of the Microsoft Power BI Dashboard Designer. A tooltip message at the top left says: "The dashboard item does not reflect changes made since the last dashboard update. Use the Update button to update the dashboard according to the last modifications or enable Automatic Updates." On the left, there's a sidebar with "DATA ITEMS" and sections for "Columns" (with SalesPerson, ExtendedPrice (Sum), and New Column), and "Sparkline" (with Argument). On the right, there's a "Sales by Employee" grid. The first cell of the grid has an info icon (a red circle with a white exclamation mark) over it. The grid data is as follows:

This indicates that this dashboard item requires the update to reflect changes. To update the Grid manually, click the **Update** button in the **Home** ribbon tab.



Note that the state of the **Automatic Updates** option is saved to the [dashboard XML definition](#) but affects only the Dashboard Designer.

## NOTE

Note that automatic updates are disabled if you click the **Cancel** button on the loading panel when performing a time-consuming operation.

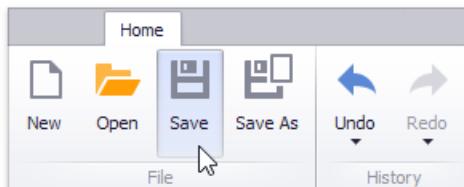
# Save a Dashboard

A dashboard provides the capability to save a dashboard definition (dashboard items, data sources, data binding, layout settings, etc.) to an XML file, and restore the dashboard from an XML file.

## Saving a Dashboard

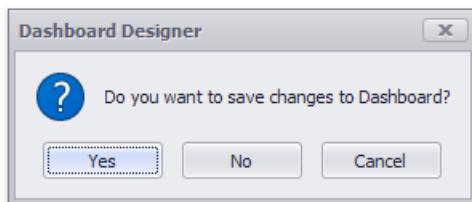
Once a dashboard is designed, you can save its definition to an XML file. In the **Dashboard Designer**, this can be accomplished in the following ways.

- You can save the dashboard by clicking the **Save** or **Save As** button in the Ribbon menu of the Designer.



This invokes the **Save As** dialog, which allows you to locate the folder in which you wish to store your file.

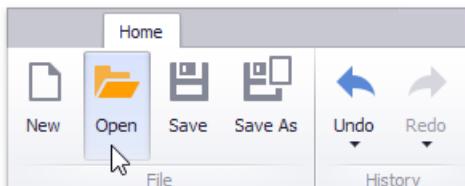
- The dashboard can be saved when the window containing the Dashboard Designer is closed. If the dashboard has been modified since the last save, a save confirmation dialog will be invoked.



## Loading a Dashboard

A dashboard previously saved to an XML file can be loaded to the Dashboard Designer.

You can open the dashboard by clicking the **Open** button in the Ribbon menu of the Designer.



This invokes the **Open File** dialog, which allows you to locate the required dashboard XML file.

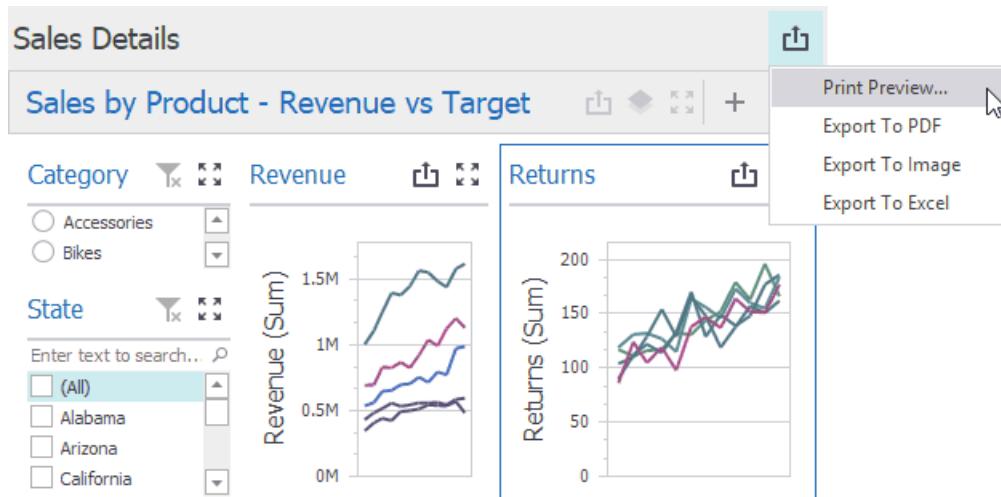
# Printing and Exporting

The Dashboard Designer provides the capability to print or export an entire dashboard and individual items.

- [Printing and Exporting Dashboards](#)
- [Printing and Exporting Dashboard Items](#)

## Printing and Exporting Dashboards

To print or export the entire dashboard, click the  button in the [dashboard title](#) area and choose the required action.

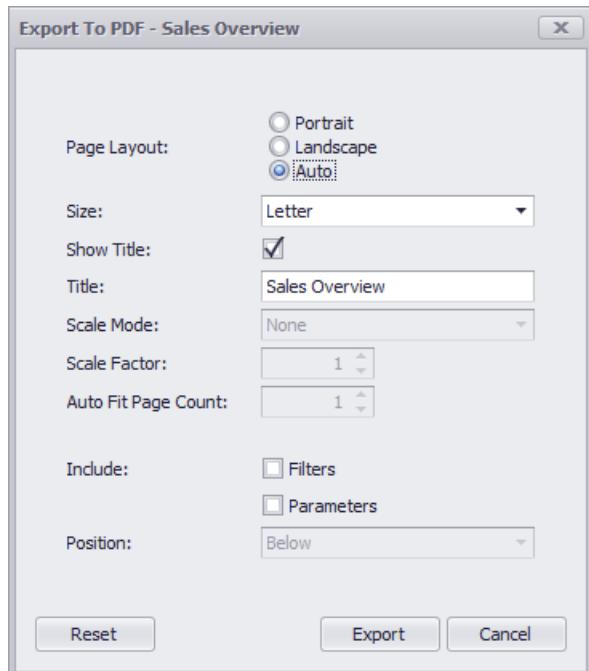


### [Print Preview...](#)

Allows you to customize the document before printing/exporting. For instance, the following settings can be changed: the orientation and size of the printed page, page margins, etc.

### [Export to PDF](#)

Invokes a corresponding dialog that allows you to export a dashboard to a PDF file with specific options. The following options are available.



- **Page Layout** - Specifies the page orientation used to export a dashboard. You can select between *Portrait*, *Landscape*, and *Auto*. Note that in the *Auto* mode, page orientation is selected automatically depending on the horizontal and vertical sizes

of a dashboard.

- **Size** - Specifies the standard paper size (for instance, *Letter* or *A4*).
- **Show Title** - Specifies whether or not to apply the dashboard title to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Scale Mode** - Specifies the mode for scaling when exporting a dashboard.

**i NOTE**

Note that this option is in effect when **Page Layout** is set to a value different from *Auto*.

- **Scale Factor** - Specifies the scale factor (in fractions of 1) by which a dashboard is scaled.

**i NOTE**

This option is in effect if **Scale Mode** is set to *Use Scale Factor*.

- **Auto Fit Page Count** - Specifies the number of horizontal/vertical pages spanning the total width/height of a dashboard.

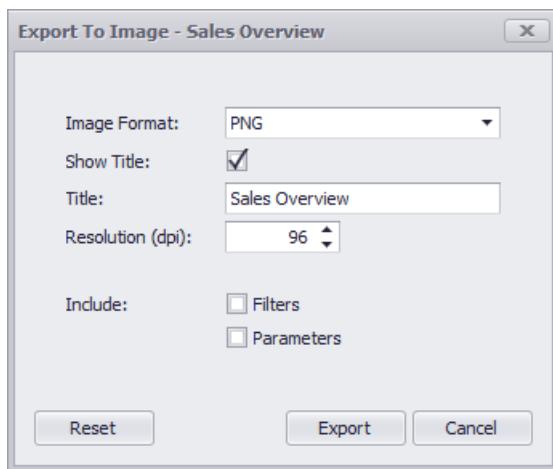
**i NOTE**

This option is in effect if **Scale Mode** is set to *Auto Fit to Page Width*.

- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

## Export to Image

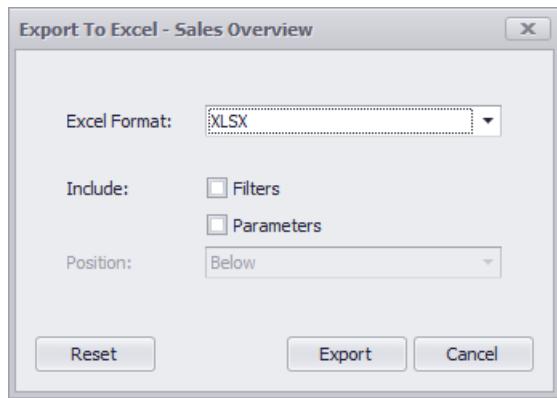
Invokes a corresponding dialog that allows you to export a dashboard to an image in the specified format. The following options are available.



- **Image Format** - Specifies the image format in which the dashboard is exported. The following formats are available: *PNG*, *JPEG*, and *GIF*.
- **Show Title** - Specifies whether or not to apply the dashboard title to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export a dashboard.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.

## Export to Excel

Invokes a corresponding dialog that allows you to export dashboard's data to the Excel file. The following options are available:

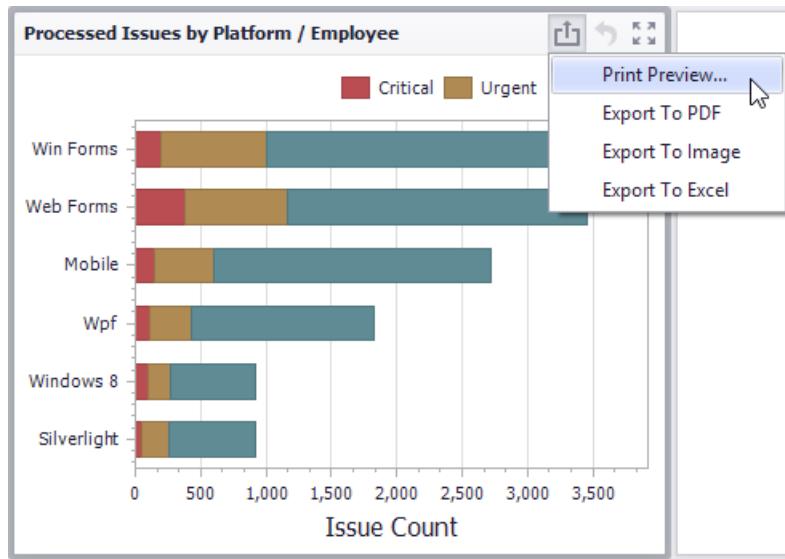


- **Excel Format** - Specifies the Excel workbook format in which the dashboard's data is exported. You can select between *XLSX* and *XLS*.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Sheet*.

Specify the required options in the invoked dialog and click the **Export** button to export the dashboard. To reset changes to the default values, click the **Reset** button.

## Printing and Exporting Dashboard Items

To print or export a dashboard item, click the button in its [caption](#) and choose the required action.



- [Print Preview...](#) - Allows you to customize the document before printing/exporting.
- [Export to PDF](#) - Invokes a corresponding dialog that allows you to export a dashboard to a PDF file with specific options.
- [Export to Image](#) - Invokes a corresponding dialog that allows you to export a dashboard to image in the specified format.
- [Export to Excel](#) - Invokes a corresponding dialog that allows you to export a dashboard item's data to the Excel workbook or CSV file.

To learn more about printing/exporting specifics of different dashboard items, see the [Printing and Exporting](#) topic for the required [dashboard item](#).

# UI Elements

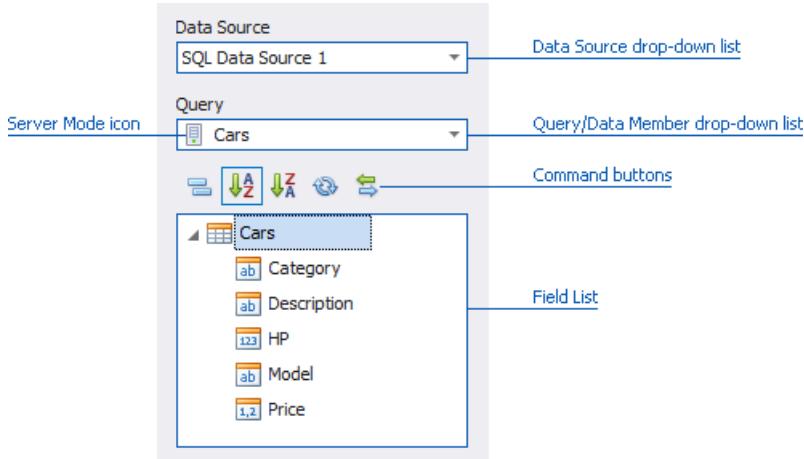
The topics in this section describe the main elements of a **Dashboard Designer** application.

This section consists of the following topics.

- [Data Source Browser](#)
- [Data Items Pane](#)
- [Print Preview](#)

# Data Source Browser

The **Data Source Browser** allows you to navigate through dashboard data sources. It displays the data source structure and allows you to [bind dashboard items](#) to the required data source fields using drag-and-drop operations. The Data Source Browser also enables you to manage [calculated fields](#).



The Data Source Browser contains the following elements.

- **Data Source** drop-down list - allows you to select the required data source.
- **Query/Data Member** drop-down list - allows you to select the required query or data member.
- The following **Command buttons** are available.

The button groups fields by type.

The and buttons are used to switch the sort order.

The button is used to refresh the Field List.

- **Field List** displays data source fields. You can drag these fields to the [data item placeholders](#) to specify data binding.

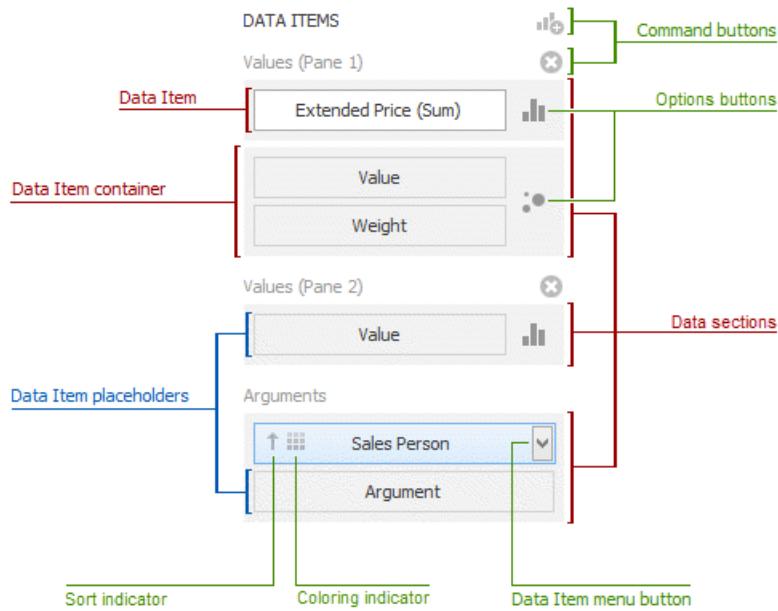
The Data Source Browser identifies the following data field types.

ICON	DESCRIPTION
	Boolean
	Byte
	Date-time
	Numeric
	String
	Calculated field

# Data Items Pane

The **DATA ITEMS** pane is placed side-by-side with the [Data Source Browser](#), and allows you to create and modify data binding using drag-and-drop operations.

To learn how to bind dashboard items to data source fields, see the [Bind Dashboard Items to Data](#) topic.



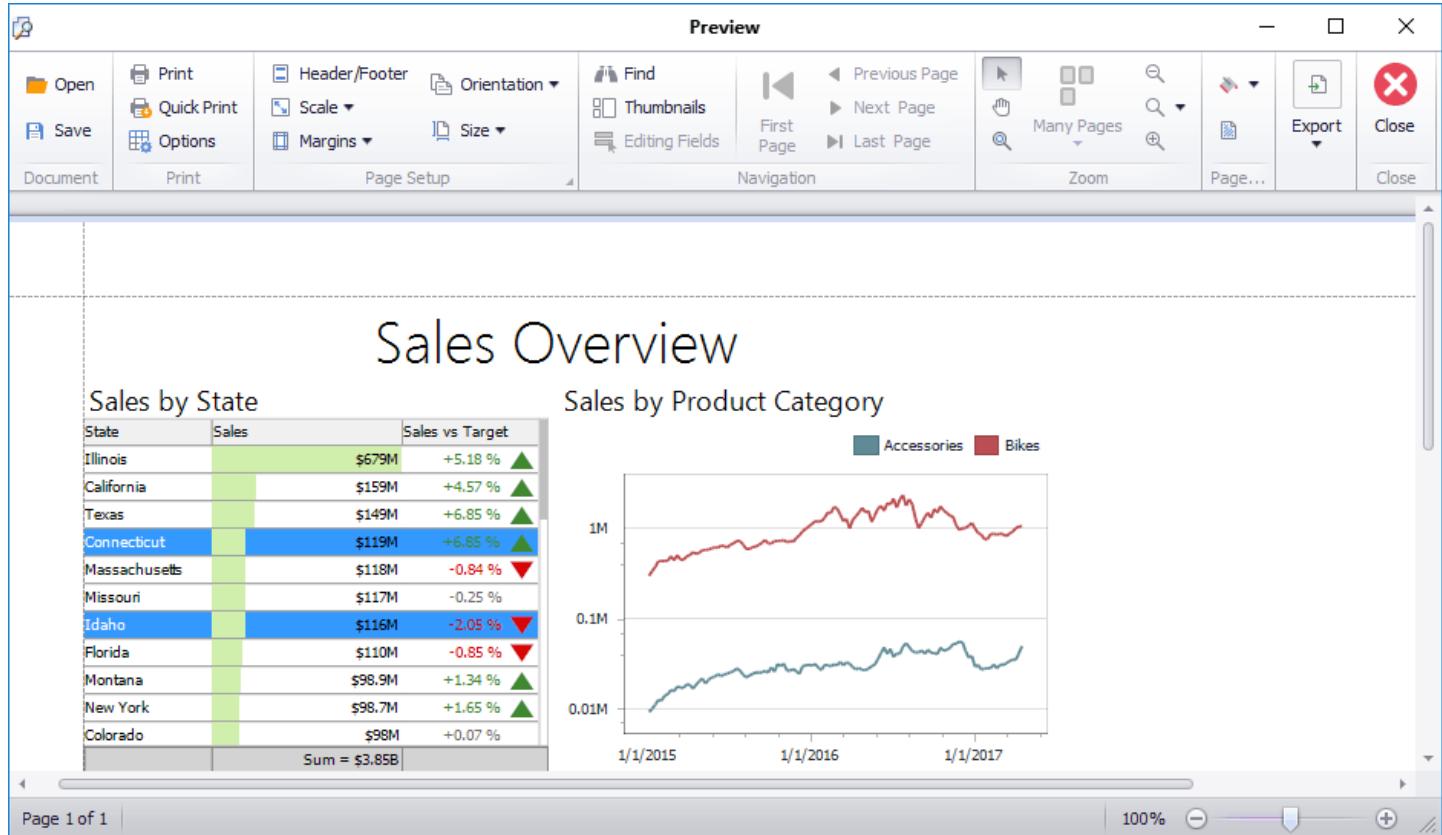
The DATA ITEMS pane can contain the following elements.

- **Data Item placeholder** - used to create a data binding using drag-and-drop operations.
- **Data Item** - identifies a data binding by mapping to a particular data source field. Each data item has the **Data Item menu** button, used to invoke a menu that allows you to perform various [data shaping](#) operations.
- **Data Section** - corresponds to a particular dashboard item area or element.
- **Data Item container** - used to provide *data item* sets (e.g., for calculating the difference between two measures). Data item containers have **Options** buttons that allow you to change specific dashboard item settings (e.g., to switch between chart series types or grid column types).
- **Sort indicator** - shows the current sort order for the data item.
- **Coloring indicator** - indicates whether coloring by hue is enabled for the data item.

Specific dashboard items have command buttons that allow you to perform various operations, for instance, to add a new pane to the chart dashboard item.

# Print Preview

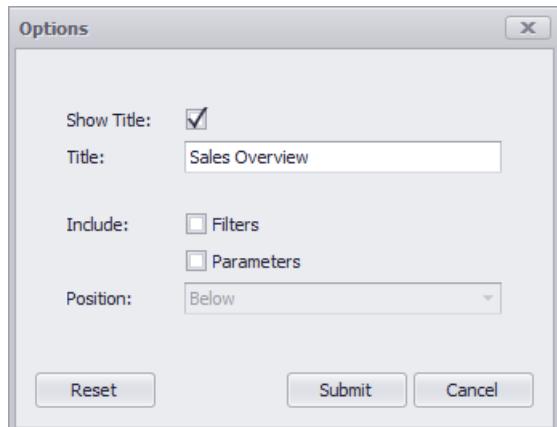
This document describes the **Print Preview** window, which displays the dashboard/dashboard item as it will appear on paper.



## Specific Options

In the Print Preview, you can change the orientation and size of the printed page, specify the margins, scale the document, etc. To learn more, see [Print Preview for WinForms](#).

You can also customize printing options specific to a dashboard/dashboard item. To do this, click the **Options** button in the **Print** group. When previewing the dashboard, the following **Options** dialog will be invoked.

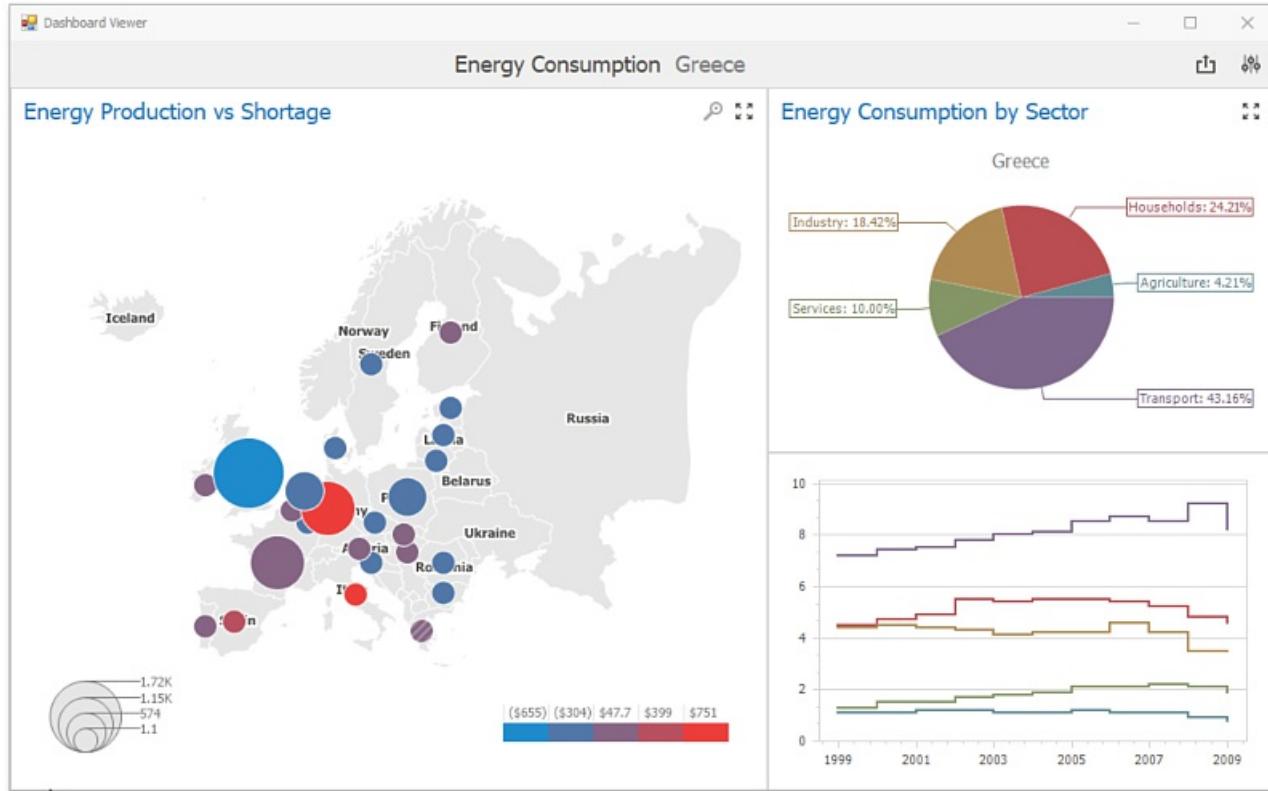


- **Show Title** - Specifies whether or not to show the dashboard title/dashboard item caption as the printed document title.
- **Title** - Specifies the title of the printed document.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

This dialog can contain different options, depending on the dashboard item. To learn more, see the documentation for the required [dashboard item](#).

# Dashboard Viewer

The **Dashboard Viewer** provides the capability to display dashboards in Windows Forms applications.



## Data Presentation

The topics in this section provide information on how the **Dashboard Viewer** presents data.

- [Data Presentation Basics](#)
- [Master Filtering](#)
- [Drill-Down](#)
- [Dashboard Layout](#)

## Dashboard Parameters

This topic describes how to change dashboard parameter values.

- [Requesting Parameter Values](#)

## Printing and Exporting

A Dashboard Viewer provides the capability to print or export both individual items of a dashboard, as well as the entire dashboard.

- [Printing and Exporting](#)

## Dashboard Items

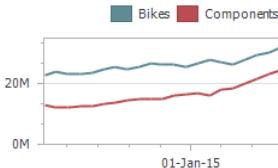
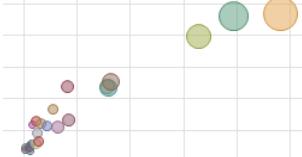
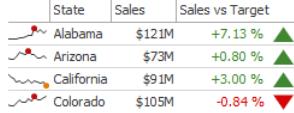
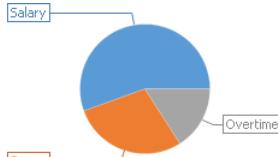
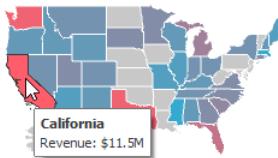
Dashboard items are used to present information in various ways.

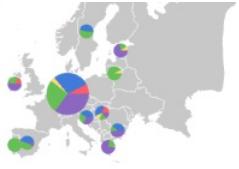
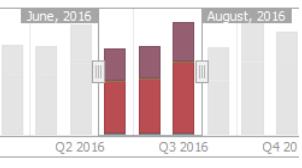
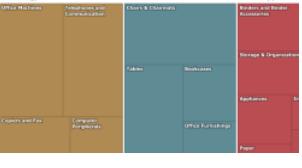
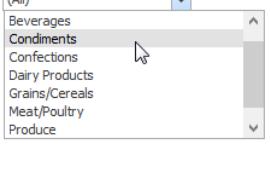
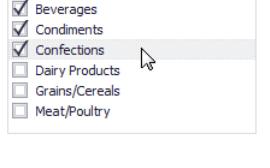
- [Chart](#)
- [Scatter Chart](#)

- Grid
- Pies
- Cards
- Gauges
- Pivot
- Choropleth Map
- Geo Point Maps
- Range Filter
- Image
- Text Box
- Treemap
- Filter Elements

# Data Presentation Basics

The **Dashboard Viewer** is used to present dashboards in Windows Forms applications. A wide range of dashboard items are used to display visual or textual information.

Dashboard Item	Image	Description
Chart	 A line chart comparing 'Bikes' (blue line) and 'Components' (red line) sales from January 2015 to January 2016. Both series show a general upward trend, with Components starting lower than Bikes but closing higher by the end of the period.	Displays data graphically using bars, lines, points, etc.
Scatter Chart	 A scatter plot with two data series represented by colored bubbles. One series is green and the other is orange. The bubbles vary in size and position across a grid, suggesting a relationship between two numerical variables.	Visualizes relationships between numeric variables.
Grid	 A grid table showing state sales and performance against target. The columns are State, Sales, and Sales vs Target. The rows represent Alabama, Arizona, California, and Colorado.	Presents data in tabular form.
Pies	 A pie chart divided into three segments: blue (largest), orange, and grey. Callouts point to each segment with labels: 'Salary' (blue), 'Bonus' (orange), and 'Overtime' (grey). The chart represents the contribution of each value to the total.	Displays a series of pies or donuts that represent the contribution of each value to the total.
Cards	 Two cards side-by-side. The left card shows 'Hitch Rack - 4-Bike Accessories' with a value of '\$307K' and '+5.48%'. The right card shows 'HL M Acces' with a value of '+16K'. Each card has a green triangle icon above the value.	Displays a series of cards, each illustrating the difference between two values.
Gauges	 A gauge scale ranging from 0B to 2.5B. The needle is positioned at 1.5B. A callout indicates a '+1.15%' increase from the previous value of 1B.	Visualizes data within a series of gauges.
Pivot	 A pivot table with 'Accessories' as the primary category. It shows 'Units Sold' and 'Revenue' for four states: California, Washington, Texas, and Florida.	Displays cross-tabular reports and allows you to analyze multi-dimensional data.
Choropleth Map	 A choropleth map of the United States where states are colored based on their revenue. A callout for California specifies a revenue of '\$11.5M'.	Colorizes areas in proportion to the provided values.

Dashboard Item	Image	Description
Geo Point Map		Displays callouts on the map using geographical coordinates.
Bubble Map		Displays bubbles on the map using geographical coordinates.
Pie Map		Places pies on the map using geographical coordinates.
Range Filter		Allows you to apply filtering by dragging selection thumbs along the argument axis.
Images		Displays images.
Text Box		Displays rich text within a dashboard.
Treemap		Visualizes data in nested rectangles.
Combo Box		Allows you to select a value(s) from the drop-down list.
List Box		Allows you to select a value(s) from the list.

Dashboard Item	Image	Description
Tree View		<p>Displays values in a hierarchical way and allows you to filter other dashboard items by selecting parent/child values.</p>

The Dashboard Viewer enables interaction between various dashboard items. These features include **Master Filtering** and **Drill-Down**.

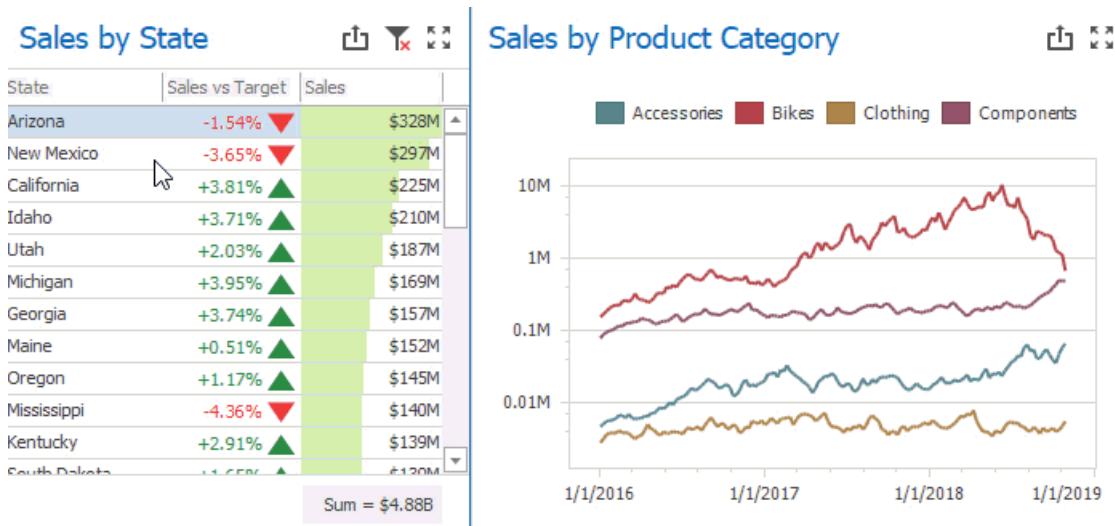
- [Master Filtering](#)
- [Drill-Down](#)

You can inspect raw or aggregated data. See the [Data Inspector](#) topic for details.

To learn more about the dashboard layout, see the [Dashboard Layout](#) topic.

# Master Filtering

The **Dashboard** allows you to use any data-aware dashboard item as a filter for the entire dashboard (**Master Filter**). You can select elements in a **Master Filter** item (chart bars, pie segments, grid records, etc.) to filter data in the rest of the dashboard by the selected values.



## Master Filtering Modes

The Master Filter item supports two selection modes.

- **Multiple**

Allows you to select multiple elements in the Master Filter item.

To clear the selection in the Master Filter item, use the **Clear Master Filter** button in the dashboard item's [caption](#).



- **Single**

Allows you to select only one element in the Master Filter item. When this mode is enabled, the default selection will be set to a Master Filter element. You can change this selection, but cannot clear it.

To learn how to filter dashboard data via a specific dashboard item, refer to the documentation for this item in the [Dashboard Items](#) section.

# Drill-Down

Dashboard provides the **drill-down** feature, which allows you to change the detail level of data displayed in a dashboard item. This feature allows you to drill down to display the details, or drill up to view more general information.



To learn how to drill down using a particular dashboard item, refer to the documentation for this item in the [Dashboard Items](#) topic.

To return to the previous detail level (drill up), use the **Drill Up** button (the ↗ icon) in the dashboard item's [caption](#), or the corresponding command in the context menu.



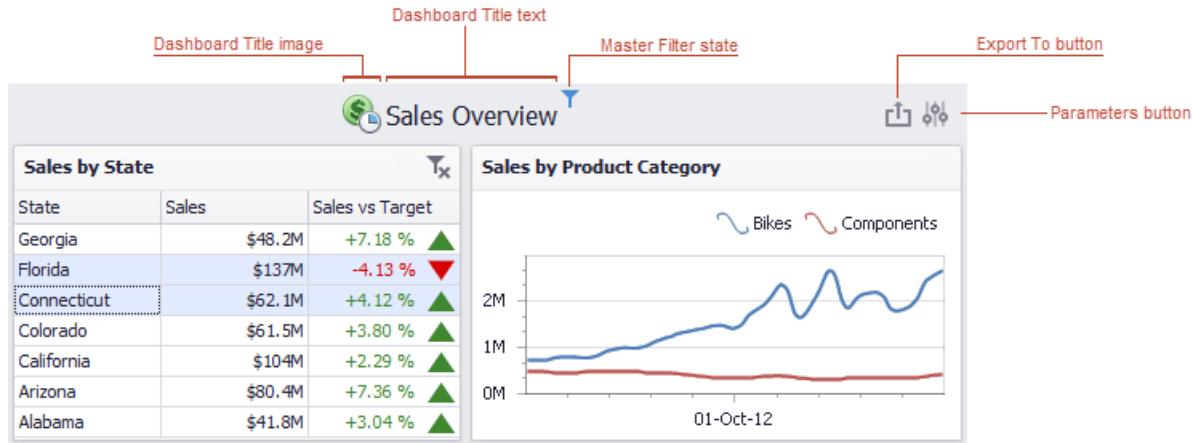
# Dashboard Layout

This topic describes the features related to the dashboard layout.

- [Dashboard Title](#)
- [Dashboard Item Caption](#)
- [Resizing Dashboard Items](#)

## Dashboard Title

The **Dashboard Title** is located at the top of the **Dashboard**. The dashboard title can contain text or image content, elements selected in the master filter item and command buttons.



When you hover over the filter icon (▼), all master filters applied to the dashboard are displayed in the invoked popup.



The dashboard title can contain the following command buttons.

- **Export To** button (the icon) - allows you to print/export the dashboard. To learn more about printing and exporting, see the [Printing and Exporting](#) topic.
- **Parameters** button (the icon) - allows you to modify dashboard parameter values. To learn how to modify dashboard parameter values, see the [Requesting Parameter Values](#) topic.

## Dashboard Item Caption

Each [dashboard item](#) has a caption that is displayed at the top of this item. The caption contains static text along with other information, as well as command buttons.

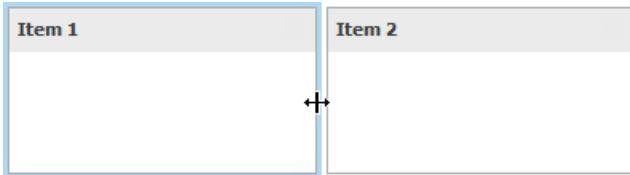


The caption of the Dashboard item contains the following information and buttons, depending on the dashboard item type:

- **Dashboard Item Name** - represents the static text within a dashboard item's caption.
- **Data Item Container Name** - represents the name of the data item container.
- **Drill-Down** value - shows value(s) from the current drill-down hierarchy. To learn more, see the [Drill-Down](#) topic.
- **Export to** button - allows you to print or export a dashboard item. To learn how to print individual dashboard items, see the [Printing and Exporting](#) topic.
- **Values** button - invokes a drop-down menu that allows you to switch between provided values (in the pie, card, gauge and map dashboard items). To learn more, see the [Data Presentation Basics](#) topic for the corresponding dashboard item.
- **Clear Master Filter** button - allows you to reset filtering when a dashboard item acts as the [Master Filter](#). To learn more, see the [Interactivity](#) topic for the corresponding dashboard item.
- **Drill Up** button - allows you to return to the previous detail level when the [drill-down](#) capability is enabled for this item. To learn more, see the [Interactivity](#) topic for the corresponding dashboard item.

## Resizing Dashboard Items

The Dashboard Viewer provides the capability to resize dashboard items.



You can resize individual items (or a group of items) by dragging their edges.

# Data Inspector

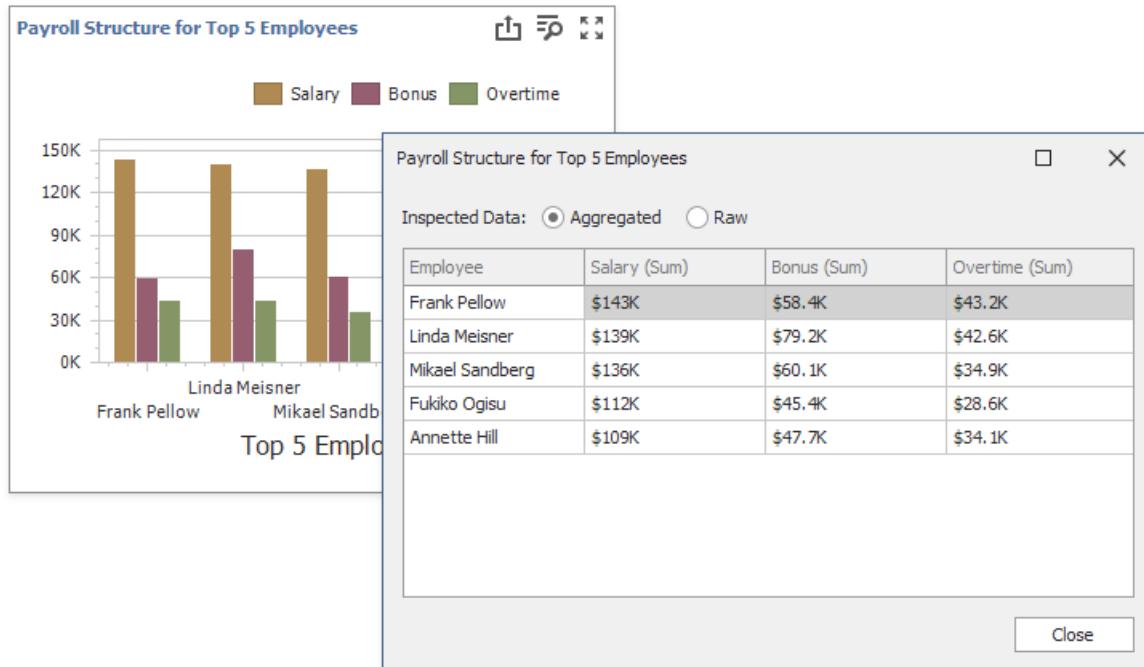
**Data Inspector** is a dialog window that displays raw or aggregated data.

## Overview

To invoke the Data Inspector window, click the "Inspect Data" button  in the [dashboard item caption](#) or select the "Inspect Data" context menu item.

## Aggregated (Displayed) Data

The data shown as *Aggregated* is retrieved from the dashboard item's data storage.

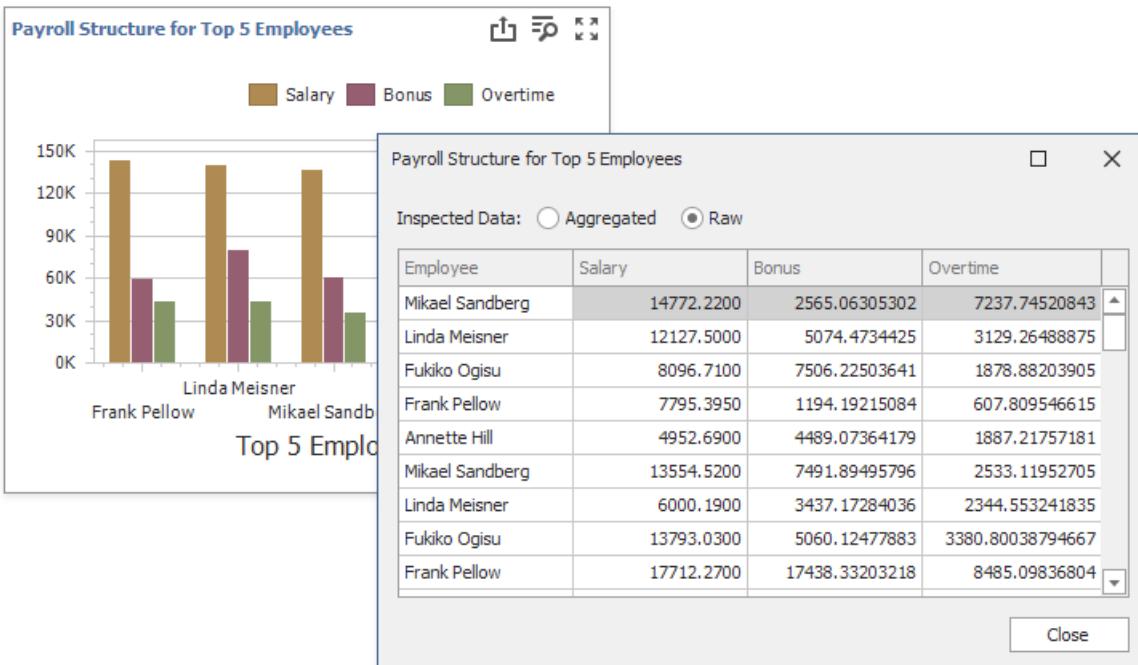


The columns are:

- [Dimensions](#), except the [Sparkline](#).
- [Measures](#). A list of dimensions does not include unbound measures (the measures without a DataMember, such as [Totals](#) and the number of points in a [Cluster](#)).
  - The [Sparkline](#) is displayed as a column.

## Raw Data

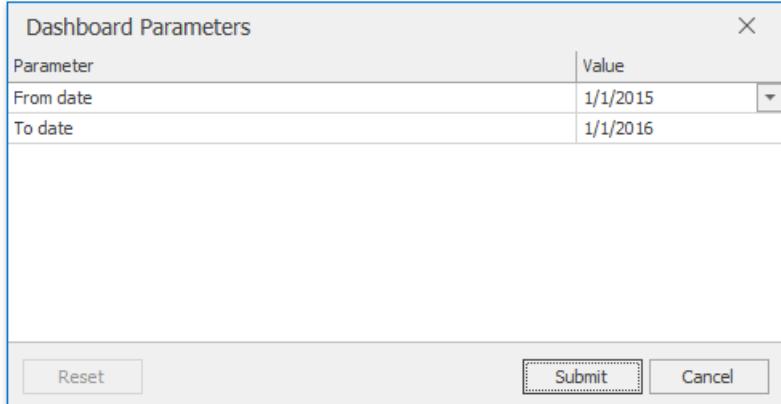
Raw data is the dashboard item's underlying data.



# Requesting Parameter Values

The Dashboard Viewer provides a built-in **Dashboard Parameters** dialog, which allows you to change dashboard parameter values.

This dialog can be used to apply filtering to dashboard data.



The screenshot shows a modal dialog titled "Dashboard Parameters". It contains a table with two rows. The first row has columns for "Parameter" (From date) and "Value" (1/1/2015). The second row has columns for "Parameter" (To date) and "Value" (1/1/2016). At the bottom of the dialog are three buttons: "Reset", "Submit" (which is highlighted with a dotted border), and "Cancel".

Parameter	Value
From date	1/1/2015
To date	1/1/2016

Reset      Submit      Cancel

To invoke the **Dashboard Parameters** dialog in the Dashboard Viewer, click the **Parameters** button (the  icon) in the [dashboard title](#).

Select the required parameter values in the **Dashboard Parameters** dialog and click the **Submit** button to apply the changes.

To reset changes to the default values, click the **Reset** button.

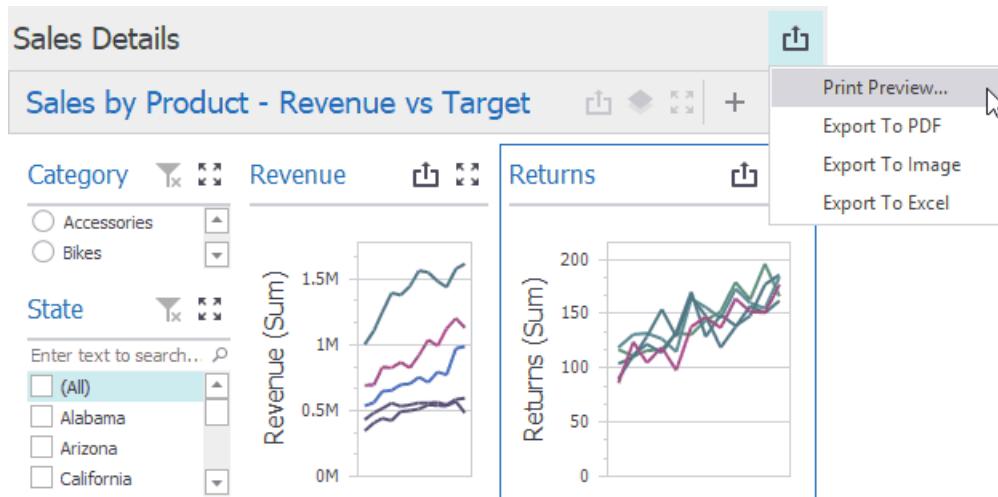
# Printing and Exporting

The Dashboard Viewer provides the capability to print or export an entire dashboard and individual items.

- [Printing and Exporting Dashboards](#)
- [Printing and Exporting Dashboard Items](#)

## Printing and Exporting Dashboards

To print or export the entire dashboard, click the  button in the [dashboard title](#) area and choose the required action.

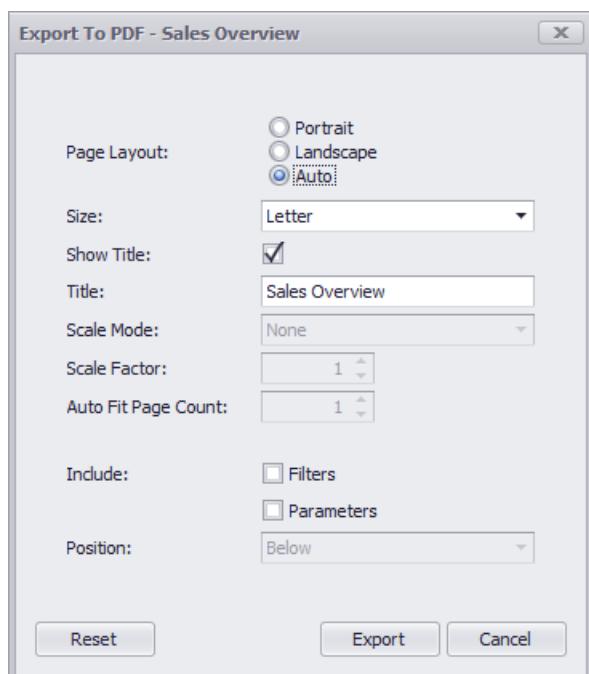


[Print Preview...](#)

Allows you to customize the document before printing/exporting. For instance, the following settings can be changed: the orientation and size of the printed page, page margins, etc.

[Export to PDF](#)

Invokes a corresponding dialog that allows you to export a dashboard to a PDF file with specific options. The following options are available:



- **Page Layout** - Specifies the page orientation used to export a dashboard. You can select between *Portrait*, *Landscape*, and *Auto*. Note that in the *Auto* mode, page orientation is selected automatically depending on the horizontal and vertical sizes

of a dashboard.

- **Size** - Specifies the standard paper size (for instance, *Letter* or *A4*).
- **Show Title** - Specifies whether or not to apply the dashboard title to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Scale Mode** - Specifies the mode for scaling when exporting a dashboard.

**i NOTE**

Note that this option is in effect when **Page Layout** is set to a value different from *Auto*.

- **Scale Factor** - Specifies the scale factor (in fractions of 1) by which a dashboard is scaled.

**i NOTE**

This option is in effect if **Scale Mode** is set to *Use Scale Factor*.

- **Auto Fit Page Count** - Specifies the number of horizontal/vertical pages spanning the total width/height of a dashboard.

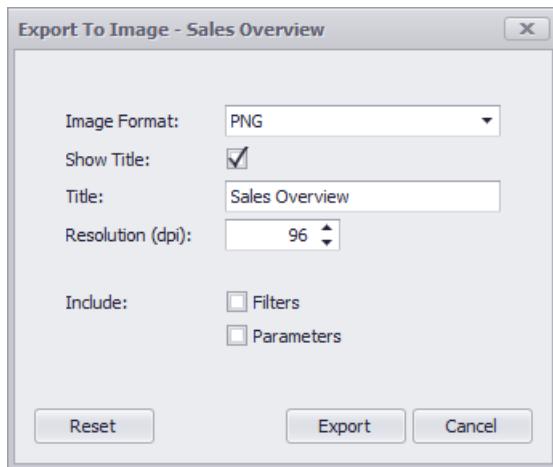
**i NOTE**

This option is in effect if **Scale Mode** is set to *Auto Fit to Page Width*.

- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

## Export to Image

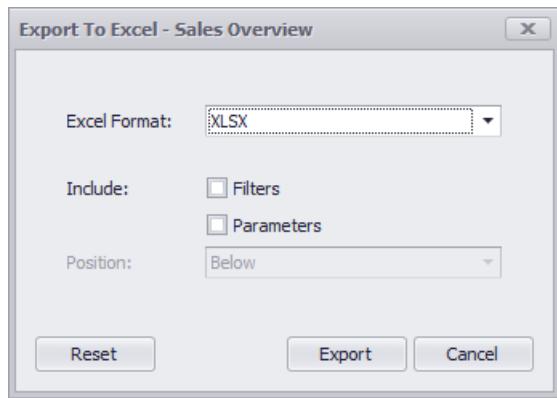
Invokes a corresponding dialog that allows you to export a dashboard to an image in the specified format. The following options are available:



- **Image Format** - Specifies the image format in which the dashboard is exported. The following formats are available: *PNG*, *JPEG*, and *GIF*.
- **Show Title** - Specifies whether or not to apply the dashboard title to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export a dashboard.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.

## Export to Excel

Invokes a corresponding dialog that allows you to export dashboard's data to the Excel file. The following options are available:

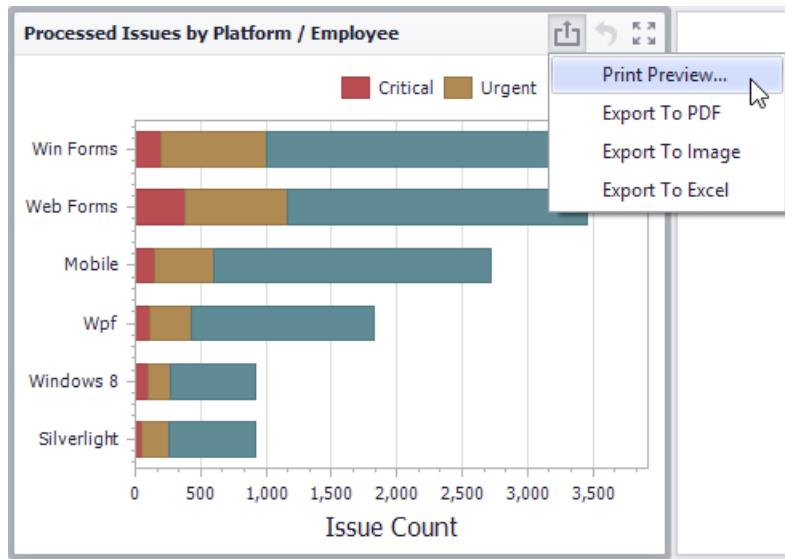


- **Excel Format** - Specifies the Excel workbook format in which the dashboard's data is exported. You can select between *XLSX* and *XLS*.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Sheet*.

Specify the required options in the invoked dialog and click the **Export** button to export the dashboard. To reset changes to the default values, click the **Reset** button.

## Printing and Exporting Dashboard Items

To print or export a dashboard item, click the button in its [caption](#) and choose the required action.



- **Print Preview...** - Allows you to customize the document before printing/exporting.
- **Export to PDF** - Invokes a corresponding dialog that allows you to export a dashboard to a PDF file with specific options.
- **Export to Image** - Invokes a corresponding dialog that allows you to export a dashboard to image in the specified format.
- **Export to Excel** - Invokes a corresponding dialog that allows you to export a dashboard item's data to the Excel workbook or CSV file.

To learn more about printing/exporting specifics of different dashboard items, see the **Printing and Exporting** topic for the required [dashboard item](#).

# Dashboard Items

The **DevExpress Dashboard** provides a number of visualization elements (**dashboard items**) designed to effectively present visual or textual information in a dashboard.

This section describes the available dashboard items.

- [Chart](#)
- [Scatter Chart](#)
- [Grid](#)
- [Pies](#)
- [Cards](#)
- [Gauges](#)
- [Pivot](#)
- [Date Filter](#)
- [Choropleth Map](#)
- [Geo Point Maps](#)
- [Range Filter](#)
- [Image](#)
- [Text Box](#)
- [Treemap](#)
- [Filter Elements](#)

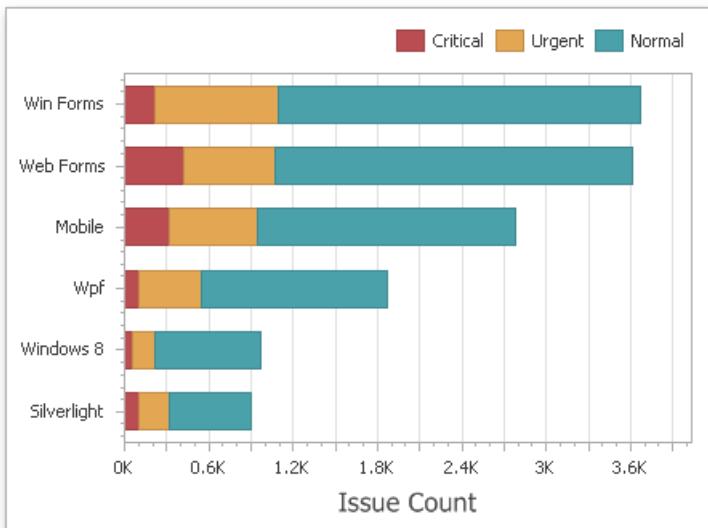
# Chart

The topics in this section describe the **Chart** dashboard item, which visualizes data in XY-diagrams of different kinds - from line and bar charts to candle stick and bubble charts.

- [Data Presentation Basics](#)
- [Interactivity](#)
- [Printing and Exporting](#)

# Data Presentation Basics

The **Chart** dashboard item presents data visually using different types of series.



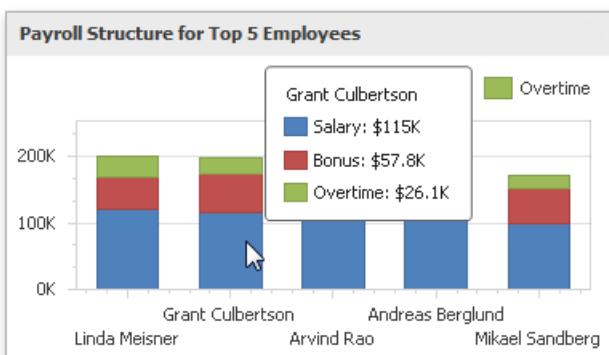
A series represents a grouping of related data points. The most important characteristic of a series is its type, which determines a particular visual representation of data.

The Chart dashboard item includes the following series types.

- A **Bar** series displays data as sets of rectangular bars with lengths proportional to the values that they represent.
- **Point** and **Line** series display data as standalone points or points joined by a line.
- An **Area** series displays data by a line that joins points, and the shaded area between the line and the argument axis.
- A **Range** series is the area between two simple series displayed as a shaded area, or bars that stretch from a point in one series to the corresponding point in another series.
- A **Weighted** series displays data using a third dimension, expressed by a bubble's size.
- **Financial** series are useful in analyzing stock and bond prices, as well as the behavior of commodities.

## Tooltip

The Chart dashboard item can display a tooltip that shows information on a hovered series point.



# Interactivity

This topic describes features that enable interaction between the **Chart** and other dashboard items. These features include **Master Filtering** and **Drill-Down**.

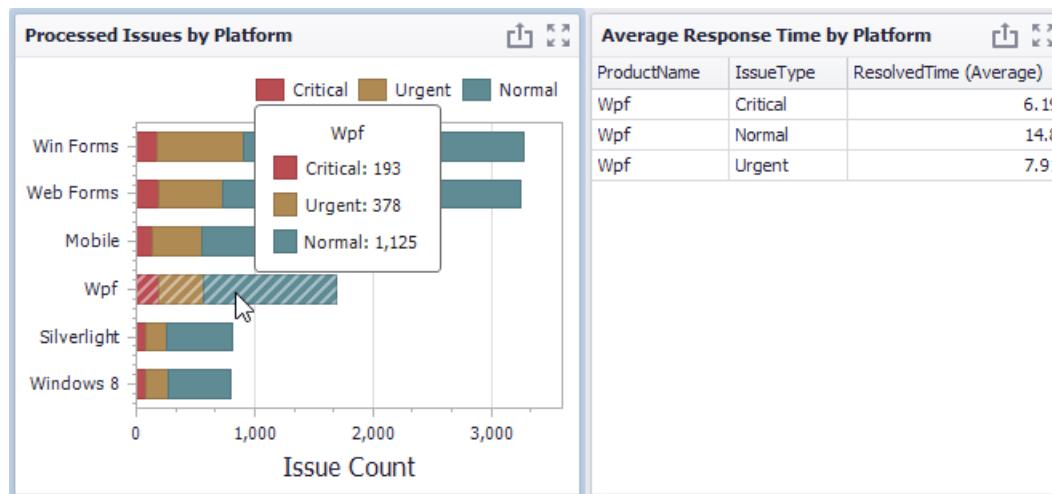
## Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

The Chart dashboard item supports filtering by **argument** or **series** values.

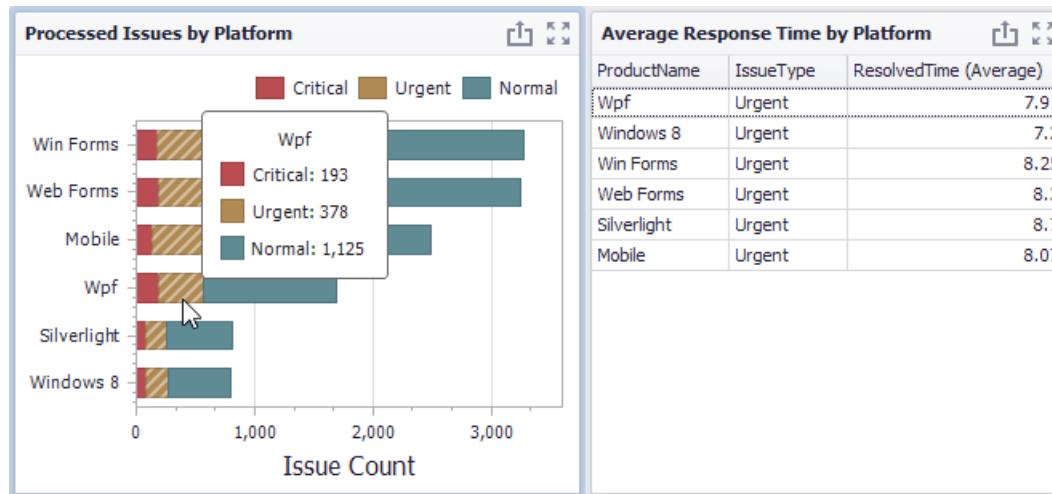
- **Filtering by Arguments**

When filtering by arguments is enabled, you can click series points to make other dashboard items display only data related to selected argument values.



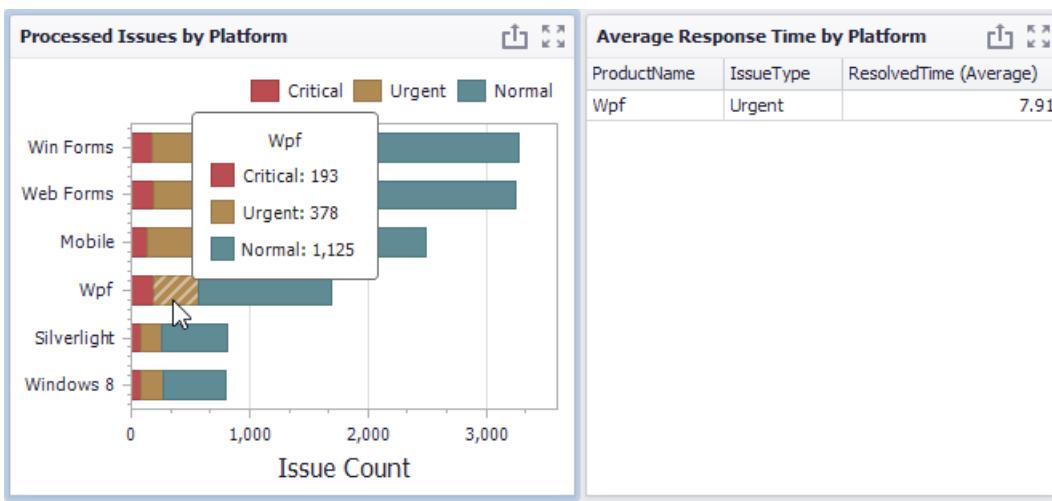
- **Filtering by Series**

When filtering by series is enabled, you can click a series point to make other dashboard items display only data related to the selected series.

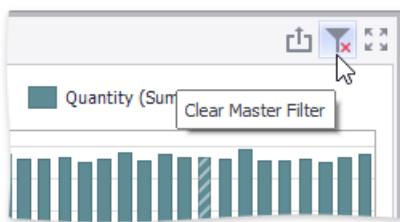


- **Filtering by Points**

When filtering by points is enabled, you can click a individual point to make other dashboard items display only data related to the selected point.



To reset filtering, use the **Clear Master Filter** button in the Chart's [caption](#), or corresponding command in the Chart's context menu.



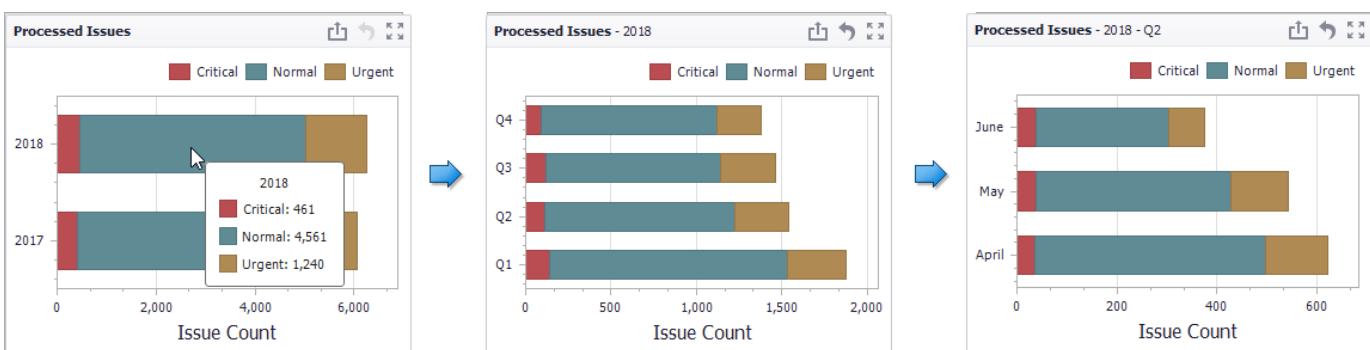
## Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more, see [Drill-Down](#).

The Chart dashboard item supports drill-down on argument or series values.

- **Drill Down on Arguments**

When drill-down on arguments is enabled, you can click a series point to view a detail chart for the corresponding argument value.

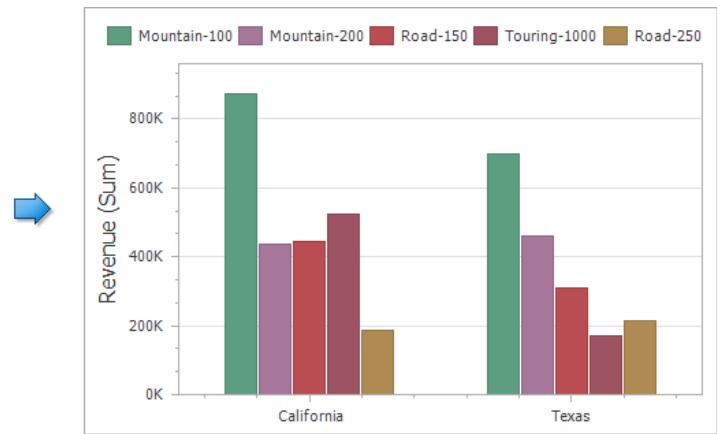
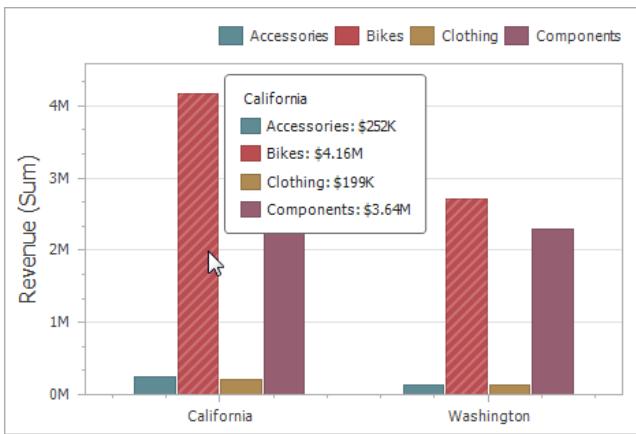


**NOTE**

When **Filtering by Arguments** is enabled, you can view the details by double-clicking a series point.

- **Drill-Down on a Series**

When drill-down on a series is enabled, you can click a series point (or corresponding legend item) to view a detail chart for the corresponding series.



#### **i NOTE**

When **Filtering by Series** is enabled, you can view the details by double-clicking a series point.

To return to the previous detail level (drill up), use the **Drill Up** button within the Chart [caption](#) area, or the corresponding command in the Chart's context menu.



# Printing and Exporting

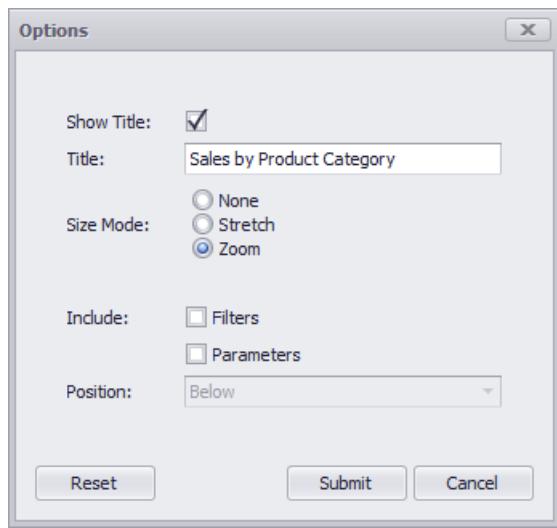
Dashboard allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes printing/exporting specifics for the **Chart** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)
- [Export To Excel](#)

## Printing

If you are printing the Chart dashboard item using the [Print Preview](#), you can customize the following options (via the **Options** button) before printing.

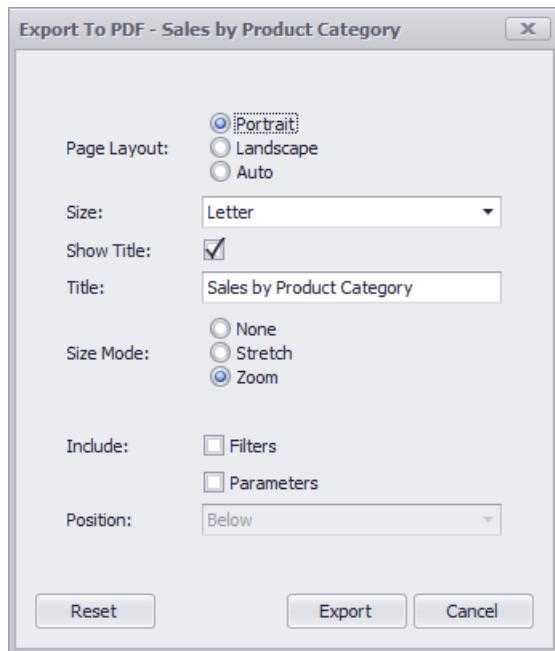


- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Size Mode** - Allows you to specify the print size mode for the Chart dashboard item.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

## Export To PDF

The following options are available when exporting the Chart dashboard item to a PDF.

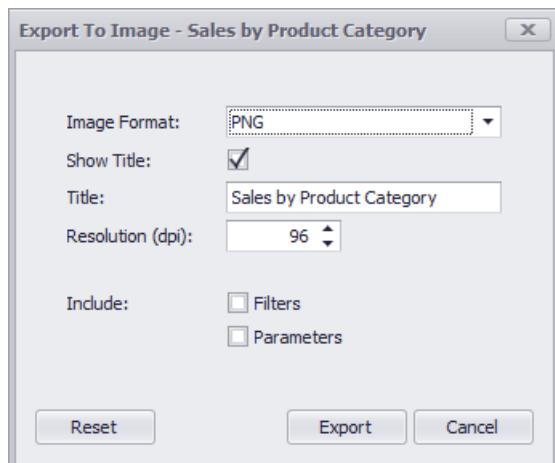


- **Page Layout** - Specifies the page orientation used to export a Chart dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the dashboard item caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Size Mode** - Specifies the export size mode for the Chart dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Chart dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:



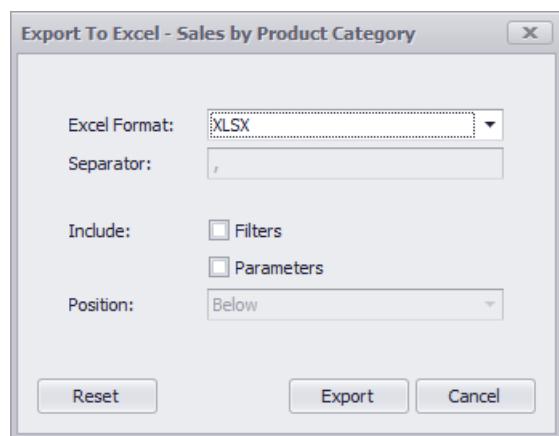
- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies of the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.

- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Excel

Data visualized within all data-bound dashboard items can be exported to the required Excel format. The following options are available:



- **Excel Format** - Specifies the Excel format in which the dashboard item is exported. You can use the XLSX, XLS or CSV formats.
- **Separator** - Specifies the string used to separate values in the exported CSV document.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select from *Below* and *Separate Sheet*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

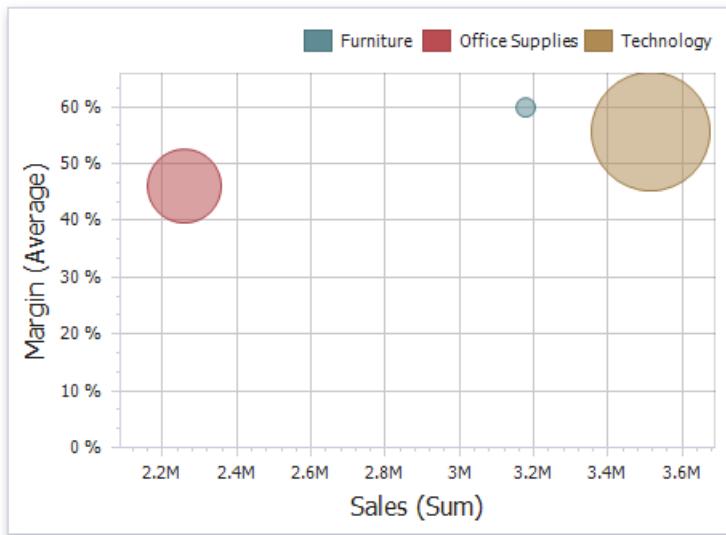
# Scatter Chart

The topics in this section describe the **Scatter Chart** dashboard item, which visualizes summaries using numerical X/Y-axes and the size of data points.

- [Data Presentation Basics](#)
- [Interactivity](#)
- [Printing and Exporting](#)

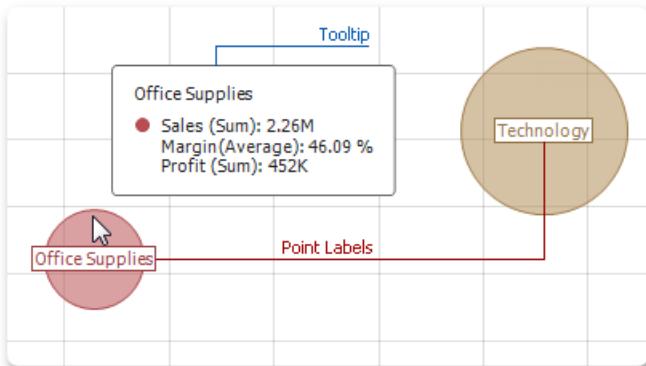
# Data Presentation Basics

The **Scatter Chart** dashboard item visualizes summaries using three dimensions: the X-axis, the Y-axis and the size of data points.



## Point Labels and Tooltips

The Scatter Chart dashboard item can display point labels and tooltips that show information on data points. To see a tooltip, hover over the required point.



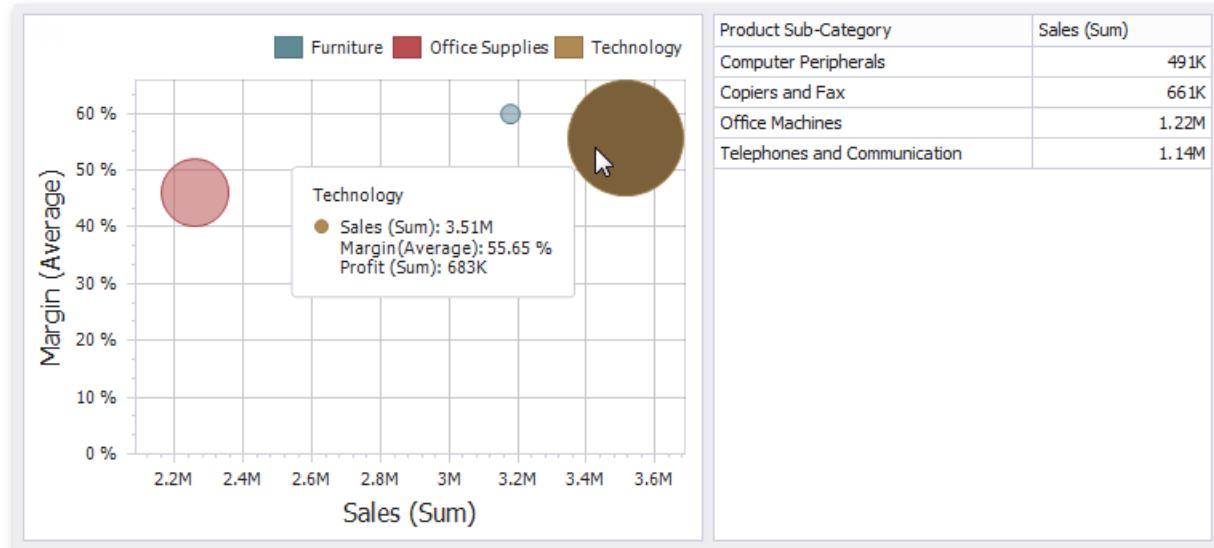
# Interactivity

This topic describes features that enable interaction between the **Scatter Chart** and other dashboard items. These features include **Master Filtering** and **Drill-Down**.

## Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

When Master Filtering is enabled, you can click a point (or multiple points by holding down the **CTRL** key) to make other dashboard items only display data related to the selected point(s).

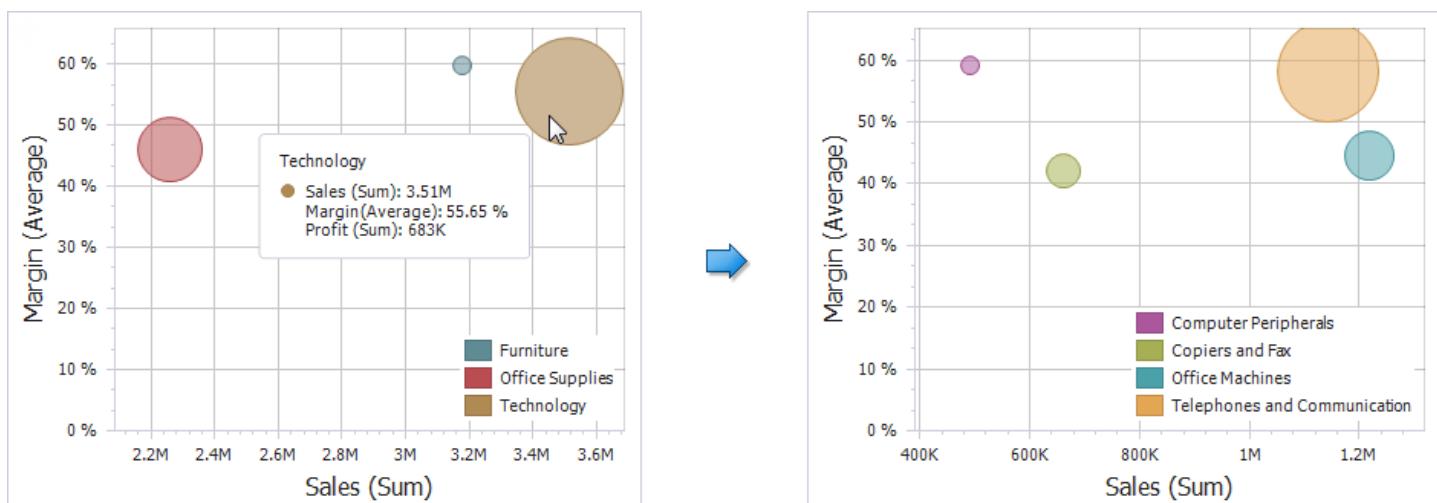


To reset filtering, use the **Clear Master Filter** button (the icon) in the Chart's [caption](#) area, or the **Clear Master Filter** command in the Chart's context menu.

## Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more, see [Drill-Down](#).

When drill-down is enabled, you can click a point to view the details.



### NOTE

When **Master Filtering** is enabled, you can view the details by double-clicking a point.

To return to the previous detail level (drill up), use the **Drill Up** button (the  icon) within the Chart's [caption](#) area or the **Drill Up** command in the Chart's context menu.

# Printing and Exporting

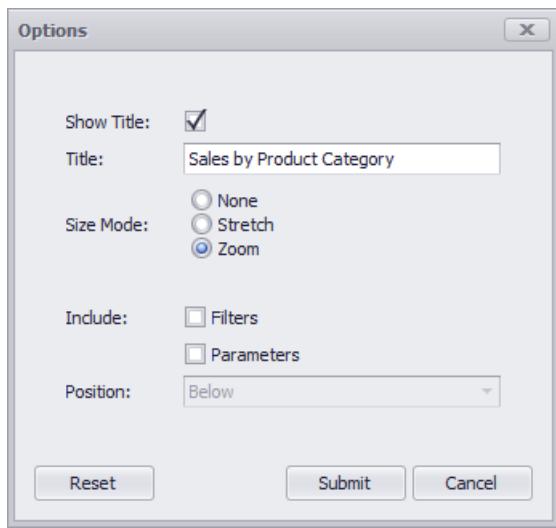
The Dashboard allows you to print/export individual dashboard items, or the entire dashboard. See the [Printing and Exporting](#) topic to learn more about printing concepts common to all dashboard items.

This topic describes printing/exporting specifics for the **Scatter Chart** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)
- [Export To Excel](#)

## Printing

You can customize the following options (via the **Options** button) before printing the Scatter Chart dashboard item using the [Print Preview](#):

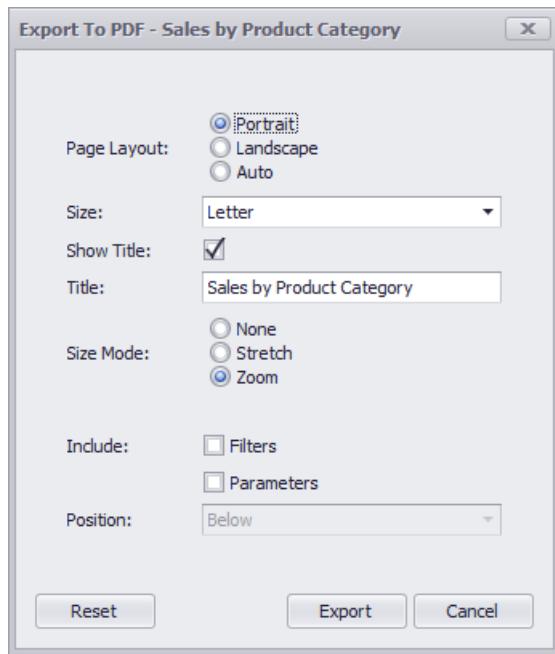


- **Show Title** - Specifies whether to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the printed document title.
- **Size Mode** - Allows you to specify the Scatter Chart dashboard item's print size mode.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the master filter and parameter values' position in the printed document. You can select from *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. Click the **Reset** button to reset changes to the default values.

## Export To PDF

The following options are available when exporting the Chart dashboard item to a PDF:

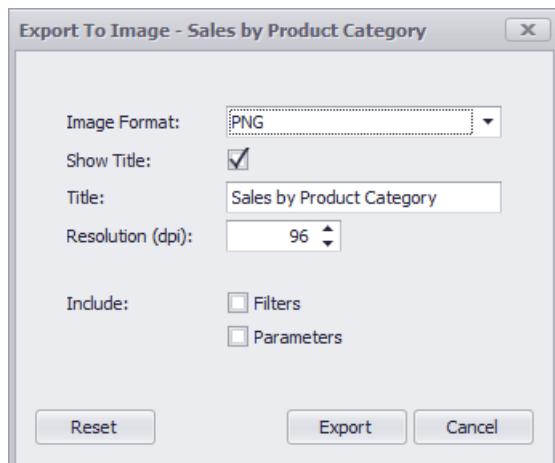


- **Page Layout** - Specifies the page orientation used when exporting a Scatter Chart dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies the exported document's title.
- **Size Mode** - Specifies the Scatter Chart dashboard item's export size mode.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select from *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Scatter Chart dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Image

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:



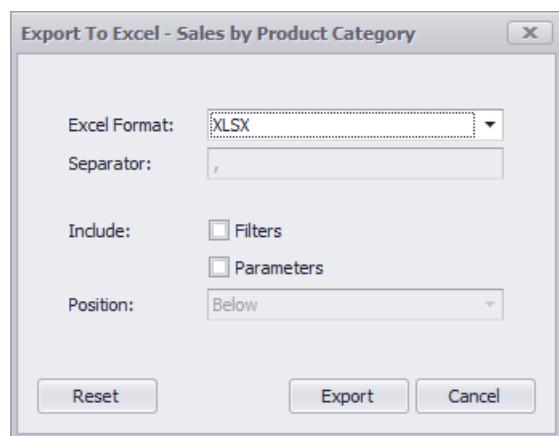
- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies of the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.

- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Excel

Data visualized within all data-bound dashboard items can be exported to the required Excel format. The following options are available:



- **Excel Format** - Specifies the Excel format in which the dashboard item is exported. You can use the XLSX, XLS or CSV formats.
- **Separator** - Specifies the string used to separate values in the exported CSV document.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select from *Below* and *Separate Sheet*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

# Grid

The topics in this section describe the **Grid** dashboard item, which displays data in a two-dimensional table.

- [Data Presentation Basics](#)
- [Interactivity](#)
- [Printing and Exporting](#)

# Data Presentation Basics

The **Grid** displays data in a two-dimensional table that supports four types of columns.

Dimension column	Hyperlink column	Measure column	Delta column	Sparkline column
State	State	Sales	Sales vs Target	Sales (Sum)
Indiana	<a href="#">Indiana</a>	\$296M	+0.80 % <span style="color: green;">▲</span>	
California	<a href="#">California</a>	\$271M	-0.20 % <span style="color: grey;">▼</span>	
Michigan	<a href="#">Michigan</a>	\$245M	-3.68 % <span style="color: red;">▼</span>	
New York	<a href="#">New York</a>	\$227M	+6.35 % <span style="color: green;">▲</span>	

- The **dimension column** displays values from the bound data item "as is".
- The **measure column** displays summaries calculated from data in the bound data item.
- The **delta column**, bound to two measures, calculates summaries for both measures, and displays the difference between these summaries.
- The **sparkline column** visualizes the variation of summary values over time.

## Sort Grid Rows

To sort records by a column's values and replace existing sort conditions that are applied to the current or other columns, click the target column's header until an *Up* or *Down* arrow icon is displayed within the header. The *Up* and *Down* arrows indicate ascending and descending sort orders, respectively.

Sales by State	
State	Sales
Colorado	\$137M
Ohio	\$137M
Indiana	\$132M
Wisconsin	\$131M
Minnesota	\$126M

To sort records by a column's values while preserving existing sort conditions, click a column header while holding the **SHIFT** key until an *Up* or *Down* arrow icon is displayed within the header.

Product Sales YTD	
Category	Product
Accessories	Cable Lock
Accessories	Bike Wash
Accessories	All-Purpose Bike Stand
Bikes	Touring-3000
Bikes	Touring-2000
Bikes	Touring-1000

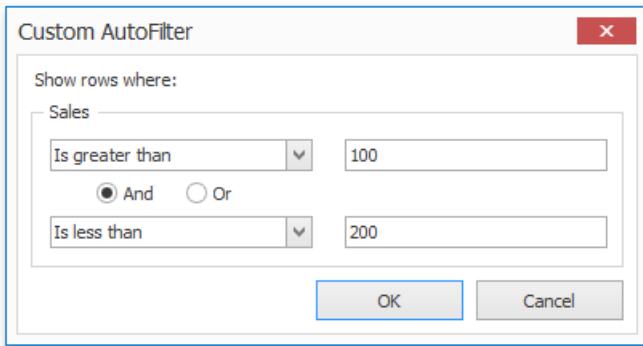
To remove sorting by a column, click a column header while holding down the **CTRL** key.

## Filter Grid Data

To filter grid data, click the filter button (the  icon) and select the required filter value in the invoked filter dropdown list.

Sales by State	
State	Sales
Alabama	(Custom)
Arizona	Alabama
California	Arizona
Colorado	California
Connecticut	Colorado
Florida	Connecticut
Georgia	Florida

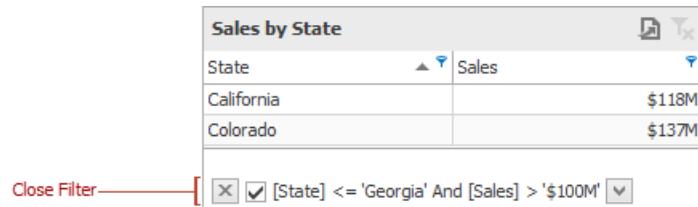
Click **Custom** to construct filter criteria involving up to two conditions. This will invoke the **Custom AutoFilter** dialog, allowing you to compare a column with one or two values.



To clear the filter applied to a specific column, invoke the filter dropdown list and click **All**.

Sales by State	
State	Sales
California	(All)
Colorado	(Custom)
Alabama	California
Arizona	Colorado

To clear all filter criteria, click the **Close Filter** button within the Filter Panel.



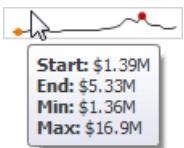
## ToolTips

A Grid dashboard item can display a tooltip when the mouse pointer is hovered over the bar in the measure column.



The tooltip shows the value in the measure column as text.

When the mouse pointer is hovered over the cell in the sparkline column, the tooltip can display start/end values and minimum/maximum values.



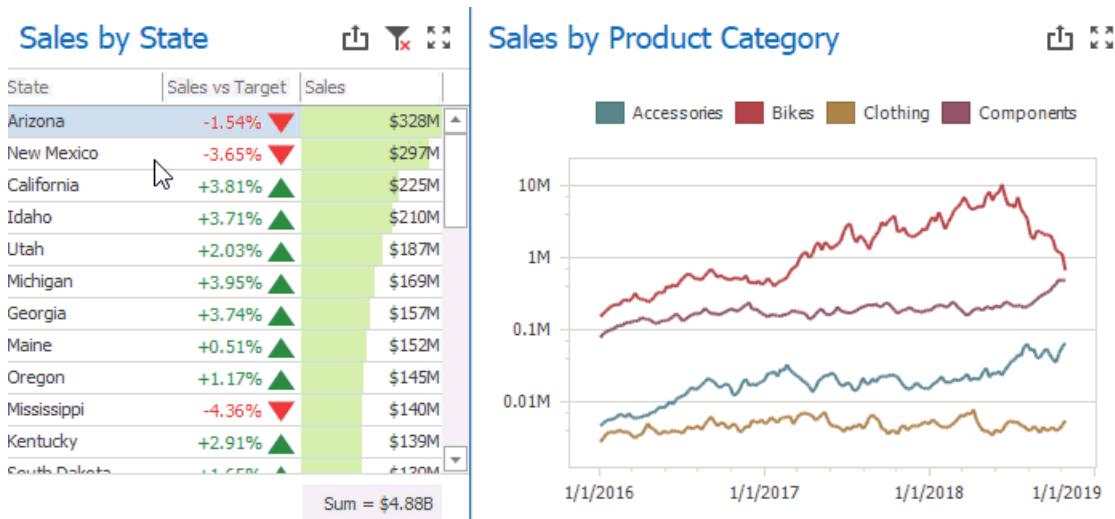
# Interactivity

This topic describes features that enable interaction between the **Grid** and other dashboard items. These features include **Master Filtering** and **Drill-Down**.

## Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

When Master Filtering is enabled, you can click a grid row (or multiple rows by holding down the **CTRL** key) to make other dashboard items only display data related to the selected record(s).



To reset filtering, use the **Clear Master Filter** button (the icon) in the Grid's [caption](#) area, or the **Clear Master Filter** command in the Grid's context menu.

## Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more, see [Drill-Down](#).

The Grid dashboard item supports drill-down for rows.

When drill-down is enabled, you can click a grid row to view the details.



### NOTE

When **Master Filtering** is enabled, you can view the details by double-clicking a grid row.

To return to the previous detail level (drill up), use the **Drill Up** button (the  icon) within the Grid's [caption](#) area, or the **Drill Up** command in the Grid's context menu.

# Printing and Exporting

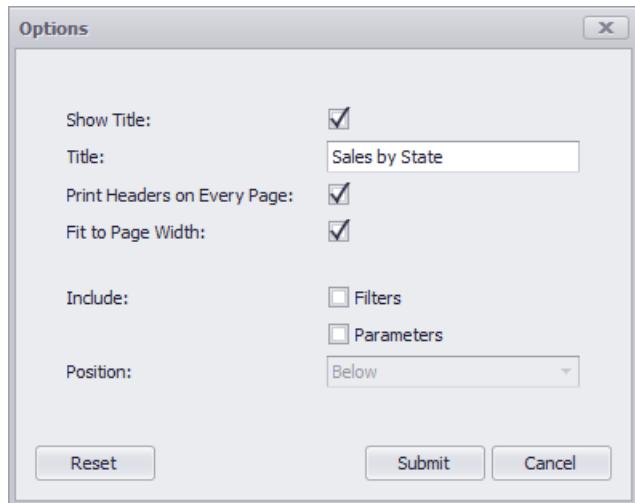
**Dashboard** allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes the specifics of printing/exporting a **Grid** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)
- [Export To Excel](#)

## Printing

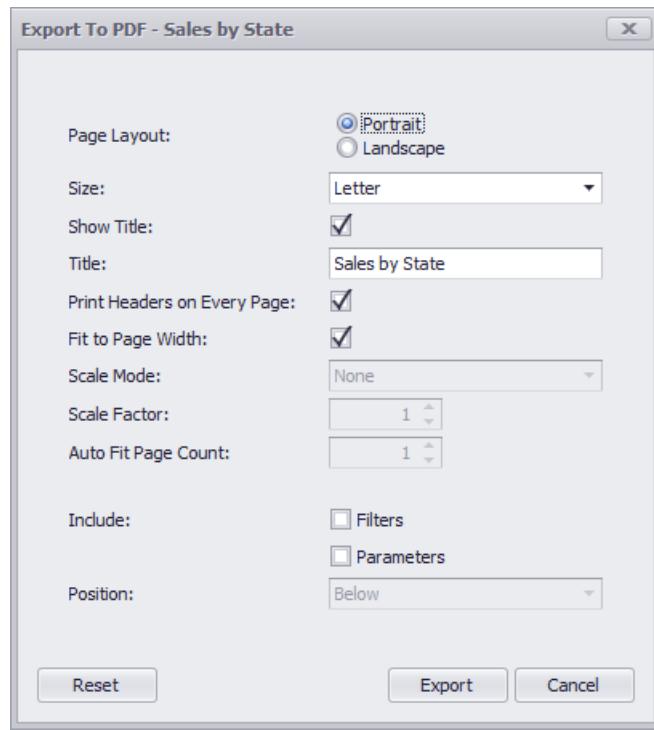
If you are printing the Grid dashboard item using the [Print Preview](#), you can customize the following options (via the **Options** button) before printing.



- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Print Headers on Every Page** - Specifies whether to print column headers of the Grid dashboard item on every page.
- **Fit to Page Width** - Specifies whether the size of the grid dashboard item is changed according to the width of the exported page.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

## Export To PDF

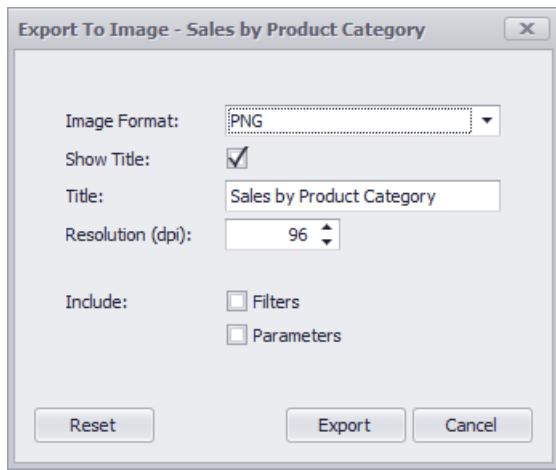


- **Page Layout** - Specifies the page orientation used to export a dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the dashboard item caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Print Headers on Every Page** - Specifies whether to print column headers of the Grid dashboard item on every page.
- **Fit to Page Width** - Specifies whether the size of the grid is changed according to the width of the exported page.
- **Scale Mode** - Specifies the mode for scaling when exporting a dashboard item.
- **Scale Factor** - Specifies the scale factor (in fractions of 1) by which a dashboard item is scaled.
- **Auto Fit Page Count** - Specifies the number of horizontal/vertical pages spanning the total width/height of a dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Grid dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:

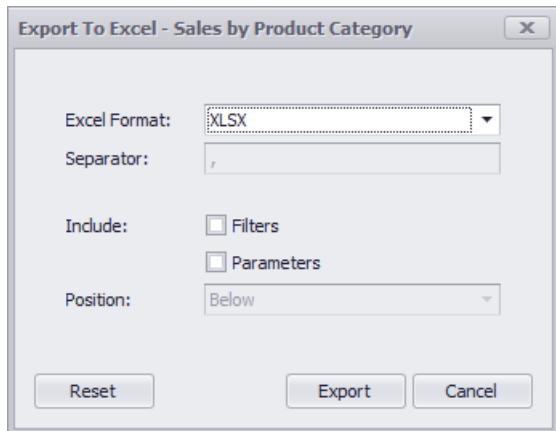


- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Excel

Data visualized within all data-bound dashboard items can be exported to the required Excel format. The following options are available:



- **Excel Format** - Specifies the Excel format in which the dashboard item is exported. You can use the XLSX, XLS or CSV formats.
- **Separator** - Specifies the string used to separate values in the exported CSV document.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select from *Below* and *Separate Sheet*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

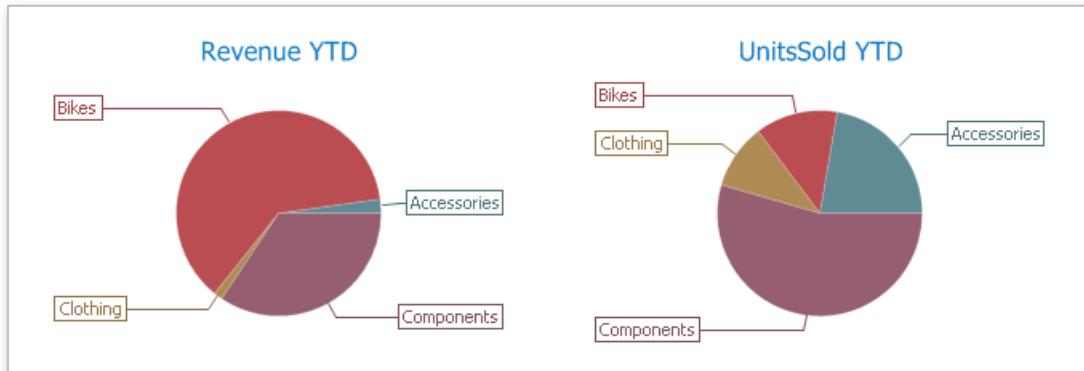
# Pies

The topics in this section describe the **Pie** dashboard item, which displays a series of pies or donuts that represent the contribution of each value to a total.

- [Data Presentation Basics](#)
- [Interactivity](#)
- [Printing and Exporting](#)

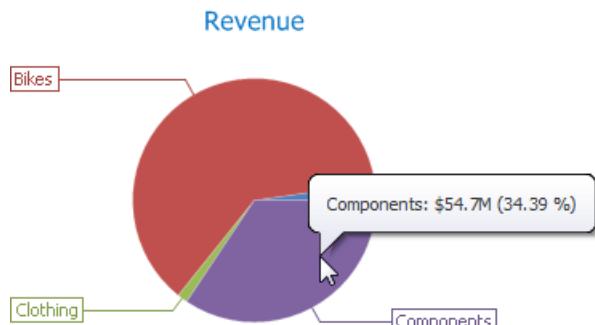
# Data Presentation Basics

The **Pie** dashboard item displays a series of pies or donuts that represent the contribution of each value to a total.



## Tooltip

A Pie dashboard item can display a tooltip that shows information about the hovered pie segment.



# Interactivity

This topic describes features that enable interaction between the **Pie** and other dashboard items. These features include **Master Filtering** and **Drill-Down**.

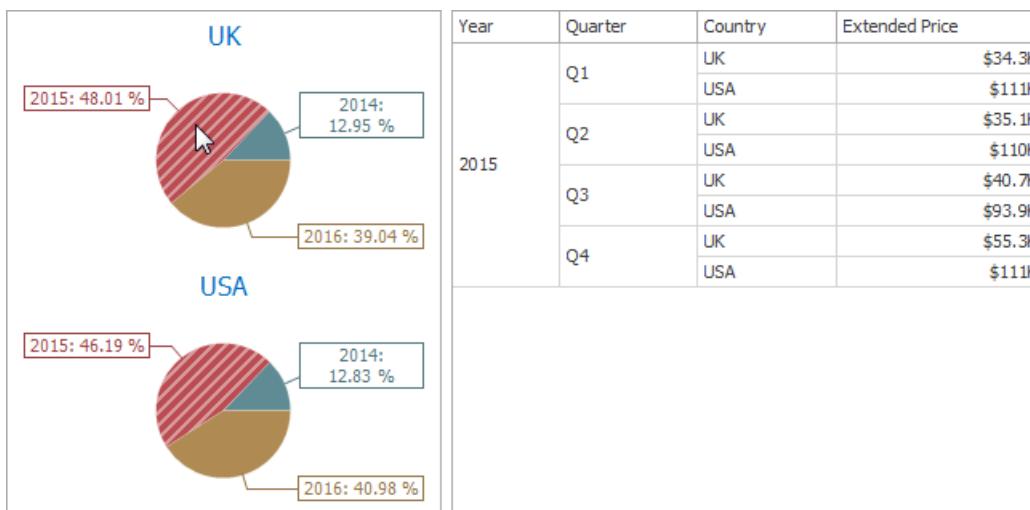
## Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

The Pie dashboard item supports filtering by **argument** or **series** values.

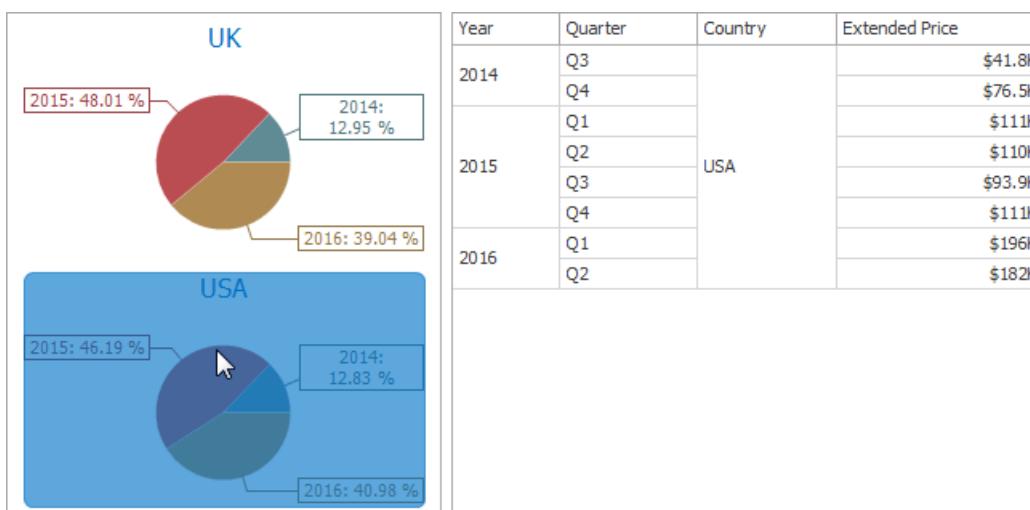
- **Filtering by Arguments**

When filtering by arguments is enabled, you can click a pie segment to make other dashboard items only display data related to the selected argument value.



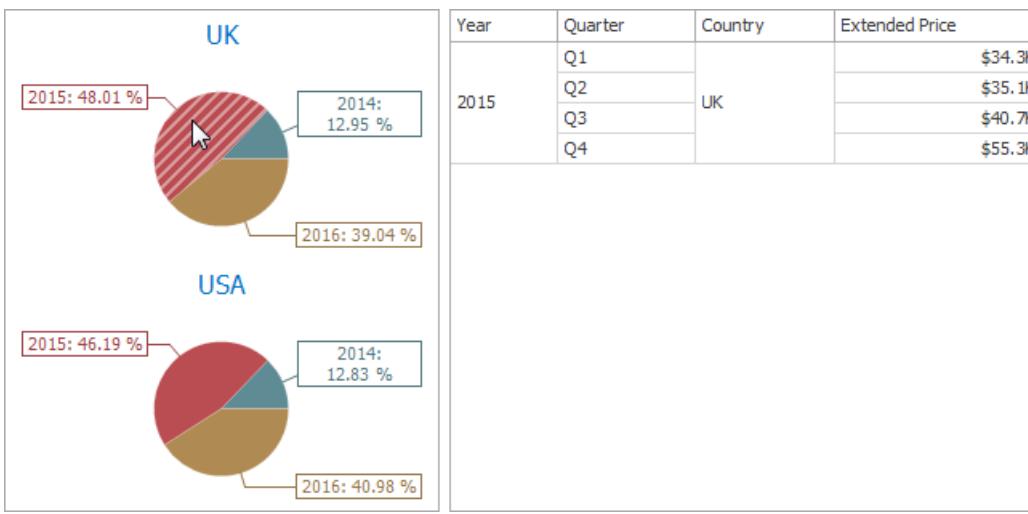
- **Filtering by a Series**

When filtering by a series is enabled, you can click a pie to make other dashboard items display only data related to the selected pie.



- **Filtering by a Points**

When filtering by points is enabled, an you can click a single pie segment to make other dashboard items display only data related to the selected segment.



To reset filtering, use the **Clear Master Filter** button (the icon) in the [caption](#) area of the Pie dashboard item, or the **Clear Master Filter** command in the context menu.

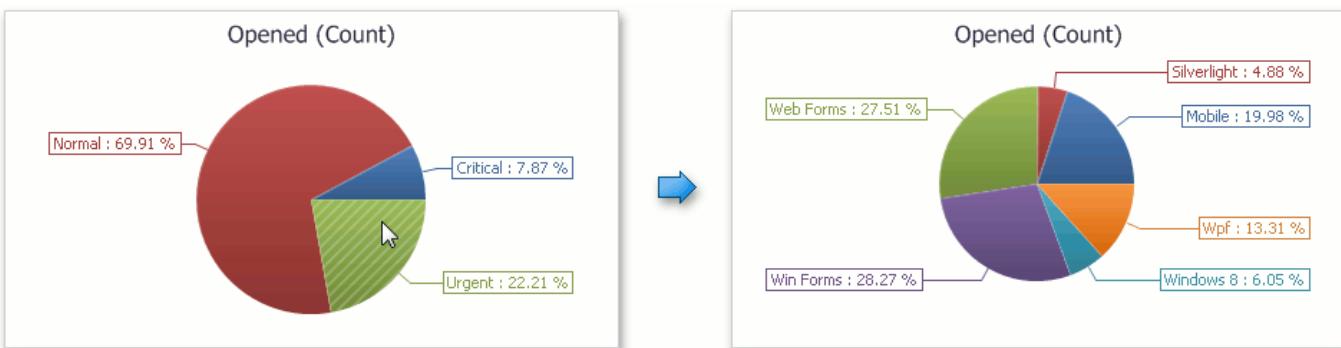
## Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more, see [Drill-Down](#).

The Pie dashboard item supports drill-down on argument or series values.

- **Drill Down on Arguments**

When drill-down on arguments is enabled, you can click a pie segment to view a detail diagram for the corresponding argument value.

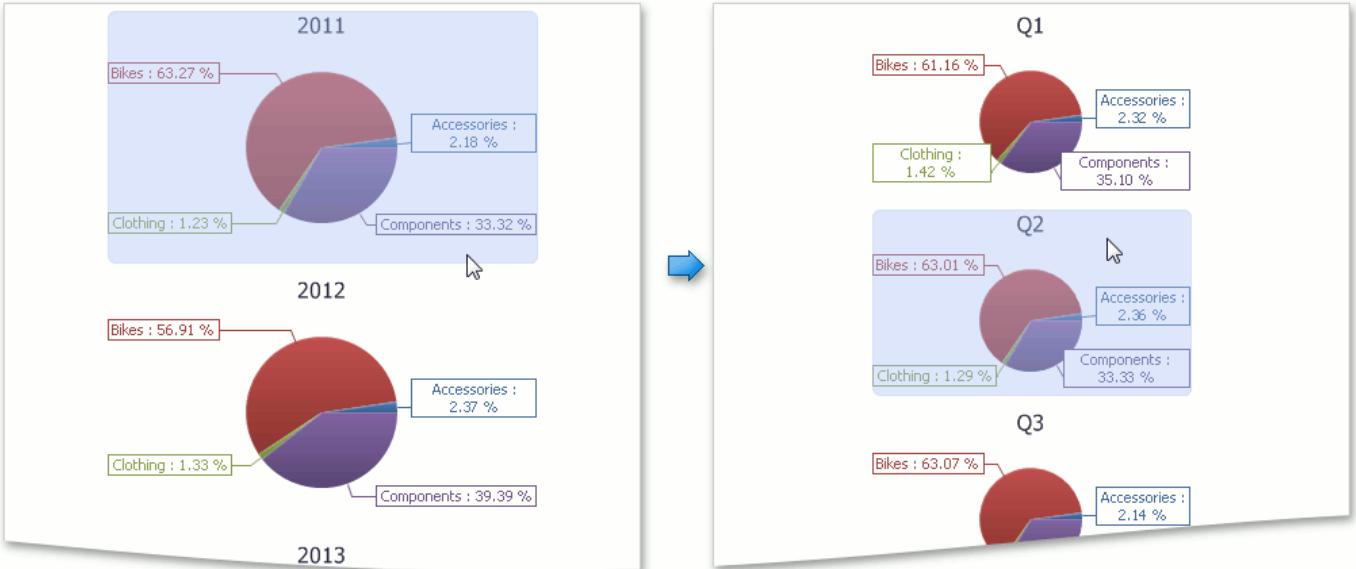


**NOTE**

When **Filtering by Arguments** is enabled, you can view the details by double-clicking a pie segment.

- **Drill-Down on a Series**

When drill-down on a series is enabled, you can click a pie chart to view a detail diagram for the corresponding series value.



#### **i NOTE**

When **Filtering by Series** is enabled, you can view the details by double-clicking a pie chart.

To return to the previous detail level (drill-up), use the **Drill Up** button (the ↕ icon) in the **caption** area of the Pie dashboard item, or the **Drill Up** command in the context menu.

# Printing and Exporting

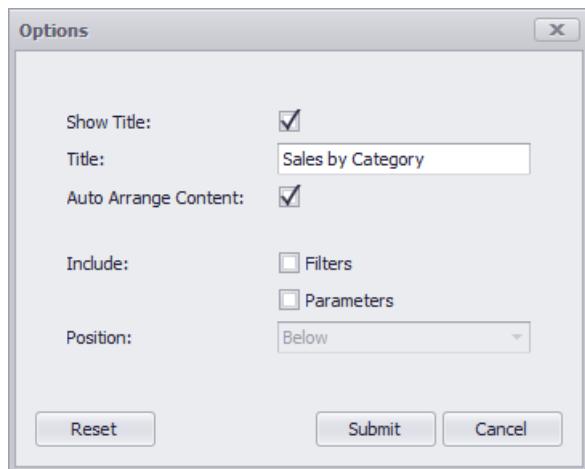
**Dashboard** allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes the specifics of printing/exporting a **Pie** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)
- [Export To Excel](#)

## Printing

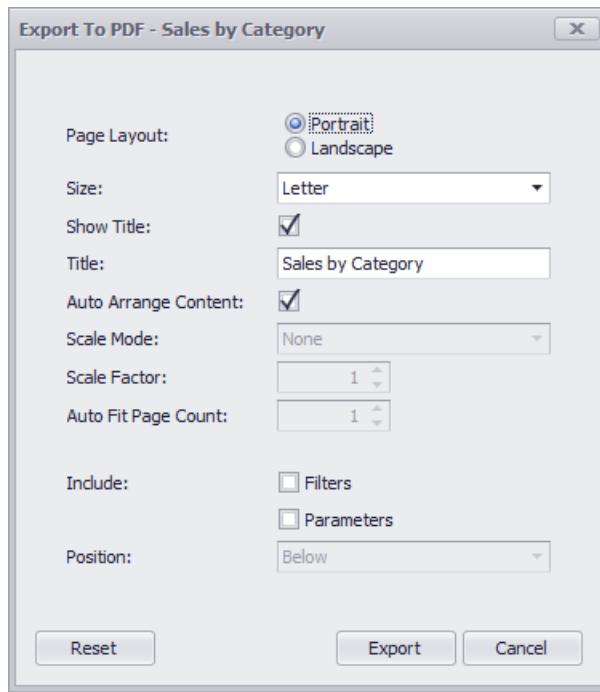
If you are printing the Pie dashboard item using the [Print Preview](#), you can customize the following options (via the **Options** button) before printing.



- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Auto Arrange Content** - Specifies whether pies are arranged automatically on the printed document.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

## Export To PDF

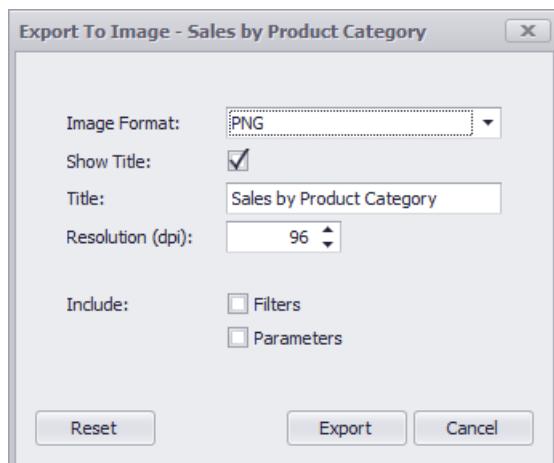


- **Page Layout** - Specifies the page orientation used to export a dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the dashboard item caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Auto Arrange Content** - Specifies whether pies are arranged automatically in the exported document.
- **Scale Mode** - Specifies the mode for scaling when exporting a dashboard item.
- **Scale Factor** - Specifies the scale factor (in fractions of 1) by which a dashboard item is scaled.
- **Auto Fit Page Count** - Specifies the number of horizontal/vertical pages spanning the total width/height of a dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Pie dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:

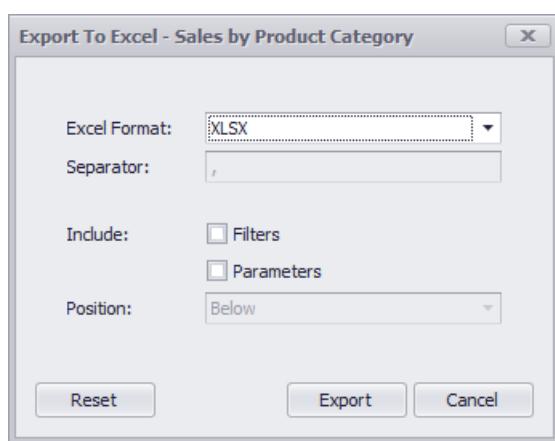


- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies of the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Excel

Data visualized within all data-bound dashboard items can be exported to the required Excel format. The following options are available:



- **Excel Format** - Specifies the Excel format in which the dashboard item is exported. You can use the XLSX, XLS or CSV formats.
- **Separator** - Specifies the string used to separate values in the exported CSV document.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select from *Below* and *Separate Sheet*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

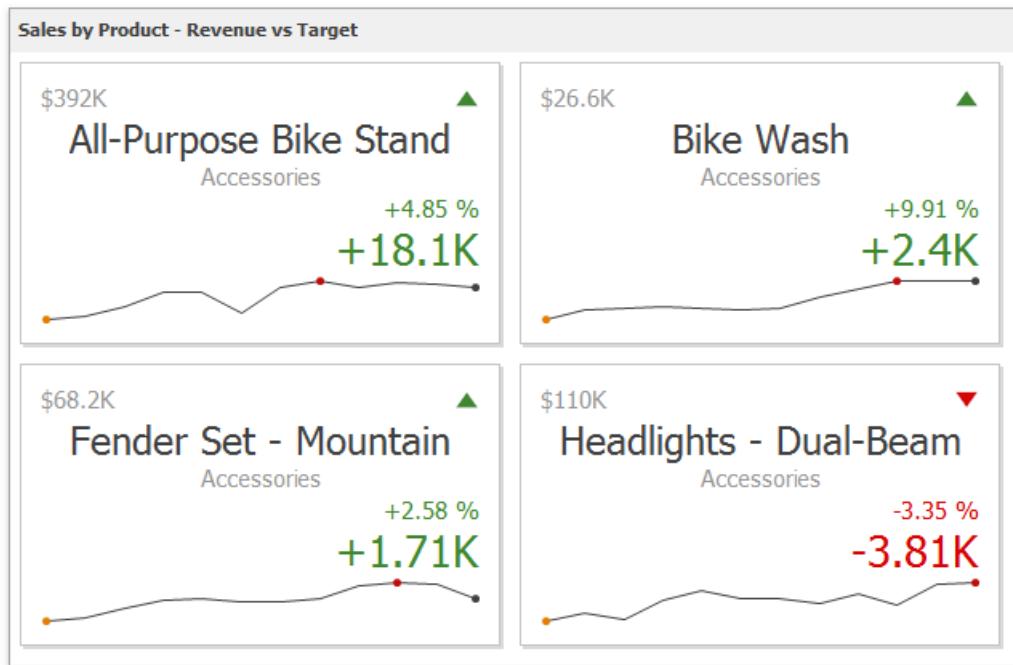
# Cards

The topics in this section describe the **Card** dashboard item, which displays a series of cards. Each card can display a single value, or show the difference between two values.

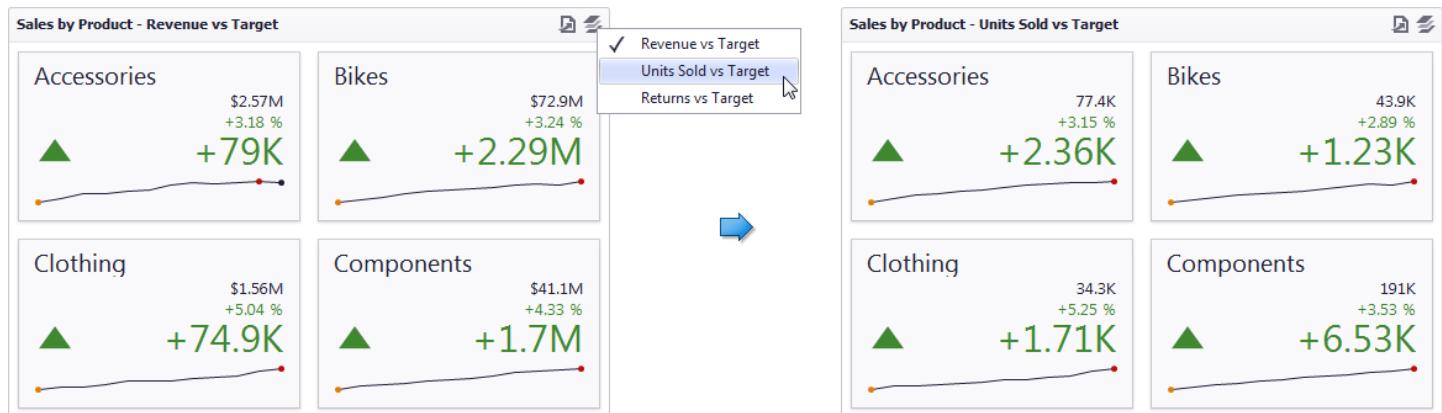
- [Data Presentation Basics](#)
- [Interactivity](#)
- [Printing and Exporting](#)

# Data Presentation Basics

The **Card** dashboard item displays a series of cards. Each card illustrates the difference between two values. This difference can be expressed as an absolute value, an absolute variation or a percentage variation.

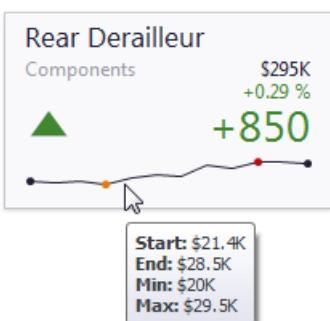


The **Card** dashboard item can illustrate this difference for various sets of values. You can switch between these sets using the **Values** button (the icon) in the dashboard item **caption** area or in the context menu.



## Tooltip

A **Card** dashboard item can display a tooltip for cards containing a sparkline. When the mouse pointer is hovered over the sparkline, the tooltip can display start/end values and minimum/maximum values.



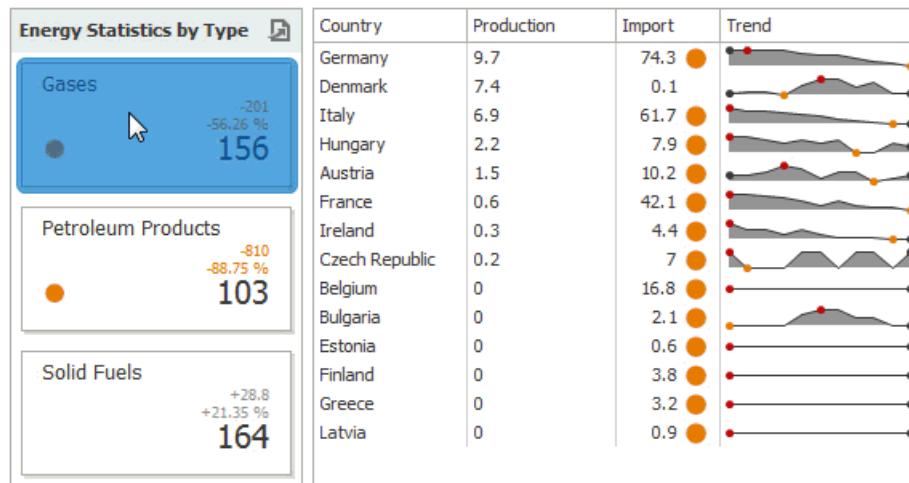
# Interactivity

This topic describes features that enable interaction between the **Card** and other dashboard items. These features include **Master Filtering** and **Drill-Down**.

## Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more, see the [Master Filtering](#) topic, which describes filtering concepts common to all dashboard items.

When Master Filtering is enabled, you can click a card (or multiple cards by holding down the **CTRL** key) to make other dashboard items only display data related to the selected card(s).



To reset filtering, use the **Clear Master Filter** button (the icon) in the [caption](#) area of the **Card** dashboard item, or the **Clear Master Filter** command in the context menu.

## Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more, see [Drill-Down](#).

When drill-down is enabled, you can click a card to view the details.



### NOTE

When **Master Filtering** is enabled, you can view the details by double-clicking a card.

To return to the previous detail level (drill up), use the **Drill Up** button (the icon) in the [caption](#) area of the **Card** dashboard item, or the **Drill Up** command in the context menu.

# Printing and Exporting

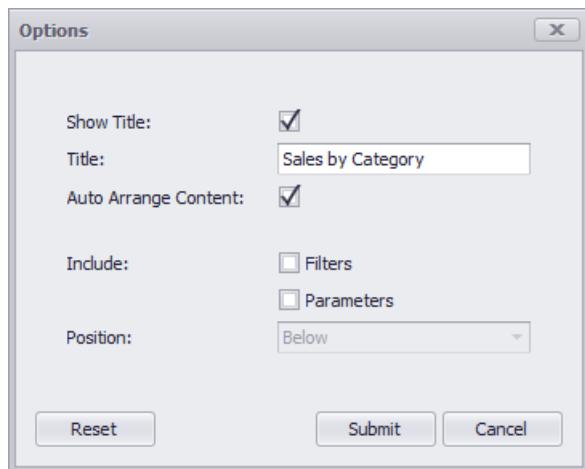
**Dashboard** allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes the specifics of printing/exporting a **Card** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)
- [Export To Excel](#)

## Printing

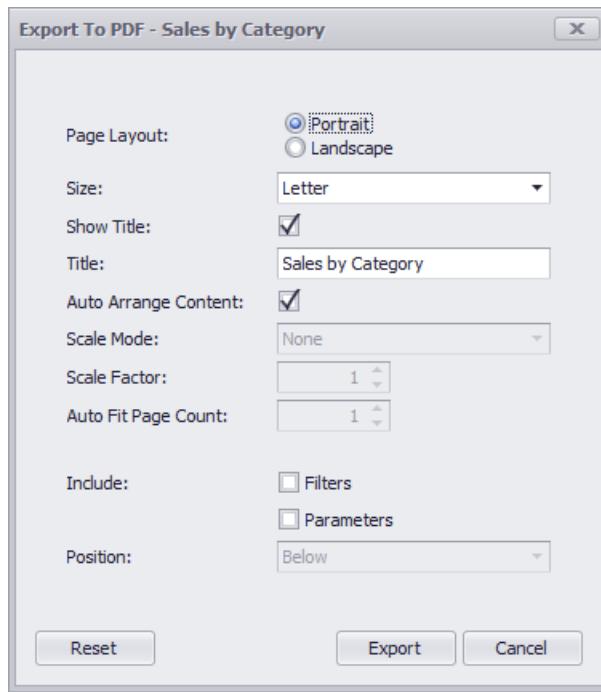
If you are printing the Card dashboard item using a [Print Preview](#), you can customize the following options (via the **Options** button) before printing.



- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Auto Arrange Content** - Specifies whether or not cards are arranged automatically on the printed document.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

## Export To PDF

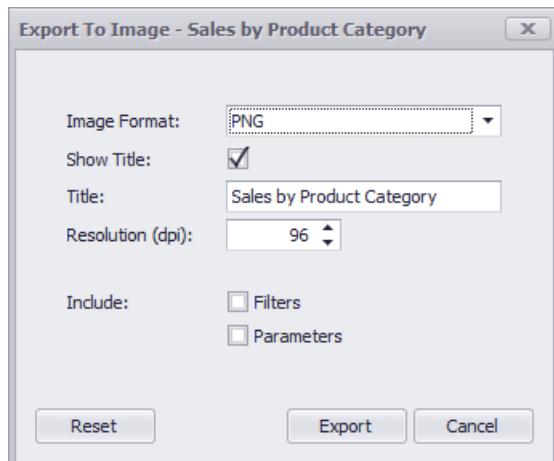


- **Page Layout** - Specifies the page orientation used to export a dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the dashboard item caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Auto Arrange Content** - Specifies whether or not cards are arranged automatically in the exported document.
- **Scale Mode** - Specifies the mode for scaling when exporting a dashboard item.
- **Scale Factor** - Specifies the scale factor (in fractions of 1) by which a dashboard item is scaled.
- **Auto Fit Page Count** - Specifies the number of horizontal/vertical pages spanning the total width/height of a dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Card dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:

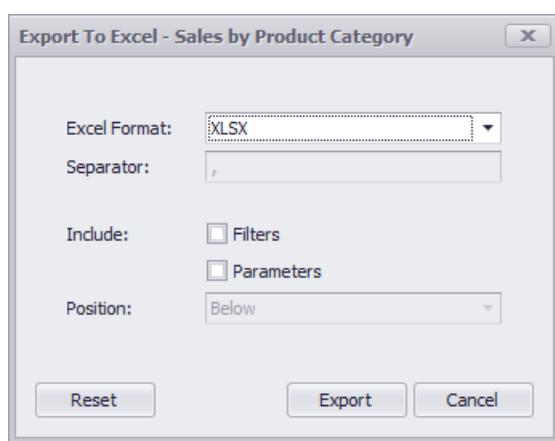


- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies of the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Excel

Data visualized within all data-bound dashboard items can be exported to the required Excel format. The following options are available:



- **Excel Format** - Specifies the Excel format in which the dashboard item is exported. You can use the XLSX, XLS or CSV formats.
- **Separator** - Specifies the string used to separate values in the exported CSV document.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select from *Below* and *Separate Sheet*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

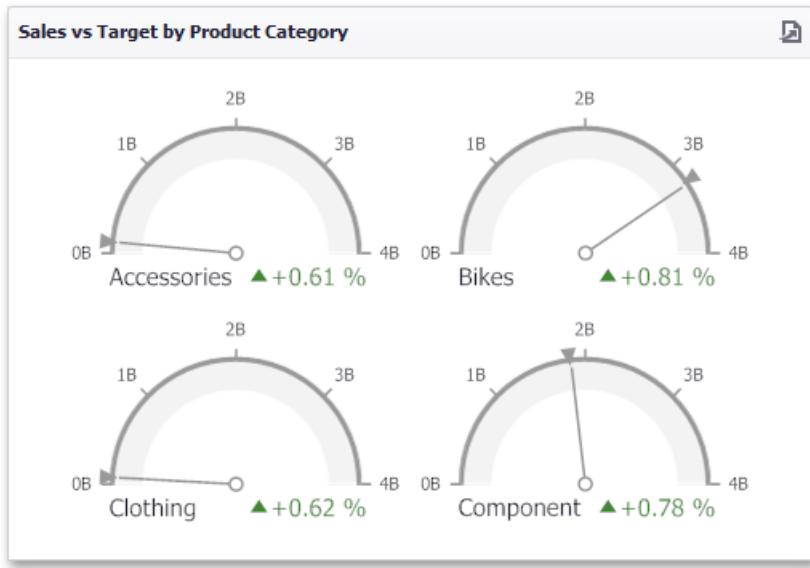
# Gauges

The topics in this section describe the **Gauge** dashboard item, which displays a series of gauges.

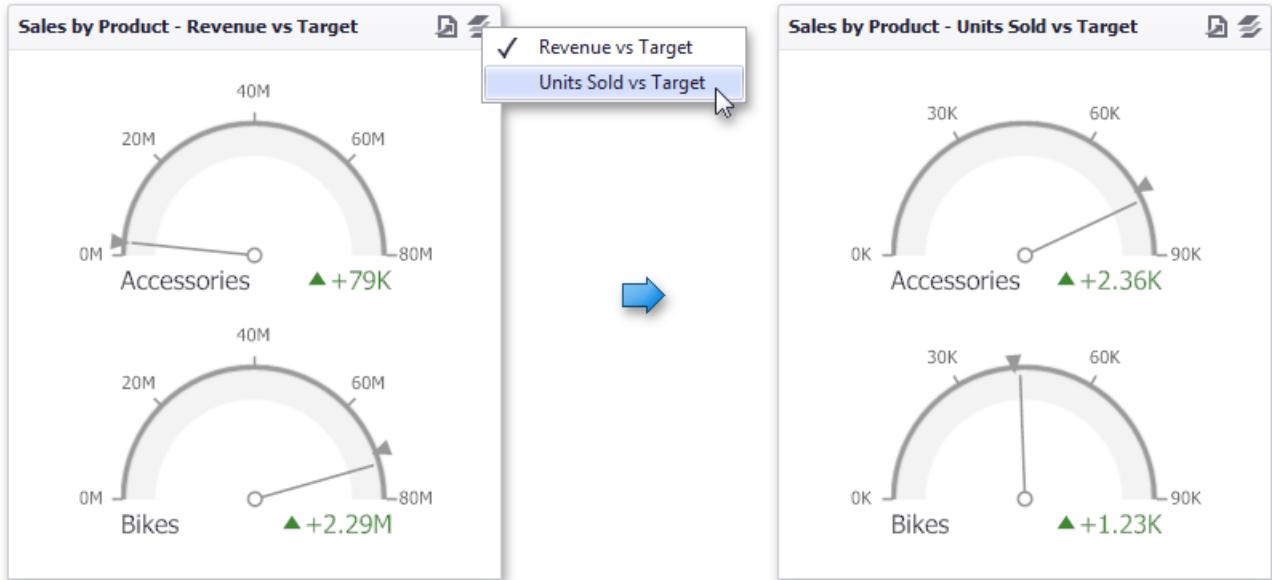
- [Data Presentation Basics](#)
- [Interactivity](#)
- [Printing and Exporting](#)

# Data Presentation Basics

The **Gauge** dashboard item displays a series of gauges. Each gauge can communicate two values - one with a needle and the other with a marker on the scale.



The **Gauge** dashboard item can illustrate the difference for various sets of values. You can switch between these sets using the **Values** button (the icon) in the dashboard item [caption](#) or in the context menu.



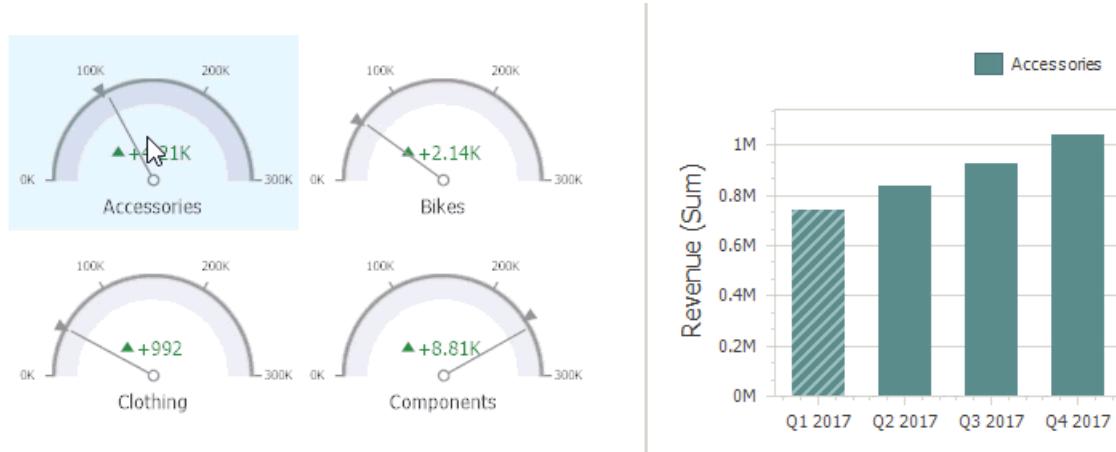
# Interactivity

This topic describes features that enable interaction between the **Gauge** and other dashboard items. These features include **Master Filtering** and **Drill-Down**.

## Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

When **Master Filtering** is enabled, you can click a gauge (or multiple gauges by holding down the **CTRL** key) to make other dashboard items only display data related to the selected gauge(s).

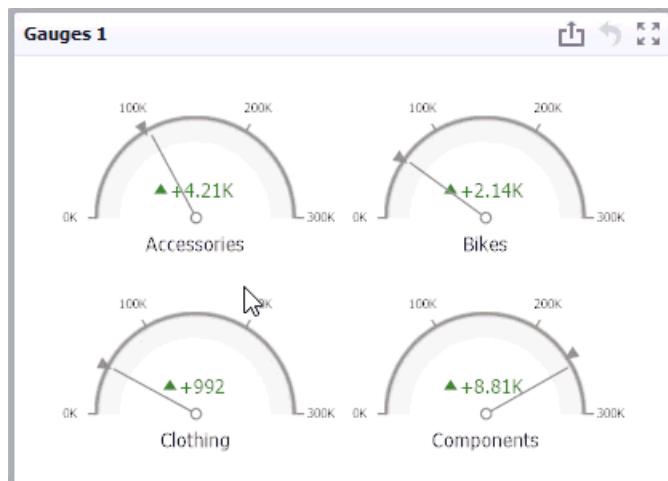


To reset filtering, use the **Clear Master Filter** button (the icon) in the [caption](#) area of the **Gauge** dashboard item, or the **Clear Master Filter** command in the context menu.

## Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more, see [Drill-Down](#).

When drill-down is enabled, you can click a gauge to view the details.



### NOTE

When **Master Filtering** is enabled, you can view the details by double-clicking a gauge.

To return to the previous detail level (drill up), use the **Drill Up** button (the icon) in the [caption](#) area of the **Gauge** dashboard

item, or the **Drill Up** command in the context menu.

# Printing and Exporting

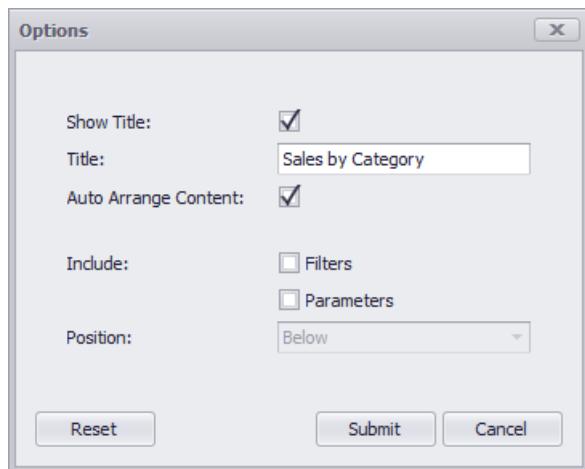
**Dashboard** allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes the specifics of printing/exporting a **Gauge** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)
- [Export To Excel](#)

## Printing

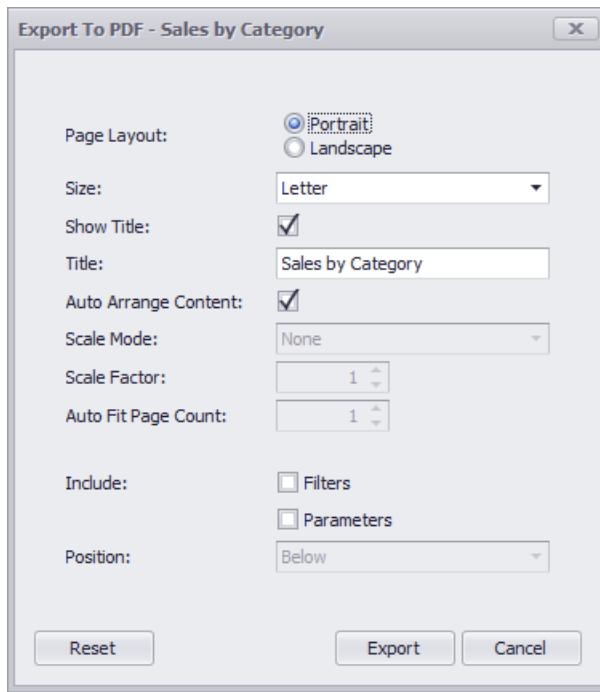
If you are printing a Gauge dashboard item using the [Print Preview](#), you can customize the following options (via the **Options** button) before printing.



- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Auto Arrange Content** - Specifies whether or not gauges are arranged automatically on the printed document.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

## Export To PDF

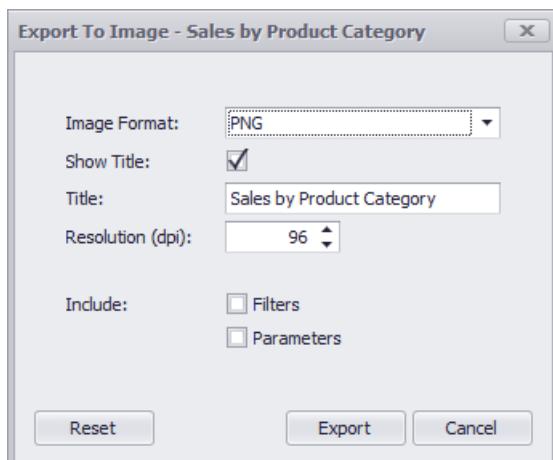


- **Page Layout** - Specifies the page orientation used to export a dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the Gauge caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Auto Arrange Content** - Specifies whether or not gauges are arranged automatically in the exported document.
- **Scale Mode** - Specifies the mode for scaling when exporting a dashboard item.
- **Scale Factor** - Specifies the scale factor (in fractions of 1) by which a dashboard item is scaled.
- **Auto Fit Page Count** - Specifies the number of horizontal/vertical pages spanning the total width/height of a dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Gauge dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:

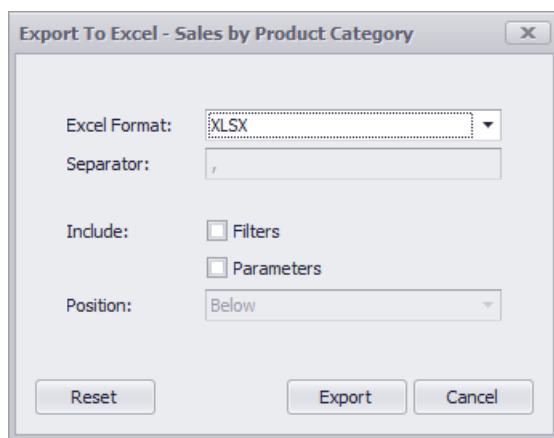


- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies of the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Excel

Data visualized within all data-bound dashboard items can be exported to the required Excel format. The following options are available:



- **Excel Format** - Specifies the Excel format in which the dashboard item is exported. You can use the XLSX, XLS or CSV formats.
- **Separator** - Specifies the string used to separate values in the exported CSV document.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select from *Below* and *Separate Sheet*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

# Pivot

The **Pivot** dashboard item displays a cross-tabular report that presents multi-dimensional data in an easy-to-read format.

Sales by State								
	▶ Accessories		▶ Bikes		▶ Components		Grand Total	
	Units Sold	Revenue	Units Sold	Revenue	Units Sold	Revenue	Units Sold	Revenue
California	36.4K	\$1.18M	12K	\$18.9M	77.8K	\$15.6M	126K	\$35.7M
Washington	20.6K	\$622K	7.6K	\$11.1M	43K	\$8.64M	71.2K	\$20.3M
Texas	19.1K	\$655K	6.29K	\$9.53M	44.3K	\$8.92M	69.6K	\$19.1M
Florida	12.1K	\$383K	4.4K	\$6.86M	25.8K	\$5M	42.3K	\$12.2M
Oregon	8.51K	\$279K	3.89K	\$6.47M	19.7K	\$3.92M	32.1K	\$10.7M
Tennessee	7.9K	\$253K	3.82K	\$6.25M	19.2K	\$3.7M	30.9K	\$10.2M
Mississippi	5.46K	\$186K	3.78K	\$6.48M	13.6K	\$3.08M	22.9K	\$9.75M

## Expanding and Collapsing Groups

To expand and collapse row and column groups, use the ▶ and ▷ buttons, respectively.

	UK	USA	Grand Total
◀ 2016 Total	\$124K	\$317K	\$441K
▶ Q1 Total	\$79.1K	\$219K	\$298K
▶ January	\$25.5K	\$68.7K	\$94.2K
▶ February	\$32.9K	\$66.6K	\$99.4K
▶ March	\$20.7K	\$84.2K	\$105K
▶ Q2	\$44.7K	\$97.4K	\$142K
Grand Total	\$124K	\$317K	\$441K

# Printing and Exporting

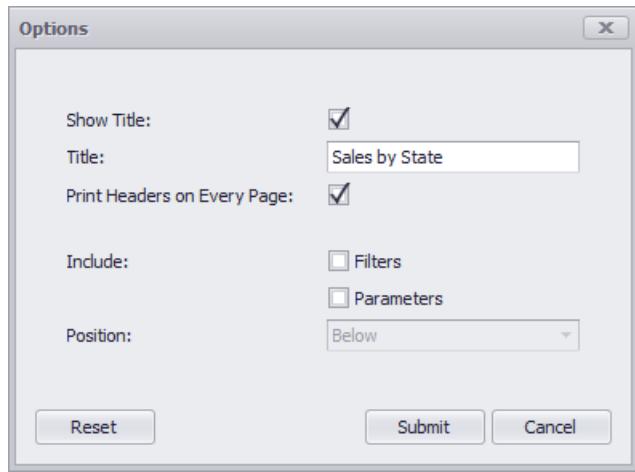
**Dashboard** allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing and exporting concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes the specifics of printing/exporting a **Pivot** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)
- [Export To Excel](#)

## Printing

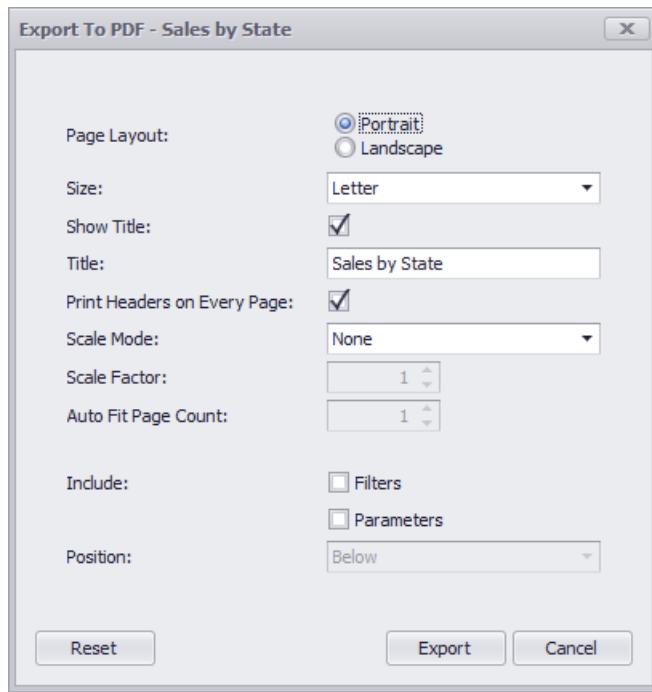
If you are printing the Pivot dashboard item using the [Print Preview](#), you can customize the following options (via the **Options** button) before printing.



- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Print Headers on Every Page** - Specifies whether to print column headers of the Pivot dashboard item on every page.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

## Export To PDF

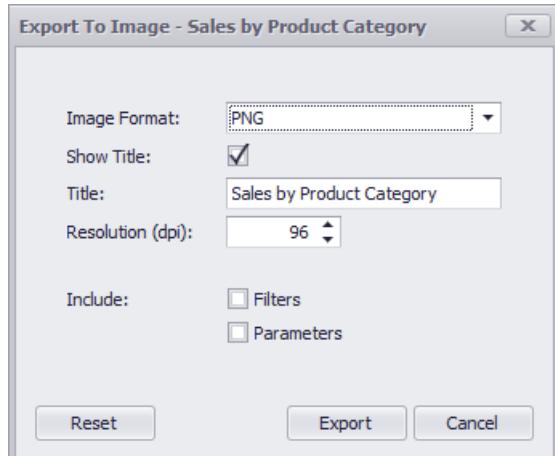


- **Page Layout** - Specifies the page orientation used to export a dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the Pivot caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Print Headers on Every Page** - Specifies whether or not to print column headers of the Pivot dashboard item on every page.
- **Scale Mode** - Specifies the mode for scaling when exporting a dashboard item.
- **Scale Factor** - Specifies the scale factor (in fractions of 1) by which a dashboard item is scaled.
- **Auto Fit Page Count** - Specifies the number of horizontal/vertical pages spanning the total width/height of a dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Pivot dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:

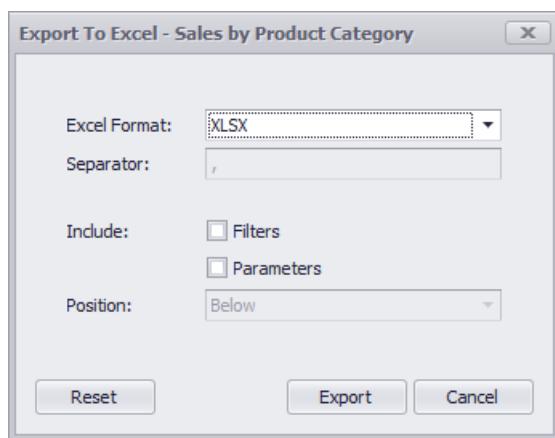


- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies of the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Excel

Data visualized within all data-bound dashboard items can be exported to the required Excel format. The following options are available:



- **Excel Format** - Specifies the Excel format in which the dashboard item is exported. You can use the XLSX, XLS or CSV formats.
- **Separator** - Specifies the string used to separate values in the exported CSV document.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select from *Below* and *Separate Sheet*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

# Choropleth Map

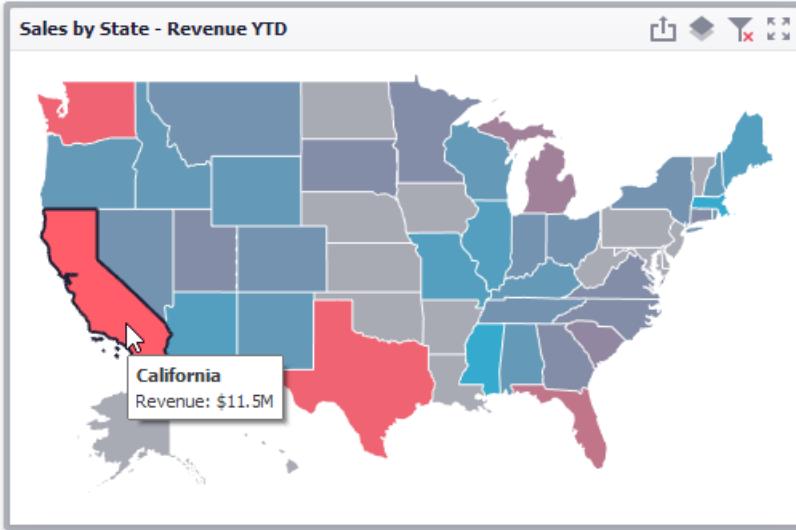
The topics in this section describe the **Choropleth Map** dashboard item, which colorizes the required areas in proportion to the provided values.

- [Data Presentation Basics](#)
- [Interactivity](#)
- [Printing and Exporting](#)

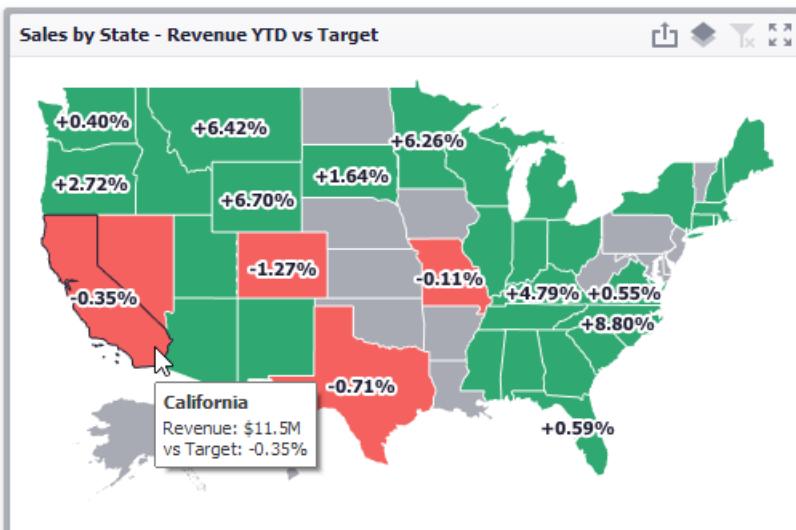
# Data Presentation Basics

The **Choropleth Map** dashboard item colorizes map areas in the following two ways.

- Based on the values provided.



- By indicating the difference between the actual and target values of a particular parameter.

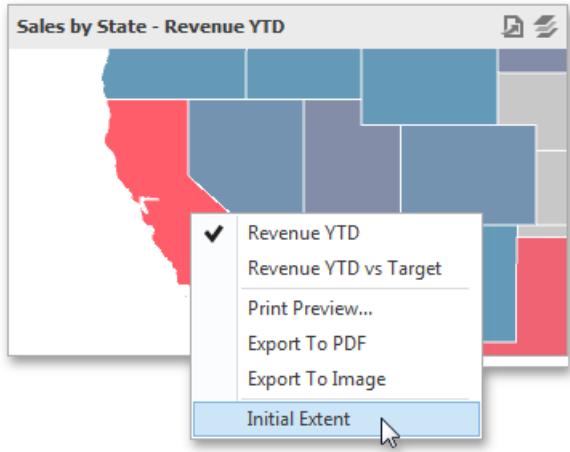


You can switch between the provided values using the **Values** button (the icon) in the map's **caption** area, or by using the context menu.

## Map Zooming and Scrolling

You can use the mouse wheel to change the current zoom level for the map. To scroll the map, hold down the left mouse button and drag it.

To move to the initial zooming and scrolling state, select the **Initial Extent** menu item in the map's context menu.



## Tooltip

The **Choropleth Map** dashboard item can display a tooltip that shows information on a hovered area.



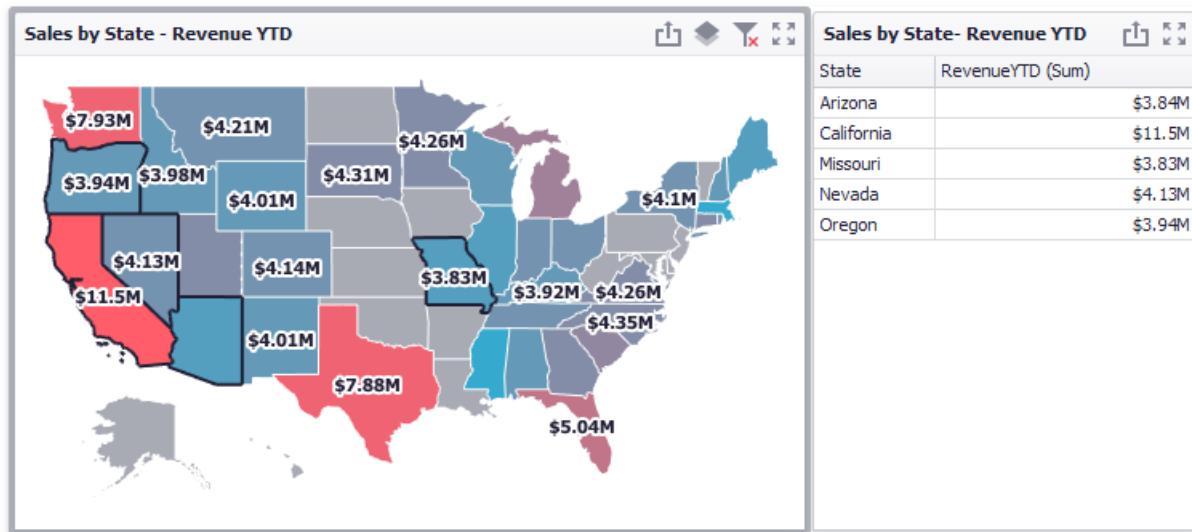
# Interactivity

This document describes the features that enable interaction between the **Choropleth Map** and other dashboard items. These features include **Master Filtering**.

## Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

When Master Filtering is enabled, you can click a shape (or multiple shapes by holding down the **CTRL** key) to make other dashboard items only display data related to the selected shape(s).



You can also select multiple shapes in the following way.

- Hold the **SHIFT** key and the left mouse button;
- Drag the mouse pointer to mark an area that includes the desired shapes;
- Release the left mouse button. All shapes within the area will be selected.

To reset filtering, use the **Clear Master Filter** button (the icon) in the Map's [caption](#), or the **Clear Master Filter** command in the context menu.

# Printing and Exporting

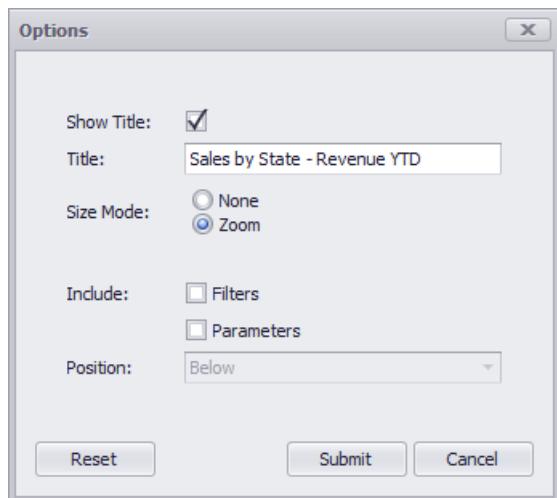
**Dashboard** allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing and exporting concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes the specifics of printing/exporting a **Choropleth Map** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)
- [Export To Excel](#)

## Printing

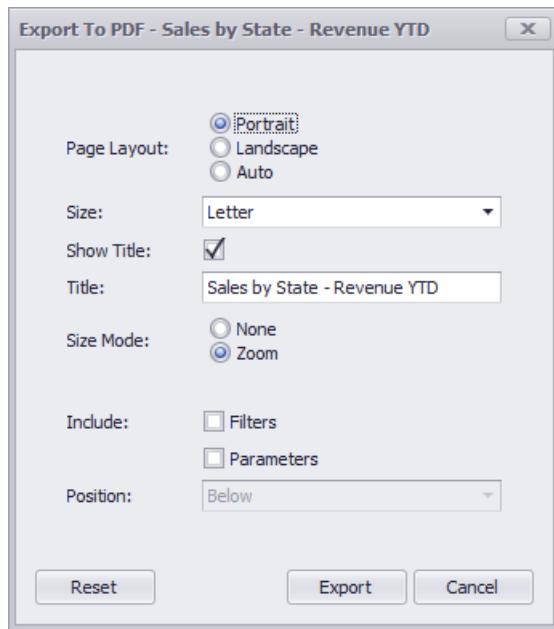
If you are printing the Choropleth Map dashboard item using the [Print Preview](#), you can customize the following options (via the **Options** button) before printing.



- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Size Mode** - Allows you to specify the print size mode for the Choropleth Map dashboard item.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

## Export To PDF

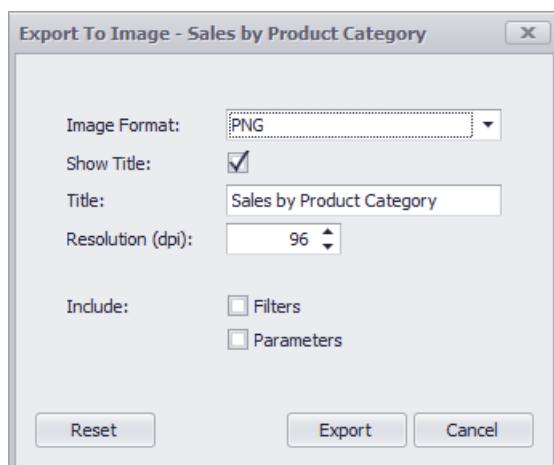


- **Page Layout** - Specifies the page orientation used to export a dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the Choropleth Map caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Size Mode** - Specifies the export size mode for the Choropleth Map dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Choropleth Map dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:



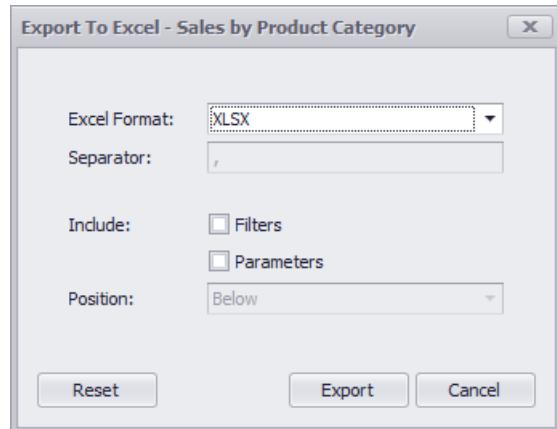
- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies of the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.

- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Excel

Data visualized within all data-bound dashboard items can be exported to the required Excel format. The following options are available:



- **Excel Format** - Specifies the Excel format in which the dashboard item is exported. You can use the XLSX, XLS or CSV formats.
- **Separator** - Specifies the string used to separate values in the exported CSV document.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select from *Below* and *Separate Sheet*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

# Geo Point Maps

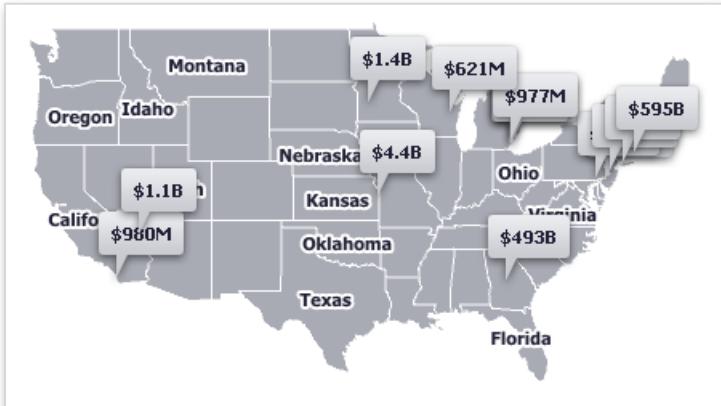
The topics in this section describe various types of **Geo Point Map** dashboard items which places callouts, bubbles or pies on the map using geographical coordinates.

- [Data Presentation Basics](#)
- [Interactivity](#)
- [Printing and Exporting](#)

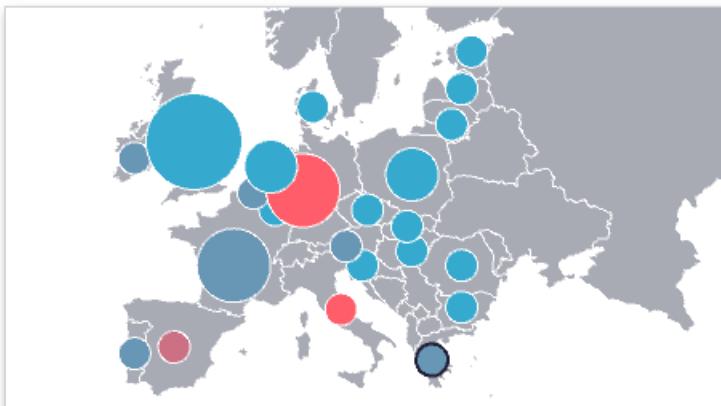
# Data Presentation Basics

The **Dashboard** supports three types of **Geo Point** maps.

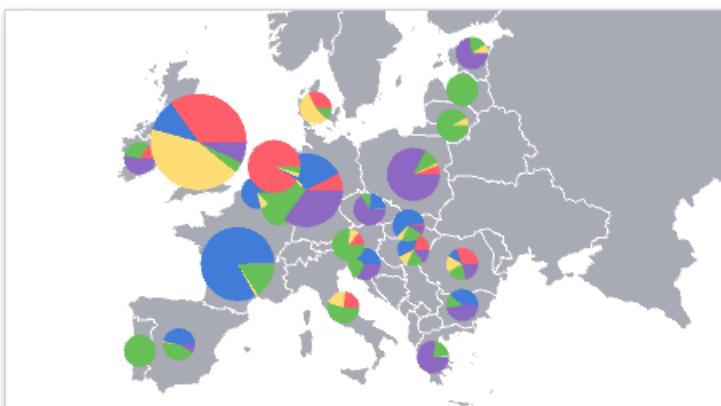
- The **Geo Point Map** dashboard item allows you to place callouts on the map using geographical coordinates.



- The **Bubble Map** dashboard item allows you to place bubbles on the map. Each bubble can represent data via its weight and color.



- The **Pie Map** dashboard item allows you to display pies on the map. Each pie visualizes the contribution of each value to the total.



## Map Zooming and Scrolling

You can use the mouse wheel to change the current zoom level for a map. To scroll the map, hold down the left mouse button and drag it.

To move to the initial zooming and scrolling state, click the **Initial Extent** menu item in the map's context menu.



## Tooltip

A **Geo Point Map** dashboard item can display a tooltip that shows information on a hovered callout/bubble/pie.



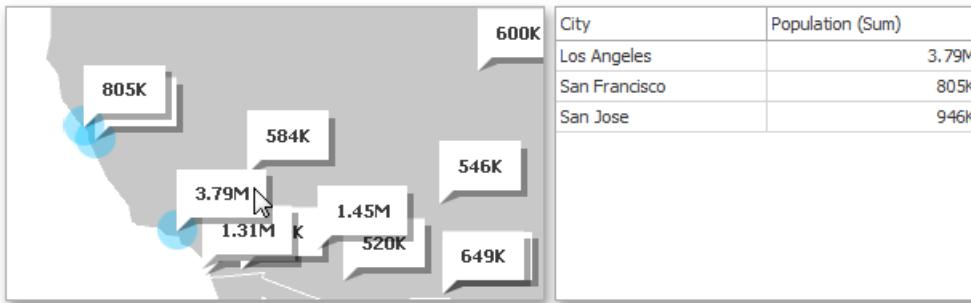
# Interactivity

This document describes the capabilities that enable interaction between **Geo Point** maps and other dashboard items. These capabilities include **Master Filtering**.

## Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

When Master Filtering is enabled, you can click a callout/bubble/pie (or multiple callouts/bubbles/pies by holding down the **CTRL** key) to make other dashboard items only display data related to the selected callout(s)/bubble(s)/pie(s).



You can also select multiple callouts/bubbles/pies in the following way.

- Hold the **SHIFT** key and the left mouse button;
- Drag the mouse pointer, to mark an area that includes the desired elements;
- Release the left mouse button. All elements within the area will be selected.

To reset filtering, use the **Clear Master Filter** button (the icon) in the Map's caption area, or the **Clear Master Filter** command in the context menu.

# Printing and Exporting

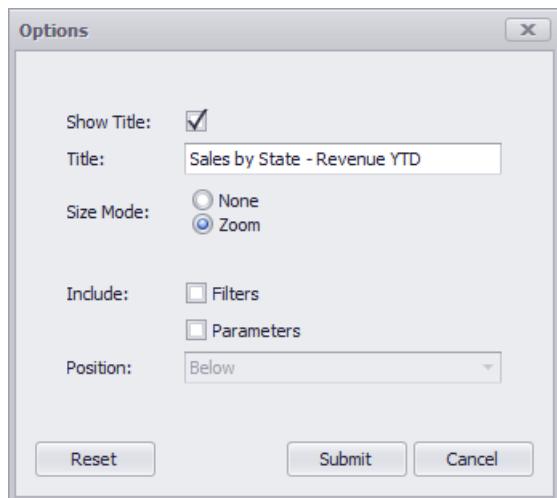
**Dashboard** allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing and exporting concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes the specifics of printing/exporting a **Geo Point Map** dashboard items.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)
- [Export To Excel](#)

## Printing

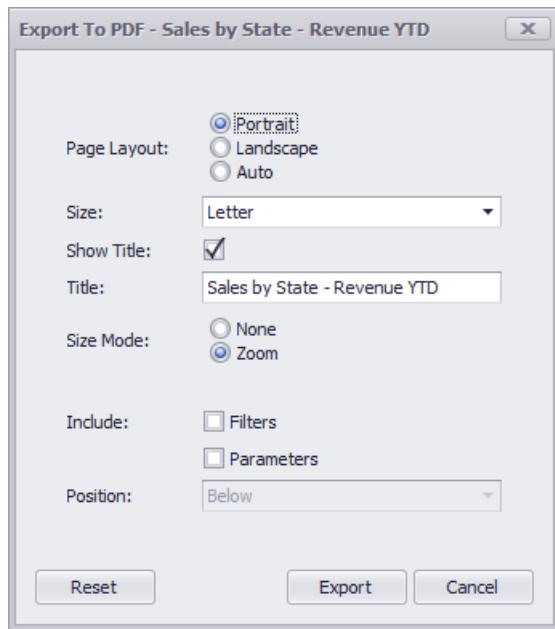
If you are printing the Geo Point Map dashboard item using the [Print Preview](#), you can customize the following options (via the **Options** button) before printing.



- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Size Mode** - Allows you to specify the print size mode for the Geo Point Map dashboard item.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

## Export To PDF

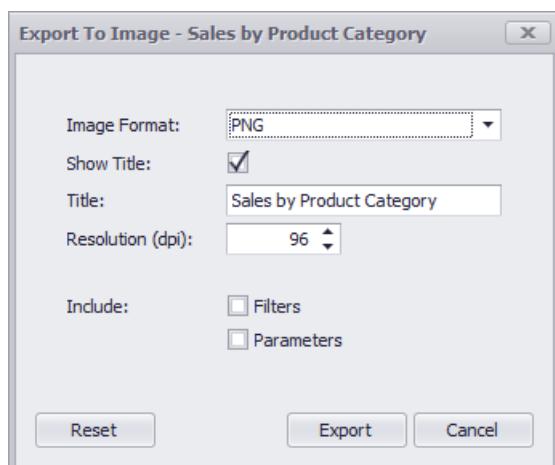


- **Page Layout** - Specifies the page orientation used to export a dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the Geo Point Map caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Size Mode** - Specifies the export size mode for the Geo Point Map dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Geo Point Map dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:



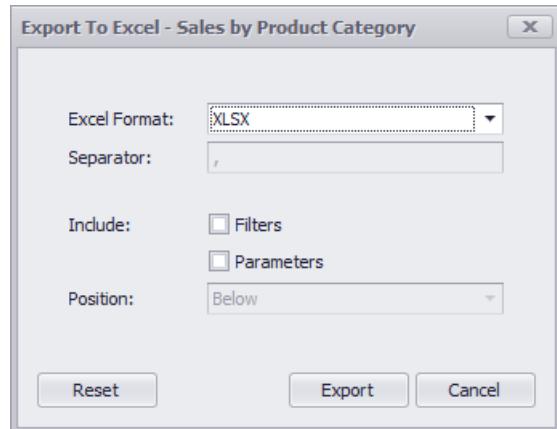
- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies of the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.

- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Excel

Data visualized within all data-bound dashboard items can be exported to the required Excel format. The following options are available:

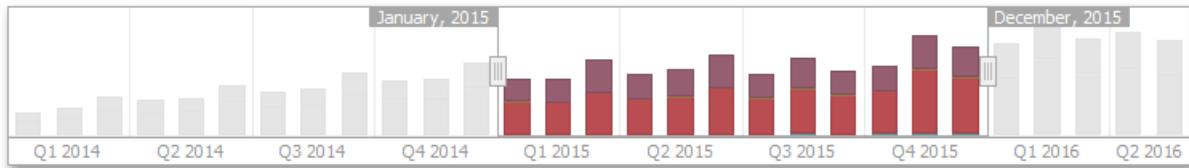


- **Excel Format** - Specifies the Excel format in which the dashboard item is exported. You can use the XLSX, XLS or CSV formats.
- **Separator** - Specifies the string used to separate values in the exported CSV document.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select from *Below* and *Separate Sheet*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

# Range Filter

The **Range Filter** dashboard item allows you to apply filtering to other dashboard items. This item displays a chart with selection thumbs that allow you to filter out values displayed along the argument axis.



To reset filtering, use the **Clear Master Filter** command in the context menu.

# Printing and Exporting

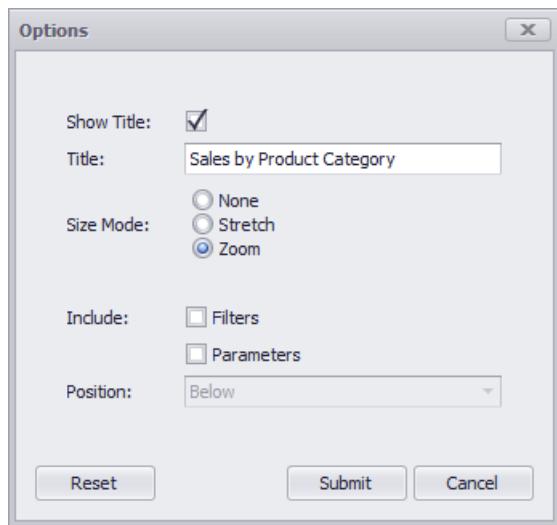
**Dashboard** allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing and exporting concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes the specifics of printing/exporting a **Range Filter** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)
- [Export To Excel](#)

## Printing

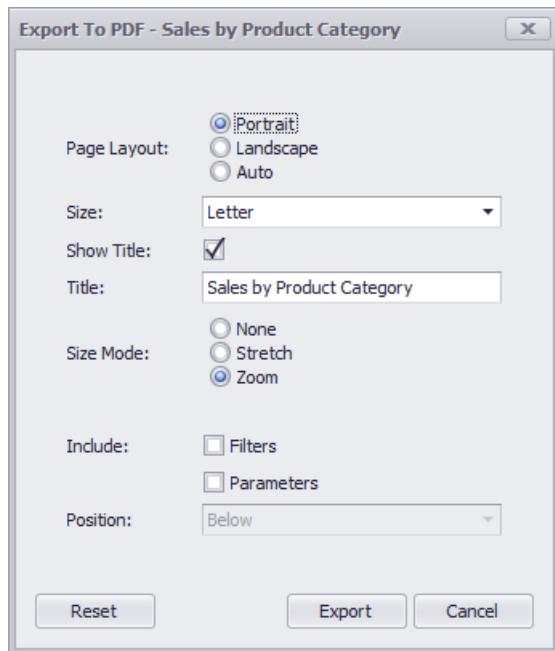
If you are printing the Range Filter dashboard item using the [Print Preview](#), you can customize the following options (via the **Options** button) before printing.



- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Size Mode** - Allows you to specify the print size mode for the Range Filter dashboard item.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

## Export To PDF

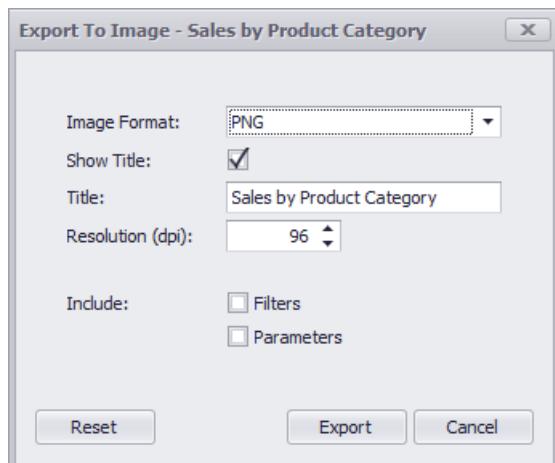


- **Page Layout** - Specifies the page orientation used to export a dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the Range Filter caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Size Mode** - Specifies the export size mode for the Range Filter dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Range Filter dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:



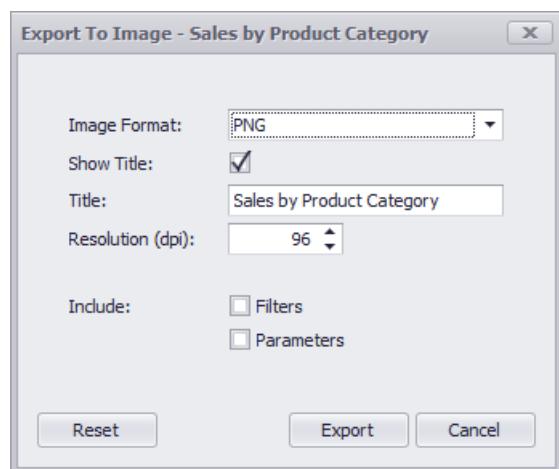
- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies of the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.

- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Excel

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:



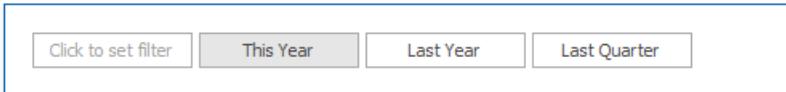
- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies of the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

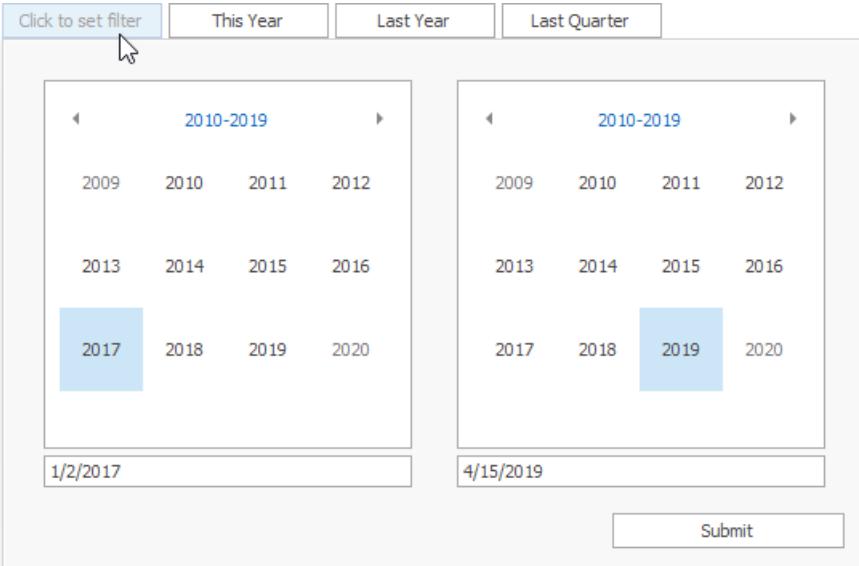
# Date Filter

The **Date Filter** dashboard item allows you to filter dashboard data based on the selected data range. The range can be relative (Last 3 Months), use fixed dates (01-01-2018), or presets (Month-to-date). You can also filter dates before or after a specified date.

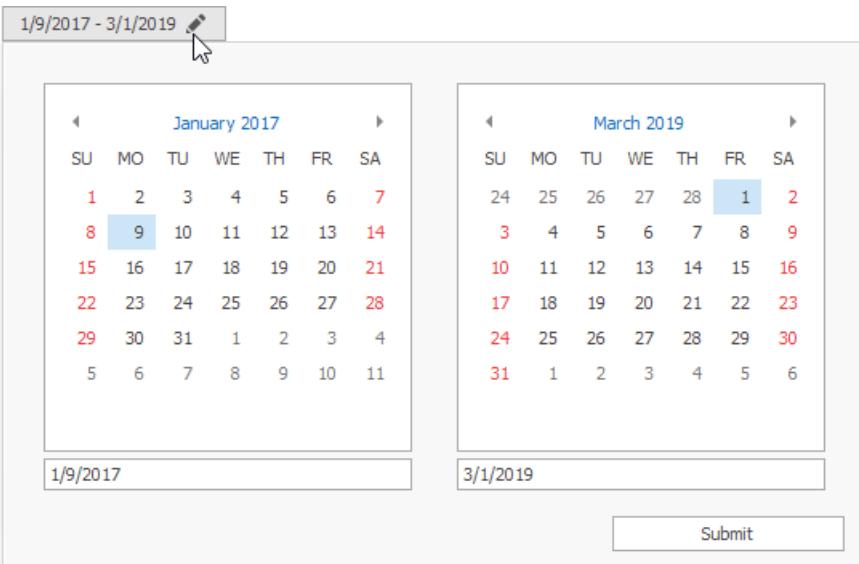
The DateFilter item displays a set of intervals that can be used as quick filters. The predefined intervals are also available in the context menu.



You can click the button to invoke the Date Picker:



# Date Picker



The DateFilter item contains a Date Picker - a button with a drop-down calendar. This button initially displays "Click to set filter".

The calendar drops down when you:

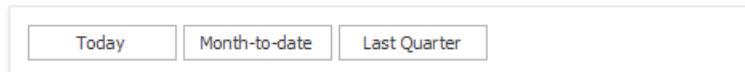
- click the button without a specified range (the button with the "Click to set filter" caption)
- click the icon on the button with the specified datetime range.

A drop-down calendar may contain a single calendar control (the Filter Type is Exact, Before or After, one calendar ele,) or two calendar controls (the Filter Type is Between).

When you select the date, the Date Picker caption displays information about that date (date range) and an icon. The caption text is constructed from a custom string with date placeholders. If you click the caption, The Date Picker button acts as a checked button to apply the date range (checked) or reset the date filter (unchecked) to its default value. When you click the icon, the drop-down calendar appears and enables the user to select another date range.

## Quick Filters

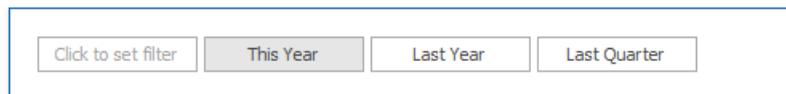
Quick Filters are buttons displayed within the DateFilter item. Each button has a DateTime range assigned to it. You can click the button to apply that range as a Date filter. The button is checked until you click the same button once more to reset the filter to its default value. The button becomes unchecked if you click another button.



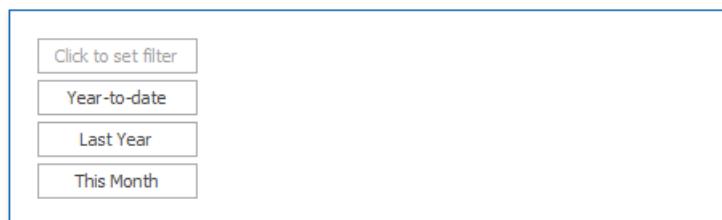
## Arrange Quick Filters

Quick filters in the DateFilter item can be arranged horizontally or vertically. The default mode is *auto height*, in which quick filters are displayed horizontally and the dashboard item shrinks automatically to fit the items and save space.

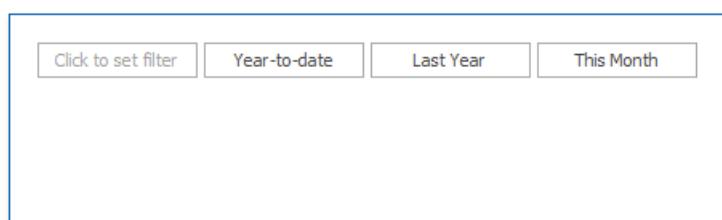
Auto Height Arrangement Mode:



Vertical Arrangement Mode:

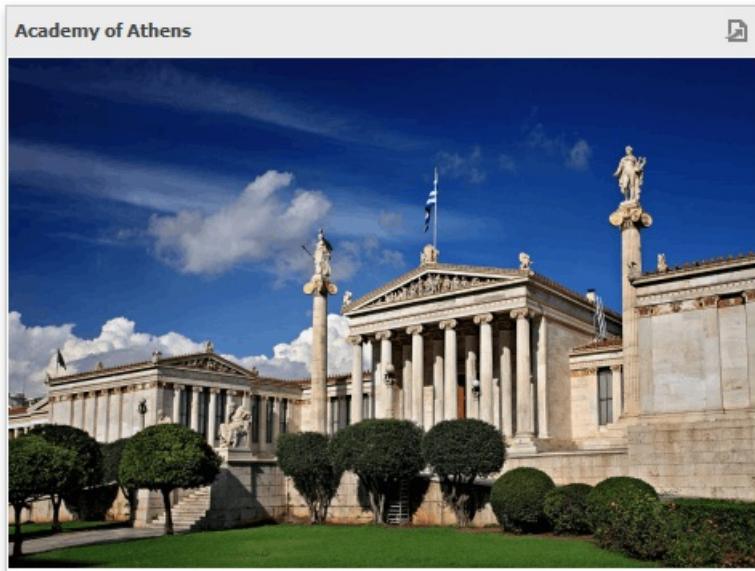


Horizontal Arrangement Mode:



# Image

The **Image** dashboard item is used to display images within a dashboard.



# Printing and Exporting

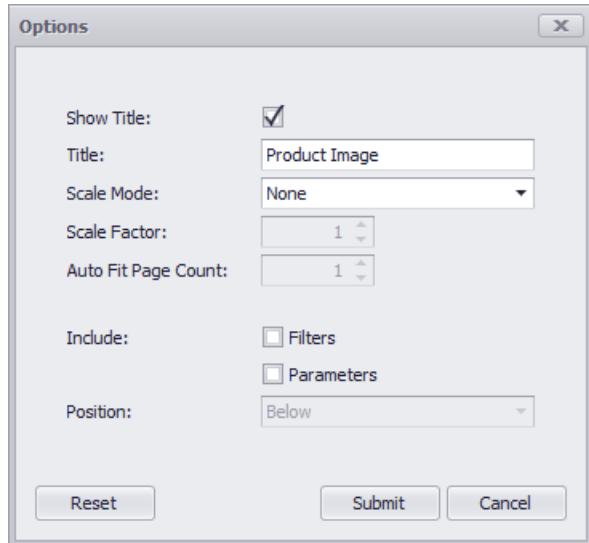
**Dashboard** allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing and exporting concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes the specifics of printing/exporting an **Image** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)

## Printing

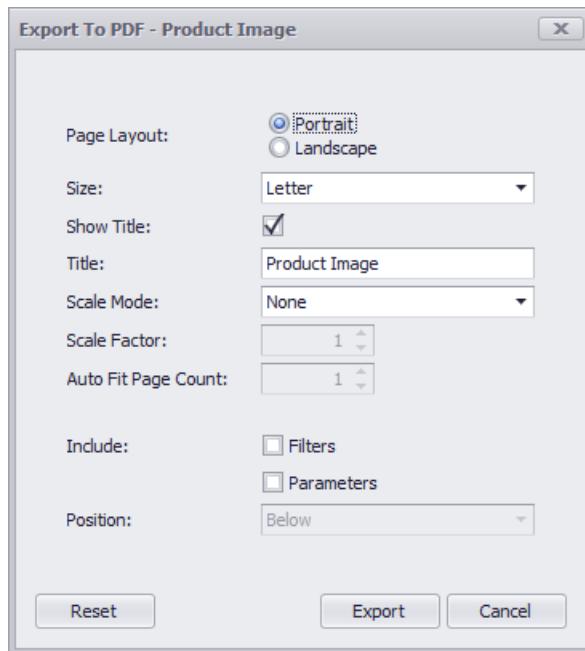
If you are printing the Image dashboard item using the [Print Preview](#), you can customize the following options (via the **Options** button) before printing.



- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Scale Mode** - Specifies the mode for scaling when printing an image.
- **Scale Factor** - Specifies the scale factor (in fractions of 1) by which an image is scaled.
- **Auto Fit Page Count** - Specifies the number of horizontal/vertical pages spanning the total width/height of an image.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

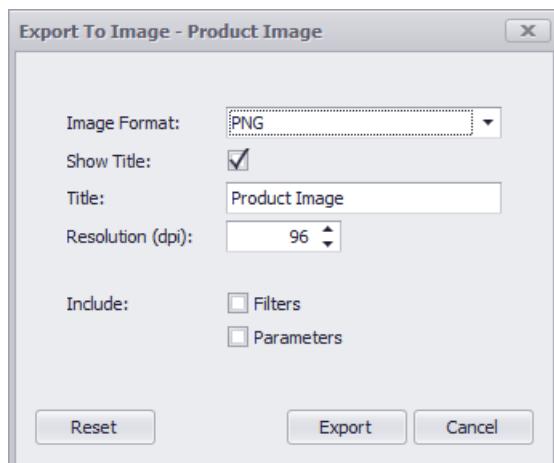
## Export To PDF



- **Page Layout** - Specifies the page orientation used to export a dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the Image caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Scale Mode** - Specifies the mode for scaling when exporting a dashboard item.
- **Scale Factor** - Specifies the scale factor (in fractions of 1), by which a dashboard item is scaled.
- **Auto Fit Page Count** - Specifies the number of horizontal/vertical pages spanning the total width/height of a dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Image dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image



- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Show Title** - Specifies whether or not to apply the Image caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.

- **Include | Parameters** - Allows you to include parameter values to the exported document.

Specify the required options in this dialog and click the **Export** button to export the Image dashboard item. To reset changes to the default values, click the **Reset** button.

# Text Box

The **Text Box** dashboard item is used to display rich text within a dashboard.

Product
<input checked="" type="radio"/> DesktopLCD 21
<input type="radio"/> DesktopLED 21
<input type="radio"/> HD Video Player
<input type="radio"/> Projector Plus
<input type="radio"/> Projector PlusHD
<input type="radio"/> SuperLCD 42
<input type="radio"/> SuperLCD 70
<input type="radio"/> SuperLED 42
<input type="radio"/> SuperPlasma 50

**Product Description**

**DesktopLCD 21**

*Production Start:* 31-Mar-10

*Consumer Rating:* 3 of 5

*Retail Price:* \$170

*Best Sales Year:* 2015

*Best Sales Company:* ACME

The 21" Brilliance LCD Computer Monitor is changing the way people display computer signals. It's amazing build quality and high precision design means you get the best possible computer picture for the best possible price. It delivers crystal-clear images with mind-blowing video. The bottom-line is simple, this Monitor offers Full HD resolution with 240Hz refresh rate.

# Printing and Exporting

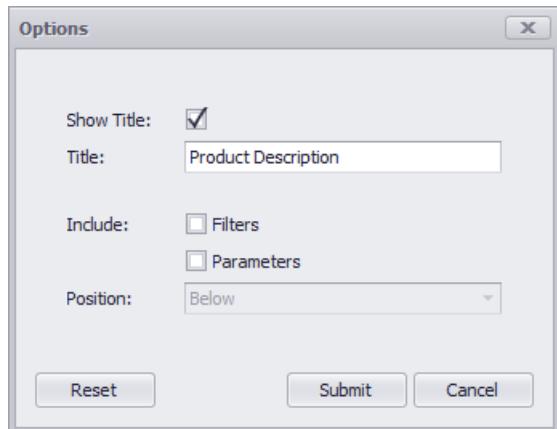
**Dashboard** allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing and exporting concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes the specifics of printing/exporting a **Text Box** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)

## Printing

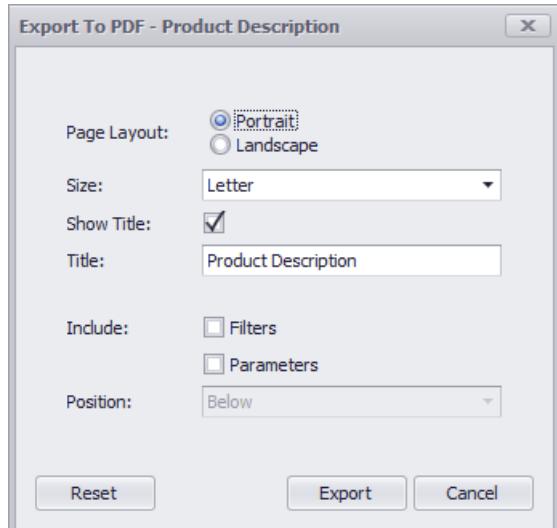
If you are printing a Text Box dashboard item using the [Print Preview](#), you can customize the following options (via the **Options** button) before printing.



- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

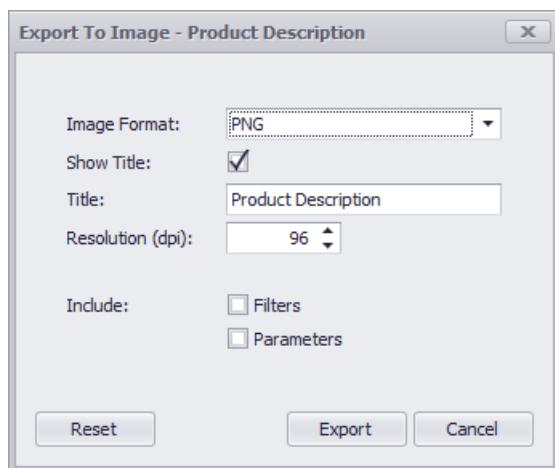
## Export To PDF



- **Page Layout** - Specifies the page orientation used to export a dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the Text Box caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Text Box dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image



- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Show Title** - Specifies whether or not to apply the Text Box caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.

Specify the required options in this dialog and click the **Export** button to export the Text Box dashboard item. To reset changes to the default values, click the **Reset** button.

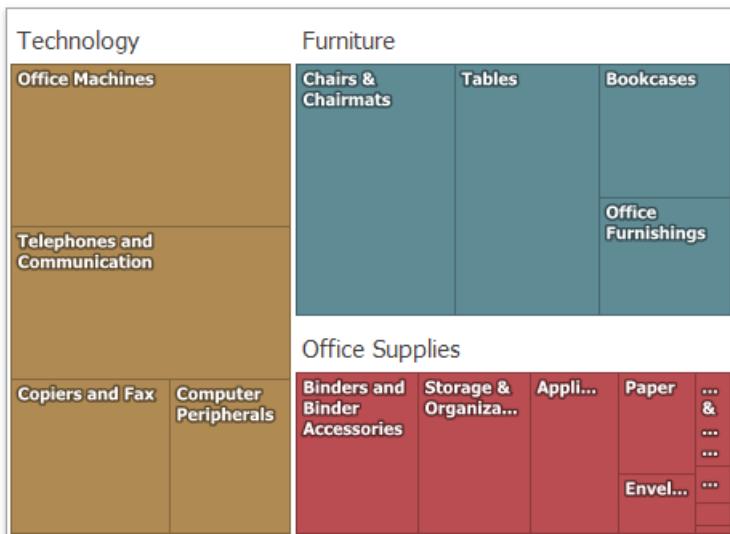
# Treemap

The Treemap dashboard item visualizes data in nested rectangles that are called *tiles*.

- [Data Presentation Basics](#)
- [Interactivity](#)
- [Printing and Exporting](#)

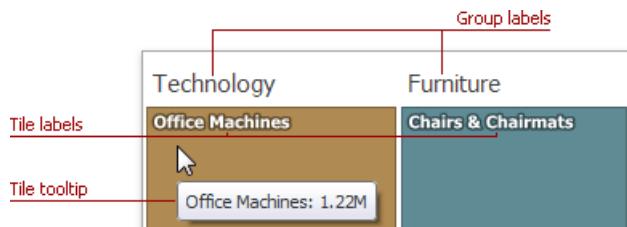
# Data Presentation Basics

The Treemap dashboard item visualizes data in nested rectangles that are called *tiles*.



## Labels and Tooltips

The Treemap displays **labels** that contain descriptions for tiles and groups, and provide **tooltips** with additional information.



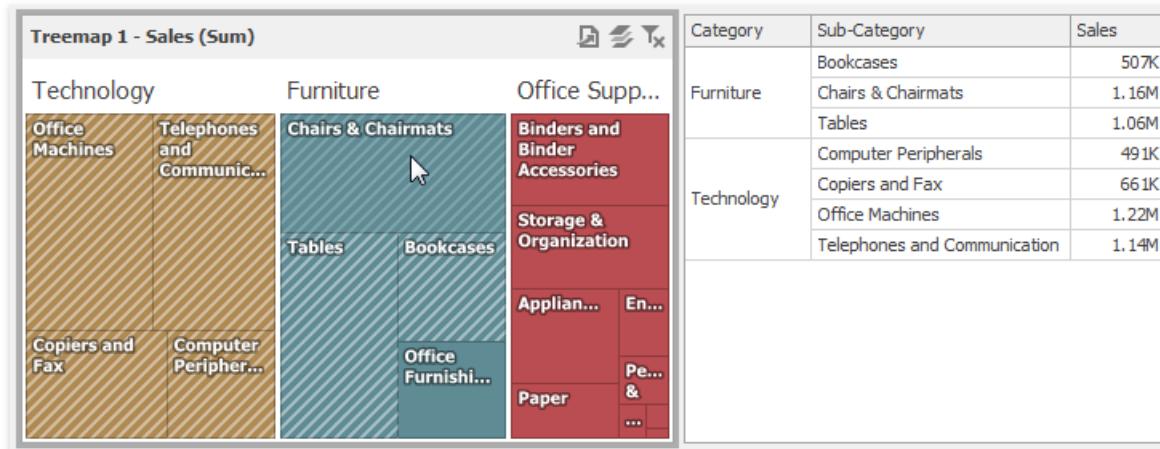
# Interactivity

This topic describes features that enable interaction between the **Treemap** and other dashboard items. These features include **Master Filtering** and **Drill-Down**.

## Master Filtering

The **Dashboard** allows you to use any data aware dashboard item as a filter for other dashboard items (**Master Filter**). To learn more about filtering concepts common to all dashboard items, see the [Master Filtering](#) topic.

When Master Filtering is enabled, you can click a tile/group caption (or multiple tiles/group captions by holding down the **CTRL** key) to make other dashboard items only display data related to the selected tile(s).

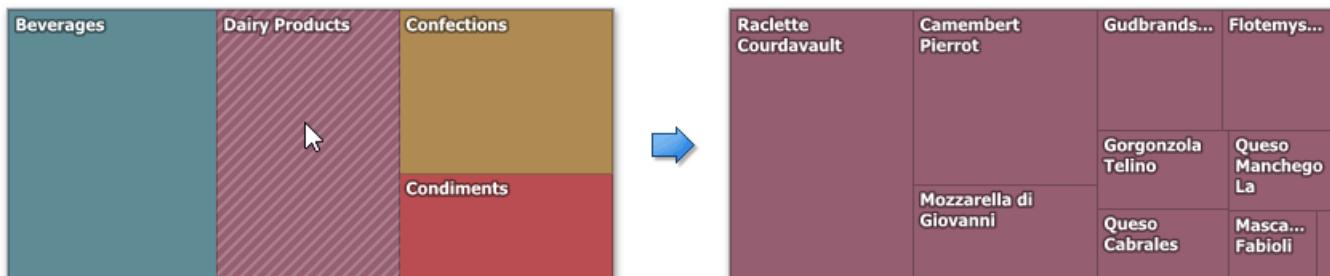


To reset filtering, use the **Clear Master Filter** button (the icon) in the Treemap's caption area, or the **Clear Master Filter** command in the Treemap's context menu.

## Drill-Down

The built-in drill-down capability allows you to change the detail level of data displayed in dashboard items on the fly. To learn more about drill-down concepts common to all dashboard items, see the [Drill-Down](#) topic.

When drill-down is enabled, you can click a tile to view its details.



### NOTE

When Master Filtering is enabled, you can view the details by double-clicking a tile.

# Printing and Exporting

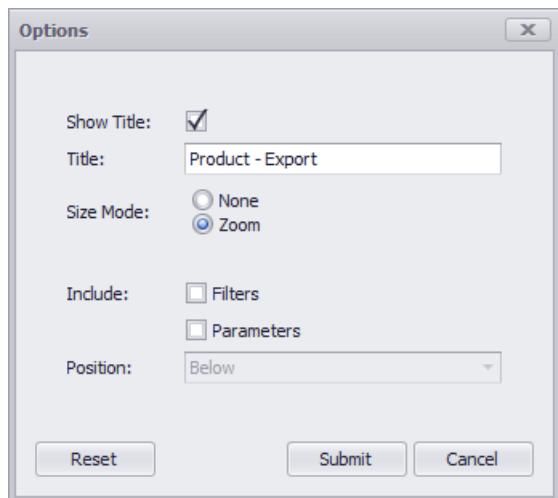
**Dashboard** allows you to print/export individual dashboard items, or the entire dashboard. To learn more about printing concepts common to all dashboard items, see the [Printing and Exporting](#) topic.

This topic describes the specifics of printing/exporting a **Treemap** dashboard item.

- [Printing](#)
- [Export To PDF](#)
- [Export To Image](#)
- [Export To Excel](#)

## Printing

If you are printing the Treemap dashboard item using the Print Preview, you can customize the following options (via the **Options** button) before printing.

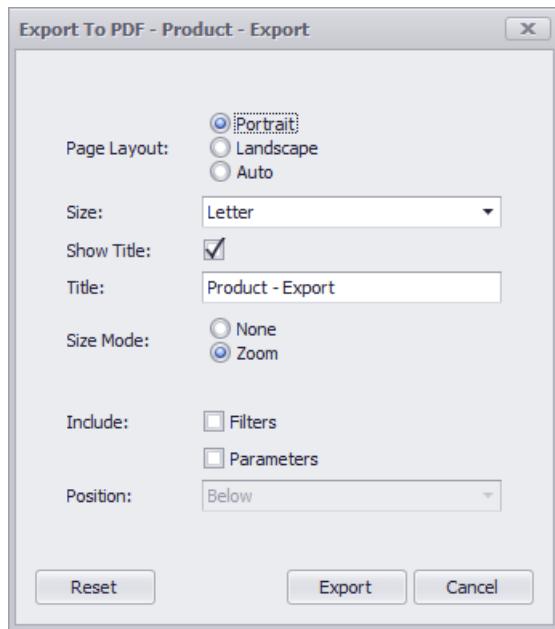


- **Show Title** - Specifies whether or not to apply the dashboard item caption to the printed document title.
- **Title** - Specifies the title of the printed document.
- **Size Mode** - Allows you to specify the print size mode for the Treemap dashboard item.
- **Include | Filters** - Allows you to include master filter values to the printed document.
- **Include | Parameters** - Allows you to include parameter values to the printed document.
- **Position** - Specifies the position of the master filter and parameter values in the printed document. You can select between *Below* and *Separate Page*.

Specify the required options in the **Options** dialog and click the **Submit** button to apply the changes. To reset changes to the default values, click the **Reset** button.

## Export To PDF

The following options are available when exporting the Treemap dashboard item to a PDF.

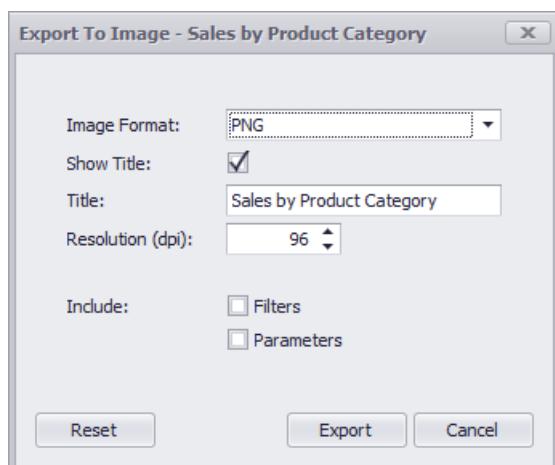


- **Page Layout** - Specifies the page orientation used to export a Treemap dashboard item.
- **Size** - Specifies the standard paper size.
- **Show Title** - Specifies whether or not to apply the dashboard item caption to the exported document title.
- **Title** - Specifies the title of the exported document.
- **Size Mode** - Specifies the export size mode for the Treemap dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the position of the master filter and parameter values in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the Treemap dashboard item. To reset changes to the default values, click the **Reset** button.

## Export To Image

All data-bound dashboard items provide the same set of options when exporting them to an Image format. The following options are available:



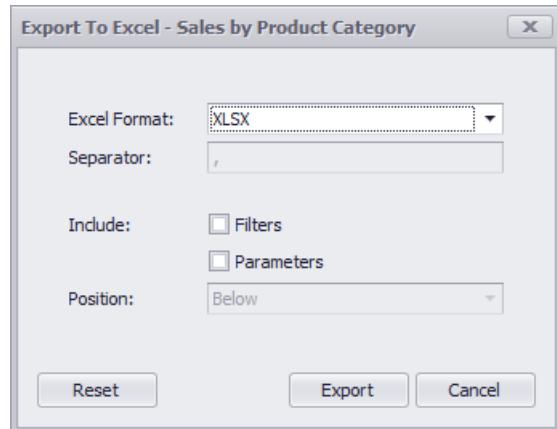
- **Show Title** - Specifies whether to apply the dashboard item caption to the exported document title.
- **Title** - Specifies of the exported document's title.
- **Image Format** - Specifies the image format in which the dashboard item is exported.
- **Resolution (dpi)** - Specifies the resolution (in dpi) used to export the dashboard item.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.

- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select between *Below* and *Separate Page*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

## Export To Excel

Data visualized within all data-bound dashboard items can be exported to the required Excel format. The following options are available:



- **Excel Format** - Specifies the Excel format in which the dashboard item is exported. You can use the XLSX, XLS or CSV formats.
- **Separator** - Specifies the string used to separate values in the exported CSV document.
- **Include | Filters** - Allows you to include master filter values to the exported document.
- **Include | Parameters** - Allows you to include parameter values to the exported document.
- **Position** - Specifies the master filter and parameter values' position in the exported document. You can select from *Below* and *Separate Sheet*.

Specify the required options in this dialog and click the **Export** button to export the dashboard item. Click the **Reset** button to reset changes to the default values.

The topics in this section describe the **Filter Elements** dashboard items used to apply master filter to other items.

- [Filter Elements Overview](#)
- [Neutral Filter Mode](#)

# Filter Elements

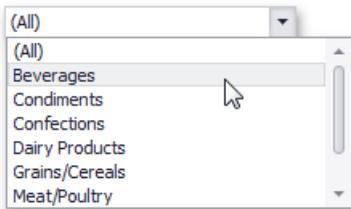
Filter elements provide the capability to [filter](#) other dashboard items.

- [Combo Box](#)
- [List Box](#)
- [Tree View](#)
- [Date Filter](#)

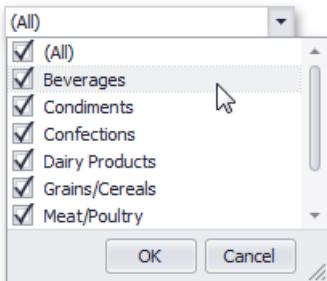
## Combo Box

The **Combo Box** dashboard item allows you to select a value(s) from the drop-down list.

- The **Standard** type allows you to select only a single value.



- The **Checked** type allows you to select multiple values in the invoked drop-down list.



## List Box

The **List Box** dashboard item allows you to select a value(s) from the list.

- The **Checked** type allows you to select multiple values in the list box.

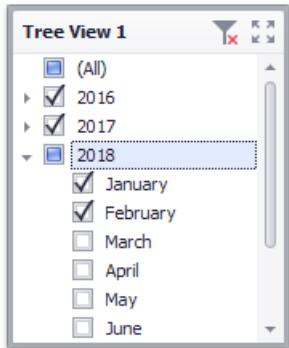


- The **Radio** type allows you to select only a single value in the radio group.



## Tree View

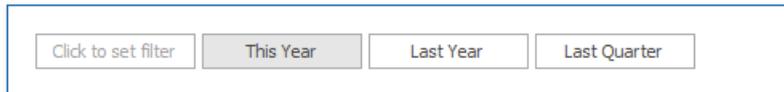
The **Tree View** dashboard item displays values in a hierarchical way and allows you to expand/collapse nodes.



## Date Filter

The **Date Filter** dashboard item allows you to filter dashboard data based on the selected data range. The range can be relative (Last 3 Months), use fixed dates (01-01-2018), or presets (Month-to-date). You can also filter dates before or after a specified date.

The DateFilter item displays a set of intervals that can be used as quick filters.

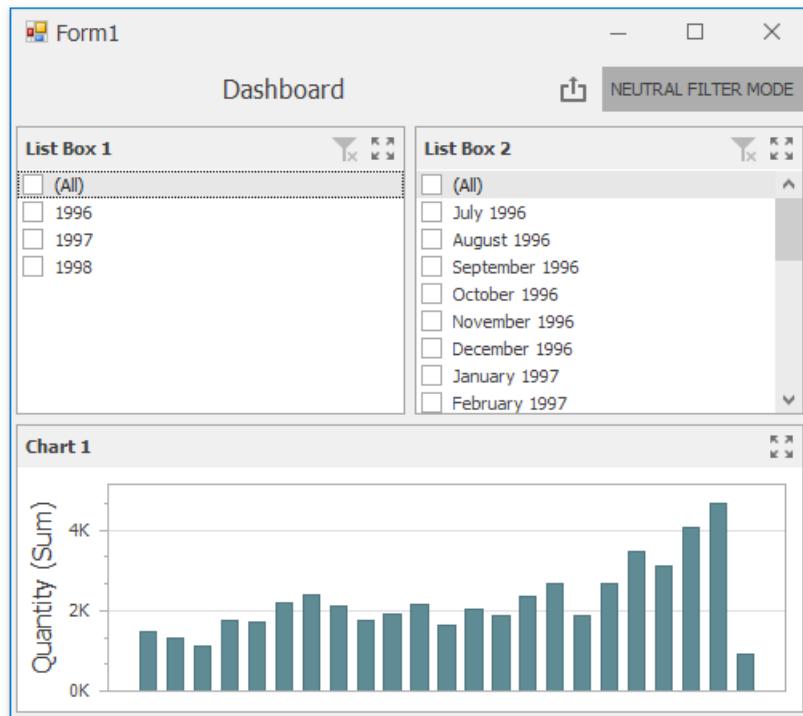


# Neutral Filter Mode

The filter elements show all items selected by default, to indicate that no filtering is currently taking place. Starting from this state, users typically begin each filtering operation by deselecting **All**, before they select individual items.

An extra click is required to begin any actual filtering operation, because the **standard filter mode** shows all items selected. This is not an optimal implementation for performance reasons, because it generates filtering criteria that are evaluated by the data layer and/or the database.

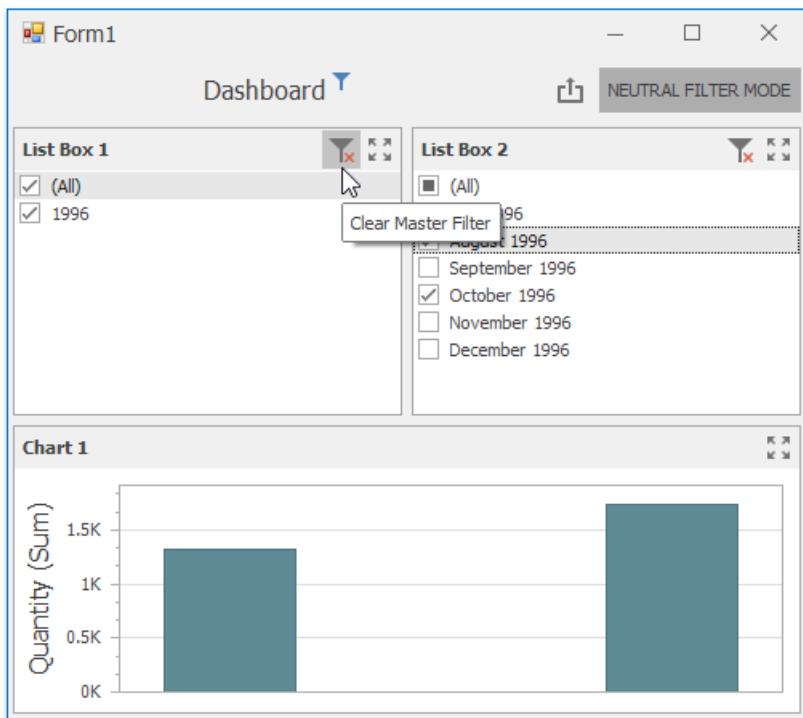
To solve these issues, the **Neutral Filter Mode** is implemented. It is neutral in the sense that it does not apply any criteria to the data source in its default state, resulting in improved performance.



All items are shown deselected. This means that an extra click is no longer required in the most common scenarios, and this behavior is familiar to end users from websites world-wide.

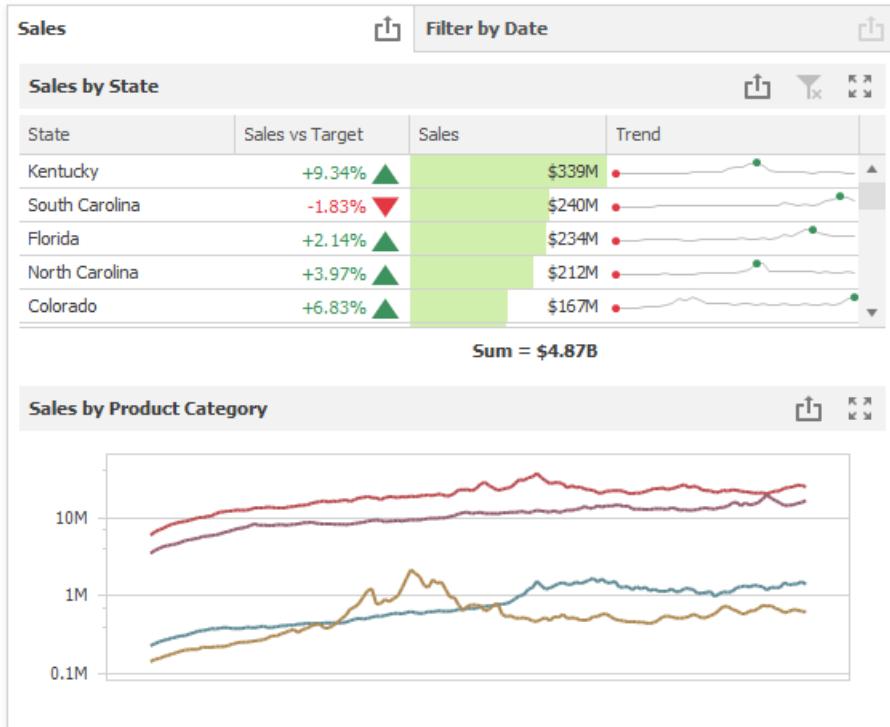
Built-in UI does not provide a command to switch the filter mode. Reload a dashboard after switching the mode.

The **Neutral Filter Mode** helps in a situation when there is a potential "dead lock", due to the fact that multiple filter elements influence each other. The **Clear Master Filter** button resets the filters.



# Tab Container

The **Tab container** dashboard item allows you to split the dashboard layout into several pages. Common filter controls for large elements in a dashboard can be located on a separate tab page.



Click the tab page's header to switch between tab pages:

