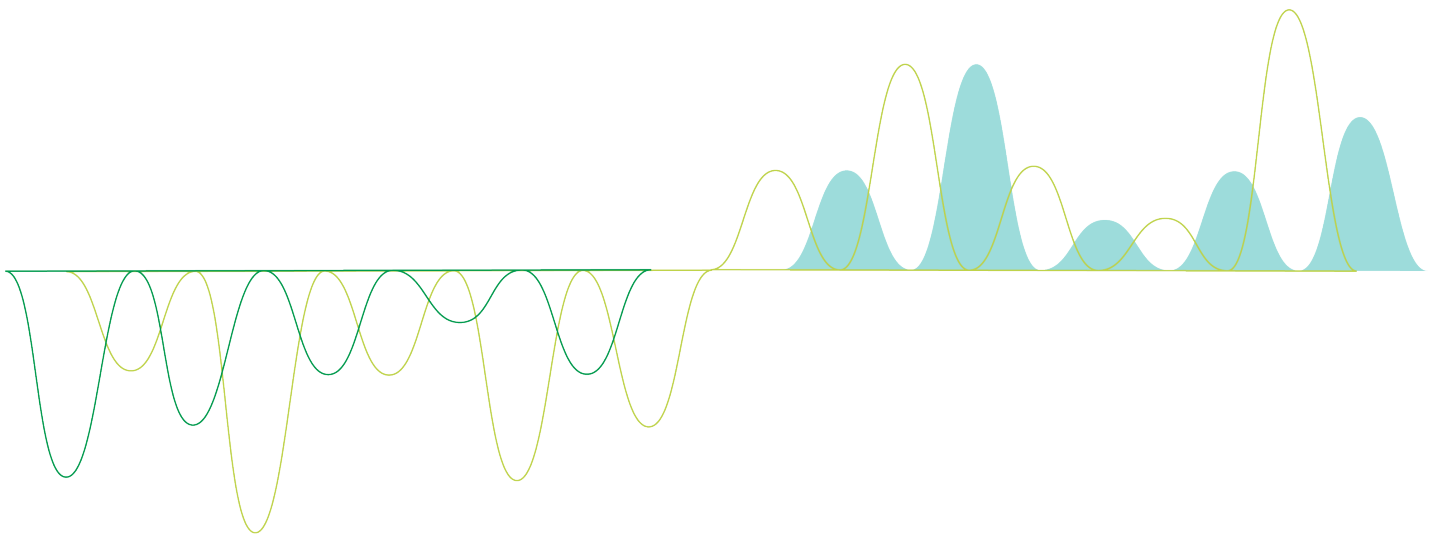


QlikView Tutorial

QlikView®

April 2019

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1 Introduction

The QlikView tutorial is a self-study course for beginners. It contains explanations and lessons that take you step by step through various features.

1.1 What is QlikView?

QlikView is a software that enables all kinds of users from beginners to experts to retrieve and assimilate data easily from any source: databases like SQL Server or Oracle as well as Excel, XML or text files. Enterprise applications such as SAP may also be used as data source for a QlikView analysis. Once loaded into the program, the data is presented in an intuitive and easy-to-use interface. To make selections in QlikView, you do not need any previous knowledge of databases or search routines: you simply click the item of which you want to know more, and the program immediately filters the data and presents all associated items. Extensive search options - direct and indirect - allow you to find any information and deliver instant answers to your questions.

QlikView offers a wide variety of graphs, charts and tables in different formats to present your data the way you want. Different views, zoom, grouping or animation create a deeper understanding and provide an even better overview. Creating the interface is very easy and does not require help from the IT department. Any graphic or table can be printed or exported to other programs for further processing. QlikView standalone can be used for free, as a Personal Edition. With QlikView Personal Edition you can make full use of the QlikView functionality, but it is not possible to open documents created by other users. To do this, you need a QlikView license.

The QlikView product group also includes QlikView Server and QlikView Publisher that can be used for centralized management of QlikView applications, for automated updates and for distribution of documents to several users. Documents published on a QlikView Server can be accessed by different clients including Internet Explorer Plugin, AJAX Zero Footprint and several mobile clients such as iPhone, iPad, Android and RIM devices.

1.2 About the tutorial

You do not need any prior QlikView experience or database knowledge to do the tutorial. Working through the entire tutorial will take about 8 hours, but not all parts are equally relevant to every user. The tutorial consists of three parts, briefly described below.

Working with QlikView

The first part, *Working with QlikView*, starts with a thorough description of how to make selections and searches in an existing QlikView document. If you do not have the intention to build or modify QlikView documents, the very first section of the tutorial may already provide sufficient information for the daily work. *Working with QlikView* also introduces you to the components of the user interface of a QlikView document and demonstrates how to use and create these components. This part is relevant if you are in charge of designing, building or modifying the user interface of QlikView documents.

Working with QlikView (page 11)

Creating a document

The second part, *Creating a document*, presents how to load data into QlikView. You will learn how to load data from different sources, how QlikView builds associations between different sets of data and how to link external information to the data. This part is crucial to when developing QlikView documents from scratch or modifying the data structures in existing documents.

Creating a document (page 91)

Advanced features

Finally, *Advanced features* can be seen as a continuation of both of the previous parts. Here you will learn how to build more complicated documents, as well as how to use more advanced features in the script, including access restriction and number formats. Whereas the lessons in the first two parts build on each other, the lessons in the third part are independent from each other and you can directly pick the topics that interest you.

Advanced features (page 117)

Going forward

Apart from this tutorial, there are many other resources for new and advanced QlikView users.

What's next? (page 146)

1.3 Preparations

To go through the lessons in this tutorial, you need to install QlikView on your computer. You also need a number of sample files.

Installation

If you have not yet installed QlikView standalone on your computer, you should do so. The software can be downloaded for free from www.qlik.com. To access the download page, you must register, or log in to your QlikView account if you are already registered. If you have purchased a QlikView license, you can enter the license number when starting the program for the first time. You can use QlikView Personal Edition without a license.

Sample files

The Sample files are located in a folder called *Tutorial* that can also be downloaded from **Access Now** under the QlikView Tutorial heading. If you have already installed QlikView, you can access the download area directly from the start page.

Download the tutorial file package to your computer. The package includes QlikView documents as well as data sources. Of course you can install it to any other folder of your choice. Just be sure to remember where to find the files.

1.4 Conventions

Before you start using QlikView, it is important to understand the terms and notational conventions used in the tutorial. In this section some of the terms will be explained.

Regional settings

Note that your computer's regional settings might affect your work in QlikView. For example, the default date and number formats differ between Swedish and English, which might affect calculations if you run English QlikView on a computer with Swedish regional settings. To get the best possible results, run this tutorial on a computer with the same language settings as the QlikView document.

1.5 Getting to know QlikView

This section gives a brief introduction about how to start working with QlikView, how to save your work and where to find help.

The start page

On the start page, you find different shortcuts, such as a direct link to download this tutorial, links to selected demo examples, a link to the QlikView demo example folder on your local computer and links to selected resources at www.qlik.com.

You also find a list of recently opened documents. Click a document or in this list to quickly open it.

If you do not want the start page to appear when you start QlikView, deselect **Show start page when launching QlikView** at the bottom of the start page. The start page can be reopened at any time by choosing **Show Start Page** from the **Help** menu.

Starting QlikView

You find QlikView on the **Start** menu, under **All Programs**.




It is also possible to start QlikView by double-clicking a QlikView file.



In this case QlikView starts with the current document opened.

Opening a document

To open an existing QlikView file, click **Open** on the **File** menu, or click  on the toolbar. You can always open the most recently used QlikView documents from the start page or the **File** menu.

Several files can be open simultaneously. Each document opens in its own window. In this case, you can alternate between the documents from the **Window** menu, or by using the keyboard combination Ctrl+Tab.

Saving a document


To save a document, click **Save** on the **File** menu or click  on the toolbar.

Closing a document

When you close a QlikView document, the selections made are preserved until you open the document again.

QlikView help

The complete online help for QlikView is available at help.qlik.com. You can search for topics that contain information that you are looking for or browse for information within different areas.

You can get help for a specific dialog or function by pressing the F1 key or clicking  on the toolbar while running QlikView.

Using documents on a QlikView Server

All variants of QlikView can be used to access documents on a QlikView Server. This is done by selecting **Open in Server** in the **File** menu or the start page. Since we cannot assume that you have access to a QlikView Server, this tutorial deals only with the use of local documents.

2 Working with QlikView


This part of the tutorial will show you how to work with an existing QlikView document. Once familiar with the basic terminology, you will learn how to make selections in QlikView. Subsequently, the components of the QlikView document will be described one by one. You will learn how to modify and work with the different sheet objects to get the results you are looking for.

2.1 Creating queries in QlikView

In this lesson you will get an overview of the basic components of a QlikView document and learn how to make queries in QlikView.

Opening the document for the first time

Do the following:

1. Start QlikView by double-clicking  on your desktop or from the **Start** menu.
2. On the **File** menu, choose **Open**.
3. Select the file *Tutorial.qvw* under `..\Tutorials source\Working with QlikView`, or where your program files are normally installed, then click **Open**.

You have now opened this QlikView document.

Getting familiar with QlikView

This is an example of what a document opened in QlikView may look like.

2 Working with QlikView

The screenshot displays the QlikView desktop environment. At the top is a menu bar (A) with options like File, Edit, View, Selections, Layout, Settings, Bookmarks, Reports, Tools, Object, Window, and Help. Below the menu bar is a toolbar with various icons. The main workspace is divided into several sections:

- Geography** (B) is the active sheet, with a **Sales** sheet also visible as a tab.
- Country** (C) is a list box containing a scrollable list of countries (D).
- Capital** (D) is another list box showing capital cities.
- Currency** (D) is a list box showing different currencies.
- Population(mio)** (D) is a list box showing population values.
- Area(km.sq)** (D) is a list box showing area values.
- Multi box** (H) is a multi-select list box with radio buttons for various fields like Capital, Country, Official name of Country, Population(mio), Pop. Growth, Currency, and Inflation.
- Table box** (I) is a table with columns: Capital, Country, Currency, and Population(mio). It lists countries like Ivory Coast, United Arab Emirates, Ghana, Ethiopia, Qatar, and Bahrain.
- Area** (J) is a bar chart showing the area in km.sq for various countries: Russia, Canada, China, U.S.A., Brazil, Australia, India, Argentina, Kazakhstan, and Sudan.
- Population** (F) is a minimized sheet object.
- Forecasted increase** (K) is an input box with a value of 10 and a text prompt: "Please enter a value for the forecasted sales increase next year".
- Population (mio)** (M) is a statistics box showing metrics: Sum (6,825.21), Average (36.30), Min (0.00), and Max (1,342.49).
- Current Selections** (N) is a box showing the current selection state.
- Clear selections** (E) is a green button.
- Search** (G) is a search object in the top right.
- Status bar** (O) is at the bottom right, showing the date and time: 4/6/11 a10:06:35.

A	At the top of the screen you find the menu bar, and just below this, toolbars.
B	Different sheets are shown as different tabs.
C	A sheet can contain many different sheet objects, such as list boxes, bar charts and text objects.
D	The most basic sheet object is the list box. Each list box represents a column (field) of the loaded database table, and contains a number of (field) values.
E	Buttons are used for performing certain commands.
F	Sheet objects that you are not focusing on at the moment can be temporarily minimized.
G	Search object
H	Multi box
I	Table box
J	Bar chart
K	Input box
L	Text object
M	Statistics box
N	Current selections box
O	Status bar

Selections

In QlikView, the main way of making queries is through the selection of field values. When you make a selection, the program instantaneously shows all the field values in the document that are related to the selected field value. To make a query, or a search, in the database, you just click something you want to know more about.

Do the following:

1. Open the *Geography* sheet.

The screenshot shows the 'Geography' sheet in QlikView. It features several data objects:

- Country**: A list box containing Afghanistan, Albania, Algeria, Andorra, and Angola.
- Capital**: A list box containing Abidjan, Abu Dhabi, Accra, Addis Abeba, and Al Dawhah.
- Currency**: A list box containing Afghani, Aus Dollar, Baht, Balboa, and Birr.
- Population(mio)**: A list box containing Not known, 0.001, 0.01, 0.03, and 0.04.
- Area(km.sq)**: A list box containing 17 075 000, 9 970 610, 9 596 961, 9 372 614, and 8 512 000.
- Multi box**: A multi-select list box with fields: Capital, Country, Official name of Country, Population(mio), Pop. Growth, Currency, and Inflation.
- Table box**: A table with columns: Capital, Country, Currency, and Population(mio). It lists countries like Abidjan, Abu Dhabi, Accra, Addis Abeba, Al Dawhah, and Al Manamah.
- Area**: A bar chart showing area in km.sq for various countries: Russia, Canada, China, U.S.A., Brazil, Australia, India, Argentina, Kazakhstan, and Sudan.
- Forecasted increase**: A text box with 'Increase% = 10' and a prompt: 'Please enter a value for the forecasted sales increase next year.'
- Population**: A summary table with fields: Population, Sum, Average, Min, and Max.
- Current Selections**: A table with columns: Fields and Values.

A 'Clear selections' button is located at the bottom left of the sheet.

2. In the list box **Country**, select the value *Albania*.

The color of the cell turns green. In QlikView terms, the value is selected. The result of the search is displayed instantaneously in all the other sheet objects. You immediately see which of the values in the other list boxes are compatible with the selection and which are not.

The image shows a close-up of the 'Country' list box. The 'Albania' option is highlighted in green, indicating it is the selected value. Other options like Afghanistan, Algeria, Andorra, Angola, and Antigua are shown in white text on a gray background.

The cells of associated field values are white. Selected and associated values are referred to as possible values in this tutorial. A cell whose contents are not associated (whose value does not occur in combination with that of the selected item) is called excluded. The cells of excluded values are gray. To

facilitate the overview of the query result, the contents of the list boxes have been sorted, not only alphabetically, but also by their state: optional values are put at the beginning of the list, excluded values at the end.

3. To make another selection, simply click the selected cell again, or click another cell in the same list box. The new selection will replace your previous selection.




4. To select more than one item in the same list box, hold the Ctrl key down while selecting additional values. If the items you are selecting are adjacent to your first selection, you can instead hold the mouse button down while dragging the cursor.

Combining selections

An optional value in another list box can be selected in combination with a previously selected value. When you select an optional value from a list box and then select another optional value from another list box, QlikView will show the combinations belonging to both selections as options. (This is equivalent to a “logical and” condition.)

Do the following:

1. Clear your selections by clicking  on the toolbar.
2. Click the *Sales* sheet.
3. Suppose you want to know which Salesperson has sold products to *Captain Cook's Surfing School* in *Monaco*. Go to the list box **Customer** and search for the value *Captain Cook's Surfing School*.
4. Select the value by clicking it.
Seven values in the list box **Country** are white. This means that they are compatible with the selection. Select *Monaco*.

You now see that *Joe Cheng* is the Salesperson you are looking for. The value *Joe Cheng* is the only one compatible with both *Captain Cook's Surfing School* and *Monaco*. By making consecutive selections this way, it is possible to get closer, step by step, to the answer you are looking for.

Keeping track of your selections

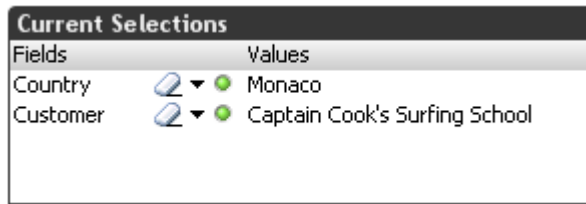
When you make many selections at the same time it can sometimes be hard to keep track of them. To help you with this QlikView has two tools, the **Current Selections** box and the **Current Selections** window. This **Current Selections** box lists all fields in which selections have been made and the values selected. If too many values are selected, only the number of selected values is shown.

Using the **Current Selections** box

On the *Geography* sheet you will find a **Current Selections** box.



Do the following:

- Make some additional selections in the list boxes and watch how they are reflected in the current selections box.



Using the **Current Selections** window


Not all QlikView documents have current selections boxes on all sheets. If you want to keep track of your selections anyway, you can use the **Current Selections** window.

1. Click  on the toolbar.
A new window will now appear on top of the QlikView window. This window resembles the current selections box quite a bit, but can be moved around as you please and will stay in place even if you go to a different sheet or start working with another document.
2. Make some selections and watch how they are reflected in the **Current Selections** window.
3. Close the **Current Selections** window by clicking  on the toolbar.

Moving selections

The current selections in an active list box can be moved using keyboard keys.




Do the following:

1. Clear your selections by clicking  on the toolbar.
2. In the **Country** list box, select the value *Afghanistan*.
The values related to *Afghanistan* are now shown in the other list boxes.
3. Use the down arrow key of your keyboard to move the current selection one step downwards in the list box.
Note that the other sheet objects are updated to show the result of the new selection.
4. To move the selection upwards, use the up arrow key.

Stepping back or forward in the list of selections

QlikView remembers the last 100 selections. By clicking the **Back** button on the toolbar, you go back to your previous selection.

Do the following:

1. Click  on the toolbar. Note that your previous selection is displayed.
2. Click  again to go back another step.
3. Click  on the toolbar, to move forward in the list of selections.



This way, you can go back and forth in the list of selections as you wish. Note that the **Back** and **Forward** buttons only apply to selections: other changes, like the removal of an object or the modification of a setting, are not affected.

Locking and unlocking selections

By default, the logic of QlikView replaces a previous selection with the new selection if the previous selection is in conflict with the new selection. To prevent this, selections may be locked. Locked cells are blue. A selection in conflict with a locked selection will not be performed.

Locking and unlocking all selections

Do the following:

1. Select an excluded (gray) value.
Note that your old selection disappears.
2. Click  on the toolbar. This will lock all selections, preventing them from being cleared by mistake.
3. Try to select an excluded value in another list box and note that it is not possible.
4. To unlock all selections, click  on the toolbar.

Locking and unlocking individual fields

It is also possible to lock fields individually.

Do the following:

1. Select *Albania* in the list box **Country**.
2. Right-click on the list box **Country**, then choose **Lock** from the shortcut menu.
This will lock the selected field values of this specific field. Because the field *Albania* also exist in the multi box called **Multi Box**, it is also locked there.
7. To unlock the selection in one field, choose **Unlock** from the shortcut menu of the list box containing it, or from the **Selections** menu.

If there are no selected items in the list box, the **Lock** command in the shortcut menu is inactive (dimmed).

Searching values

QlikView includes different ways of searching for values in your data.

Normal text search

To find values in list boxes, especially in list boxes with many values, you can use the text search. Suppose you are looking for the value *Greece*.

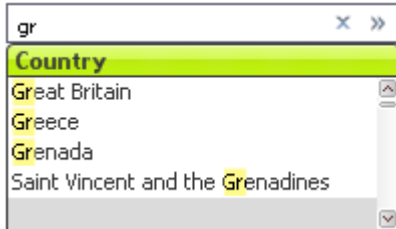
Do the following:


1. Clear your selections.
2. Click on the title bar of the list box **Country** (on the *Sales* sheet) to make it active.

Active sheet objects have a green title bar in this document.

3. Type the letters *gr*.

The search string appears in a separate window. Now the list box shows only countries containing a word starting with “gr”.



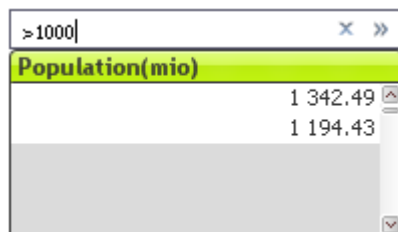
Instead of just starting to type you may also choose **Search** from the **Edit** menu or click  on the toolbar. List boxes can also be configured to hold a little search icon in the captions. These icons can be clicked directly to open the search window. Pressing the Enter key will select all values matching your search string. You can also click on the country you wish to select from the search results.

Numeric search

Similarly, if the search is made in a field containing numeric data, you can start your search string with greater than “>” or less than “<” and then type a number. Suppose you want to select all countries with a population above 1 billion.

Do the following:

1. Clear your selections.
2. Click on the title bar of the list box **Population(mio)**.



3. Type *>1000*. The string appears in a separate window. Only numbers above 1000 are now available in the list box.
4. Press Enter to select them.

The sheet objects are updated to reflect the result of the selection.

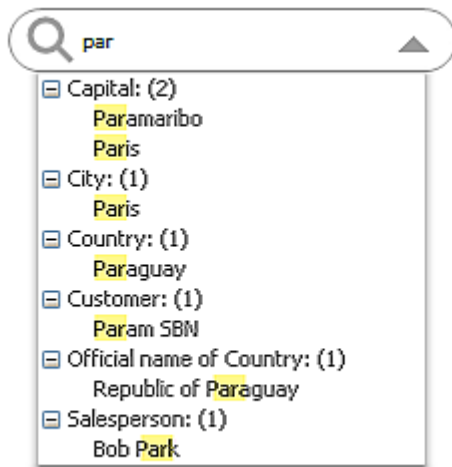
Using a search object

With the search object you can search simultaneously in multiple fields or all fields in the document.


Do the following:

1. Clear your selections.
2. On the *Geography* sheet, click the search bar located above the table box.

3. Type *par*.



As you can see, the search object offers you several hits for this search string, grouped by the fields containing these values. To select values you can click on a value or on a field name to select all hits for this field. You can even select several hits by holding the Ctrl key while clicking, provided that the selected values are logically compatible with each other. You can use this kind of general search to find associated values in a list box.

To do so, click the chevron  in the search window when searching in a list box. Apart from the search options explained here, you can perform a fuzzy search to find values similar to your search string or an advanced search to use search expressions. For more information, see the QlikView online help.

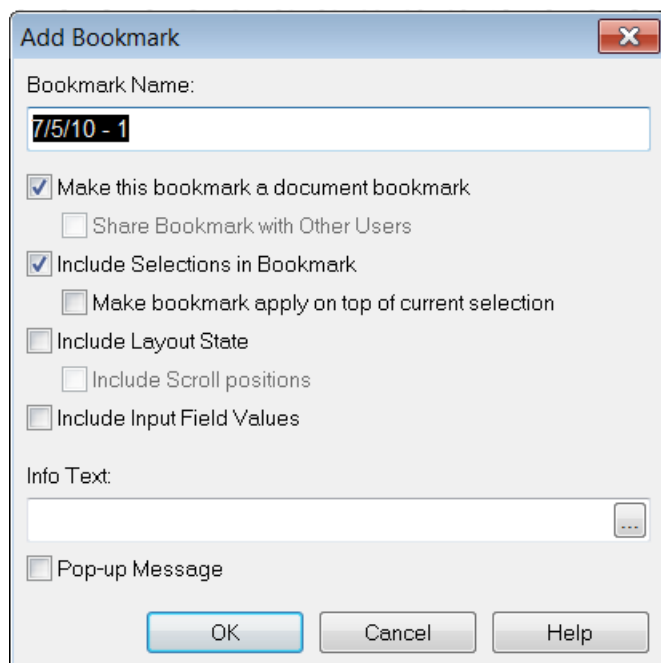
Selection bookmarks

It is possible to save a set of selections for later use.

Do the following:

1. Select one or several values, then choose **Add Bookmark** from the **Bookmarks** menu. The default name for the created bookmark is that of the current date (displayed in the **Add Bookmark** dialog, see the picture below).

2. Change the name of the bookmark in the dialog if you wish, and then click **OK**.



3. Open the **Bookmarks** menu and note that the bookmark you just created is included in the list of created bookmarks.
4. Clear the current selections.
5. To show the saved set of selections again, simply select the bookmark in the list.

A maximum of ten bookmarks can be displayed in the list. To see additional bookmarks, to get more details on a specific bookmark or to delete a bookmark, choose **More** from the **Bookmarks** menu.

Bookmarks can also be created and selected using a bookmark object in the layout.

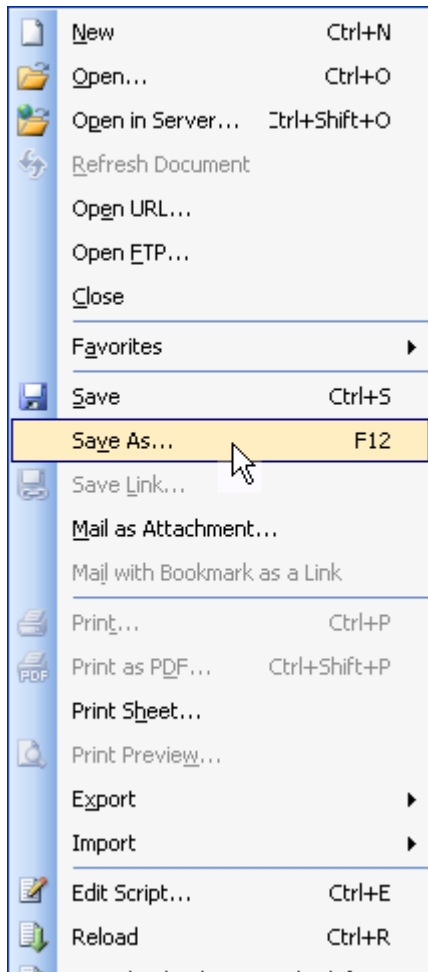
Creating a bookmark object (page 85)

Now that you have learned how to make selections in QlikView, it is time to describe the components of the document more thoroughly. The most basic component is the sheet, which will be introduced in the next lesson.

Saving your work

If you do not want to turn to the next lesson right away, you can close the document. You should also save the document, since the following lessons are based on the work you have done so far.

1. Choose **Save As** from the **File** menu to save a copy of the document.



2. Type *MyTutorial.qvw* or something similar in the **File** name box, then click **Save**.

You can now close the file:

3. Choose **Close** from the **File** menu.

If you will not be working with QlikView for a while, you can also exit the program:

4. Choose **Exit** from the **File** menu.

Checking your work

Open the file *TutorialFinal* from the folder *Working with QlikView* and compare it with the one you just saved.

2.2 Handling sheets and sheet objects

This lesson introduces the sheet, which is the most basic component of a QlikView document. You will learn about the logical connection between sheets. Another objective is to create a sheet, add sheet objects to it and size as well as position them. To facilitate these tasks you will display and use the layout toolbar. Basic object formatting is also included at the end of this lesson.

Opening the document

If you closed the document and exited QlikView after the previous lesson, you need to open it again.

1. Start QlikView by double-clicking the QlikView icon on your desktop.
2. Open the *MyTutorial.qvw* file. If you used the file recently you can open it directly from the **Recently Opened Documents** tab on the **Start** page.

Opening a document (page 10)

Sheets

The sheet can be considered the most basic component of QlikView because it holds all the different objects. A document usually contains several sheets, which is useful when you want to achieve a more structured layout. Any sheet object can be put on any sheet. The sheets will, however, still be logically connected, which means that a selection made on one sheet will affect all sheet objects on all other sheets.

Each sheet has a tab associated with it. the tab helps you find the sheet you are looking for because it contain the sheet's name. By clicking on a tab, you activate the sheet attached to it. You can recognize an active tab from the bold text.

Logical connections between sheets


There are two sheets in your document: *Geography* and *Sales*. *Geography* is the active sheet. The sheets are logically connected, that is a selection made on one sheet will affect all sheet objects on all other sheets.

Do the following:

1. Click the tab *Sales*.
The tab name changes from normal to bold, and the sheet associated with it is shown.
2. Select the value *Albania* in the list box **Country**.
The cell of the selected value turns green and you immediately see all the values of all other fields that are compatible with the selection (white). You see that the fictive company has one customer in *Albania*, *Moe's Laundromat*, and that *John Lemon* is responsible for the sales.
3. Go to the sheet *Geography* by clicking on its tab.



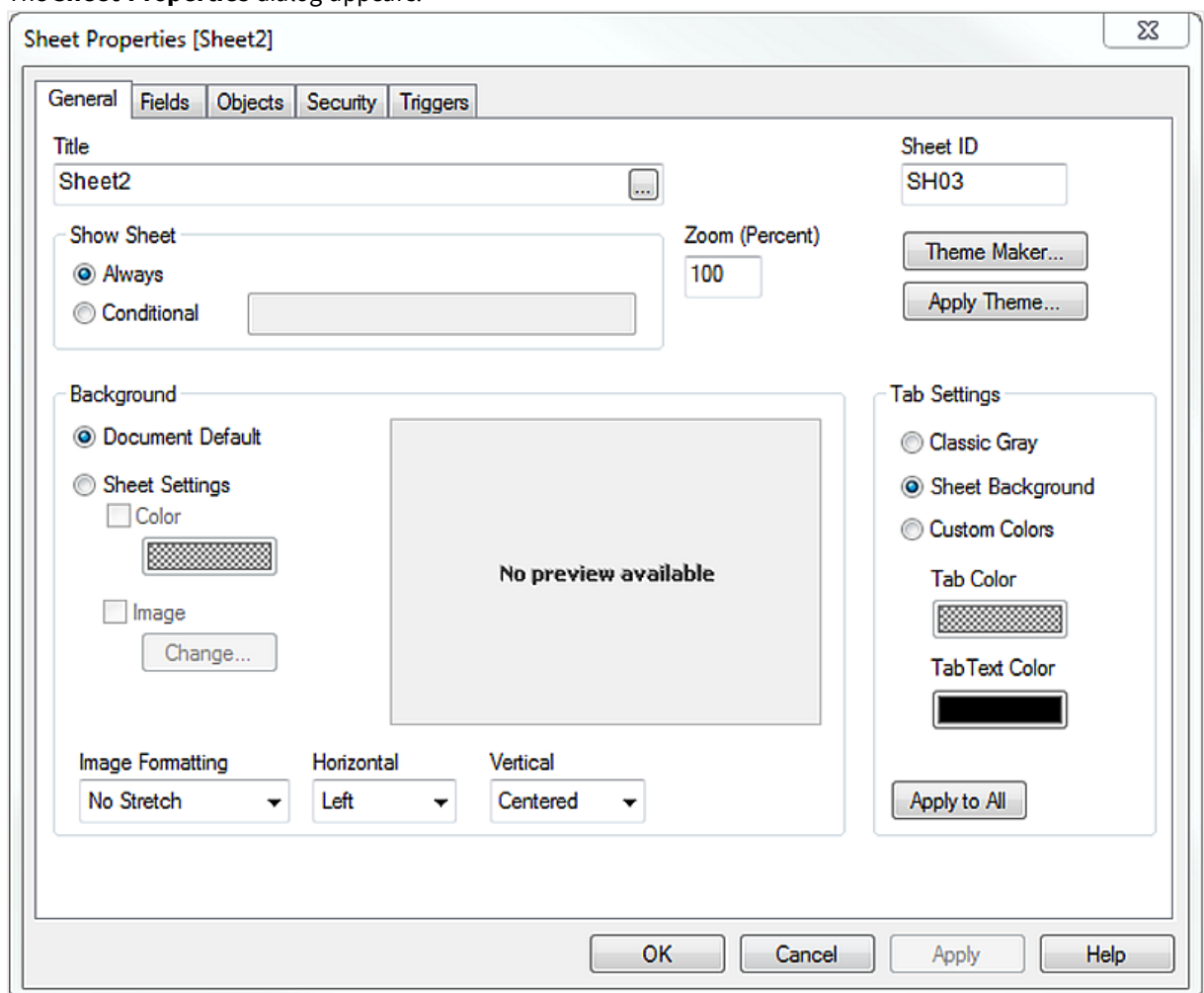
The sheet *Geography* also contains a **Country** list box. Note that the value *Albania* is selected (green) in this list box too, although you made your selection on the sheet *Sales*. The green dot on the tab *Sales*. This is a selection indicator, helping the user to keep track of selections made on other sheets. If referring to a locked selection, the selection indicator is blue.

4. Click the tab *Sales*.
5. Select the item *Cezar Sandu* (currently excluded) in the list box **Salesperson**.
You immediately see that *Cezar Sandu* has been active in *France*, *Germany*, and *Mongolia*. The item *Albania*, which is not compatible with the selected item *Cezar Sandu*, has been excluded.
6. Click the tab *Geography*.
The data displayed in the sheet objects has been updated to show the result of the new selection: *France*, *Germany*, and *Mongolia*, as well as the items related to these countries, are shown as optional (white).
7. Clear your selections by clicking  in the toolbar.

Adding a sheet

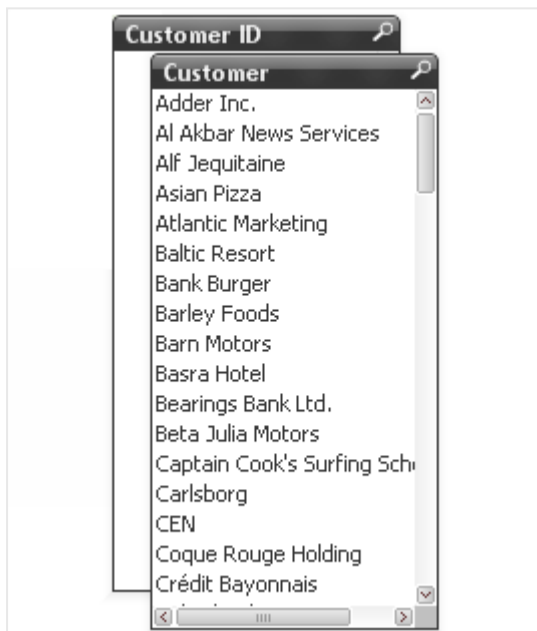
Do the following:

1. Choose **Add Sheet** from the **Layout** menu.
A new sheet appears.
2. Right-click the empty sheet and choose **Properties** from the shortcut menu.
The **Sheet Properties** dialog appears.



3. On the **General** tab, change the title from *Sheet2* to *Customers*.
By default, a new sheet inherits the default background that is set in the document properties. If you want the sheet to have a different background, you can set a special background color or image for the sheet in the **Background** group on the **General** tab. We will leave this setting unchanged.
4. Still in the **Sheet Properties** dialog, click the **Fields** tab.
5. Select **Customer**, then click **Add >**.
The field has now been moved to the column of displayed fields, which means that it will appear as a list box on your sheet.
You can also double-click fields in the left column to move them to the right .
6. Double-click the field name **Customer ID**.
7. Click **OK** to close the dialog.

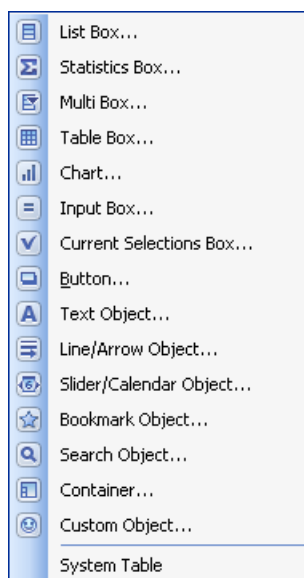
You have now created a new sheet containing two list boxes. The list boxes are not placed where you want them, you will fix this soon.



Instead of creating a new sheet, it is also possible to right-click an existing sheet and selecting **Copy Sheet**. When copying a sheet, all sheet objects on that sheet are copied at the same time.

Adding new sheet objects

If you right-click somewhere on the *Customers* sheet, and then select **New Sheet Object**, you see this list of all the sheet objects that can be used in QlikView.



All the sheet objects except buttons, text objects and line/arrow objects can be used for making selections in the data. All sheet objects may be used for viewing the result of selections.

The *Customers* sheet created in the previous lesson contains two list boxes, **Customer** and **Customer ID**. Suppose you want to add a third sheet object: a list box containing countries.

Do the following:

1. Make sure that the *Customers* sheet is active, then right-click somewhere on the sheet.
2. Select **New Sheet Object**, then **List Box**. The **New List Box** dialog opens.
3. On the **General** tab, select **Country** from the **Field** drop-down list.
4. Click **OK**.

The **Country** field now appears as a list box on your sheet *Customers*.

Moving a sheet object

To move a sheet object you, select it with the mouse button, then keep the mouse button depressed while dragging it. To move a sheet object step by step, press Ctrl+arrow. For bigger steps, use Ctrl+Shift+arrow.


Do the following:

- On the sheet *Customers*, align all sheet objects vertically on the left hand side of the sheet.

Undo layout change

QlikView maintains a list of the latest layout changes. You can use the **Undo layout change** command to take you backwards one step in the list whenever something goes wrong or the result of the last change was not satisfactory. **Undo layout change** refers to moving, sizing and removing sheet objects as well as changes to document, sheet and sheet object properties.

Do the following:

- Click  on the toolbar to undo your latest layout change. The list box moves back to its previous position.



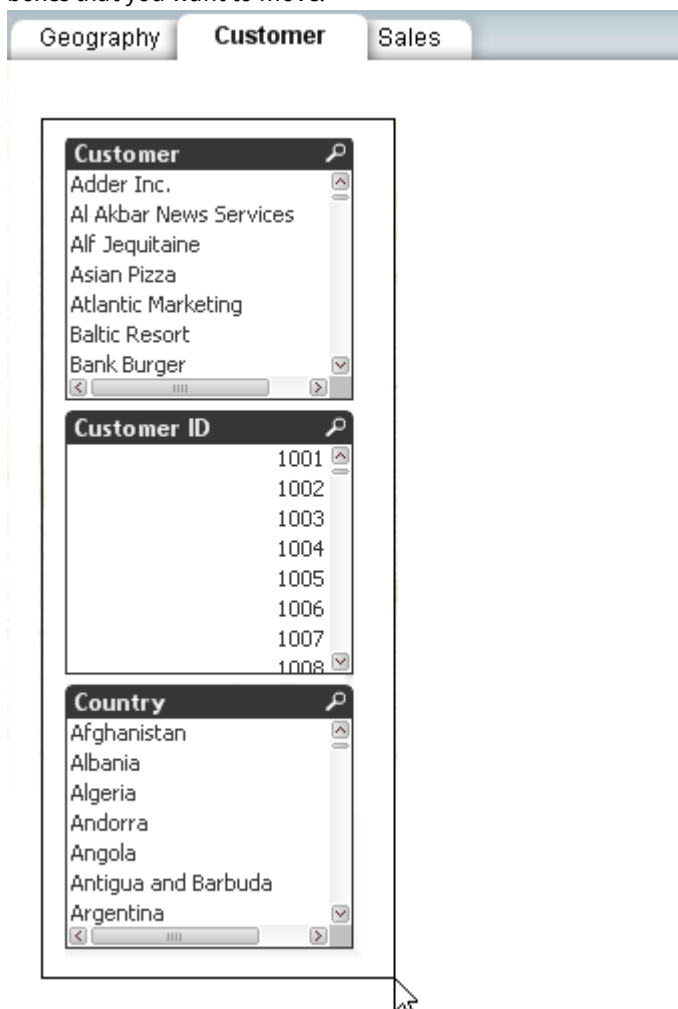
You can also press Ctrl+Z to undo your changes.

Selecting and moving several sheet objects simultaneously

To move several sheet objects at the same time, start by selecting them.

Do the following:

1. On the sheet *Customers*, place the cursor in the top left corner, then drag a rectangle enclosing all the list boxes that you want to move.



Note that the title bars of the enclosed list boxes turn green after you let go of the mouse button. This means that they are selected, that is active.

2. Place the cursor on the title bar of one of the list boxes, then drag.
All the selected list boxes are moved.

If the list boxes are not perfectly aligned, do not worry - you will fix this in a moment.

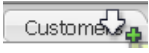


It is also possible to select several sheet objects by Shift-clicking their title bars. To select all objects on a sheet, press Ctrl+A.

Copying sheet objects

To copy a sheet object on the same sheet, press the Ctrl key while placing the cursor on the title bar of the object that you want to copy. Drag the cursor to the place where you want to put the copy of the sheet object. You can either copy sheet objects to another place on the same sheet, or to another sheet.

Do the following:

1. Click the tab *Geography*.
2. Press the Ctrl key while placing the cursor on the title bar of the list box **Country**.
3. Drag the list box to the tab *Customers*.
4. When the cursor turns into a white arrow on the tab *Customers*, release the mouse button, then the Ctrl key. 
5. Click the **Customer** sheet to make sure that a copy of the **Country** list box has appeared. Its position on the sheet is now the same as on the sheet from which it was copied. Move it to the right of the other **Country** list box.

Sizing a sheet object

You can size list boxes (and other sheet objects) by dragging the window frame of the object.

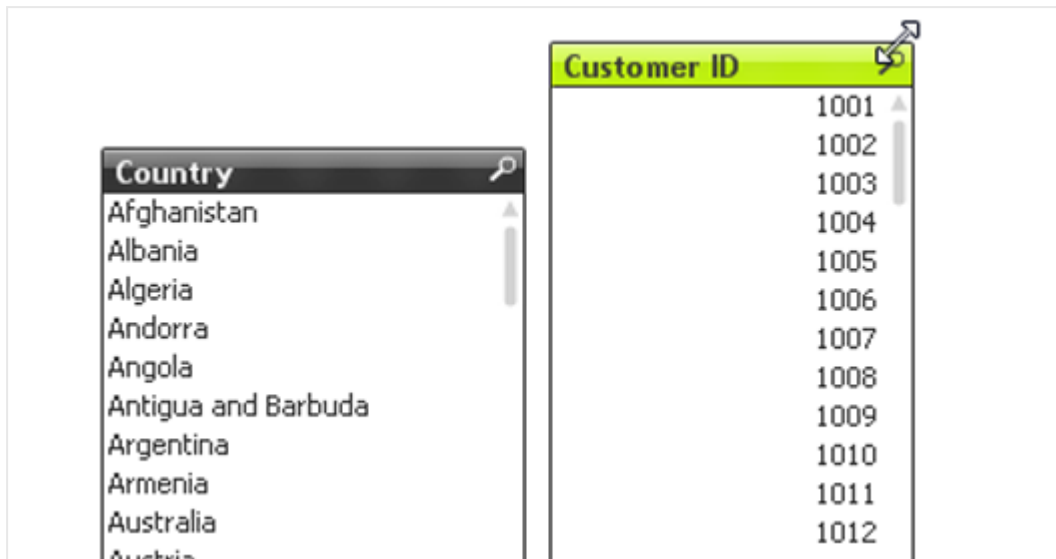
Do the following:

1. On the sheet *Customers*, click the title bar of the list box **Customer ID** to make it the only active list box.



If other list boxes are active, they will be sized as well.

2. Move the cursor to one of the corners of the list box until the appearance of the cursor changes.





3. Press the mouse button and drag the corner.

The **Customer ID** list box now overlaps the list box next to it. You will deal with this in the next section.

Aligning and distributing sheet objects on the sheet

There are several commands that help you tidy up the layout of your sheets by aligning and spacing your sheet objects.

Do the following:

1. Select all list boxes on the *Customers* sheet.
You can tell from the green title bars which list boxes are selected (active).
As you are going to align the list boxes vertically, you may want to make them a little smaller. While several list boxes are selected (active) at the same time, you can size them all at once by dragging one of the window frames.
2. In the **Layout** menu, select **Align/ Distribute** and **Adjust Top**. 
The list boxes are now evenly spaced horizontally, but you also want them to be aligned to the left.
3. Select all list boxes again if necessary, then choose **Left Align**. 
4. While the list boxes are still active (green), move them down a little on the sheet.



*Feel free to experiment with the layout. You can always use **Undo Layout Change** or press **Ctrl+Z** (Windows standard) to undo your layout changes.*

Displaying and using the design toolbar

If you use a QlikView document only for making selections, the standard and navigation toolbars are sufficient: they contain the most common commands for working with a document. However, as soon as you modify the layout, add objects etc., the design toolbar may be helpful. The design toolbar contains commands for adding

sheet objects, moving sheets, and adjusting the layout.



Do the following:

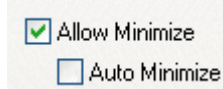
- Select **View > Toolbars > Design** to show the design toolbar.

Minimizing and restoring a sheet object

List boxes and other sheet objects can be minimized if, for some reason, you do not want them on the screen now but might need them again later.

Do the following:

1. On the **Geography** sheet, right-click the **Capital** list, and choose **Properties**.
2. On the **Caption** tab, select **Allow Minimize**, and click **OK**.



The minimize symbol appears in the top right corner of the list box. ▢

3. Click the symbol or double-click the title bar of the list box.
The list box turns into an icon, which is placed where there is space on the sheet. The icon can be moved freely.



4. Restore the list box by double-clicking the icon.

Auto minimizing

Auto minimizing is a useful function where only one of the charts on a certain sheet will have its full size at any given time. The others are minimized to save space on the sheet. The charts **Area** and **Population** on the *Geography* sheet have been preset to **Auto Minimize**.

Container object

The container object is a tool for showing several object types in a limited space. For more information, see the QlikView online help.

Removing a sheet object

If you have followed all the steps above, there are two **Country** list boxes on your sheet *Customers*. Since you only need one, the other can be removed.

Do the following:

1. On the sheet *Customers*, right-click on one of the **Country** list boxes, and click **Remove**.
2. Click **OK**.
The list box disappears from the screen.




You can also remove a sheet object by selecting it and pressing the Delete key.

Changing the border of a sheet object

Every sheet object has a border that can be given a number of different layouts. You can change the border layout.

Do the following:

1. Right-click the list box, and choose **Properties**.
2. On the **Layout** tab, select a border style of your choice.
3. Click **OK**.
To keep a consistent layout, you should undo your change regarding the border.
4. Click **Undo Layout**. 



If you want all the sheet objects in the document to have the same border, you should change the setting on the **Layout** tab of the **Document Properties** dialog instead.

Setting properties (page 86)

Changing the font of a sheet object

You can change the font and its size, color and style.


Do the following:

- To change the font of a single object, open the **Font** tab in the **Properties** dialog of the particular object.
 - To change the font of the entire document, open the **Font** tab of the **Document Properties** dialog.
- Setting properties (page 86)*

Copying layout formats between sheet objects

If you want to copy formats from an existing sheet object to other sheet objects, you can do this by using the **Format Painter**. The statistics box **Population (mio)** on the *Geography* sheet does not have the same layout as the other sheet objects. You can easily change that.

Do the following:

1. Select a sheet object that has the correct layout, for example the table box, so that its caption turns green.
2. Click  on the **Design** toolbar.
3. Click the statistics box **Population (mio)**.
The layout (border and caption) of the statistics box changes.

Using the format painter for several sheets

You can use the **Format Painter** tool for any sheet object. You can also use it for several sheet objects at once. Just click the source object, then double-click on the **Format Painter** button and click on each of the target objects. To end the “painting”, click the **Format Painter** button again or press Esc.

Linked objects

If you want several objects to have the same layout properties, you can use linked objects. These are objects that share all properties with the exception of size, position and display state (minimized, normal or maximized). When you change the properties of one object the change is immediately reflected in the other linked objects. Linked objects can reside on the same sheet or on different sheets.

Do the following:

1. Right-click a sheet object and click **Copy to Clipboard > Object**.
2. Right-click somewhere on the sheet (or on a different sheet) and click **Paste Sheet Object as Link**.
3. Save your document.

Saving, closing and exiting

If you don't want to turn to the next lesson right away, you can close the document. You should also save the document, since the following lessons are based on the work you have done so far.

2.3 List boxes and statistics boxes

In the previous lesson you learned to add, copy, move, size and remove list boxes and other sheet objects. You will now learn to modify a list box and its way of displaying data. The sort order and the number format are examples of properties that you will change. At the end of the lesson, you will also learn how to create and use a statistics box.

Opening the document

If you closed the document and exited QlikView after the previous lesson, you need to open it again.

1. Start QlikView by double-clicking the QlikView icon on your desktop.
2. Open the *MyTutorial.qvw* file. If you used the file recently you can open it directly from the **Recently Opened Documents** tab on the **Start** page.
Opening a document (page 10)

The list box

The list box, which is the most basic object on the screen, contains a list of all the values of a specific field (column) in the database.




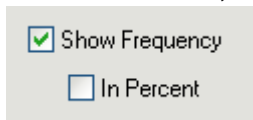
All the values contained in the database field are shown in the list box. If there is not enough space to show all values in the visible part of the list box, scroll bars are displayed on the right in the bottom. If a value occurs several times in one and the same field, it will only be displayed once in the list box.


Showing frequency

Suppose you are interested in knowing how many customers you have in different cities.

Do the following:

1. Clear your selections. 
2. On the *Sales* sheet, right-click the **City** list box, and click **Properties**.
3. On the **General** tab, check **Show Frequency**.



4. Click **OK**.
Any city in the list box is now followed by its number of occurrences in the data. As the field **City** is part of the customer data, we can interpret this as the number of customers. In *Alma-Ata* we have two customers, for example.
5. Undo the change that you made, using **Undo Layout Change**. 

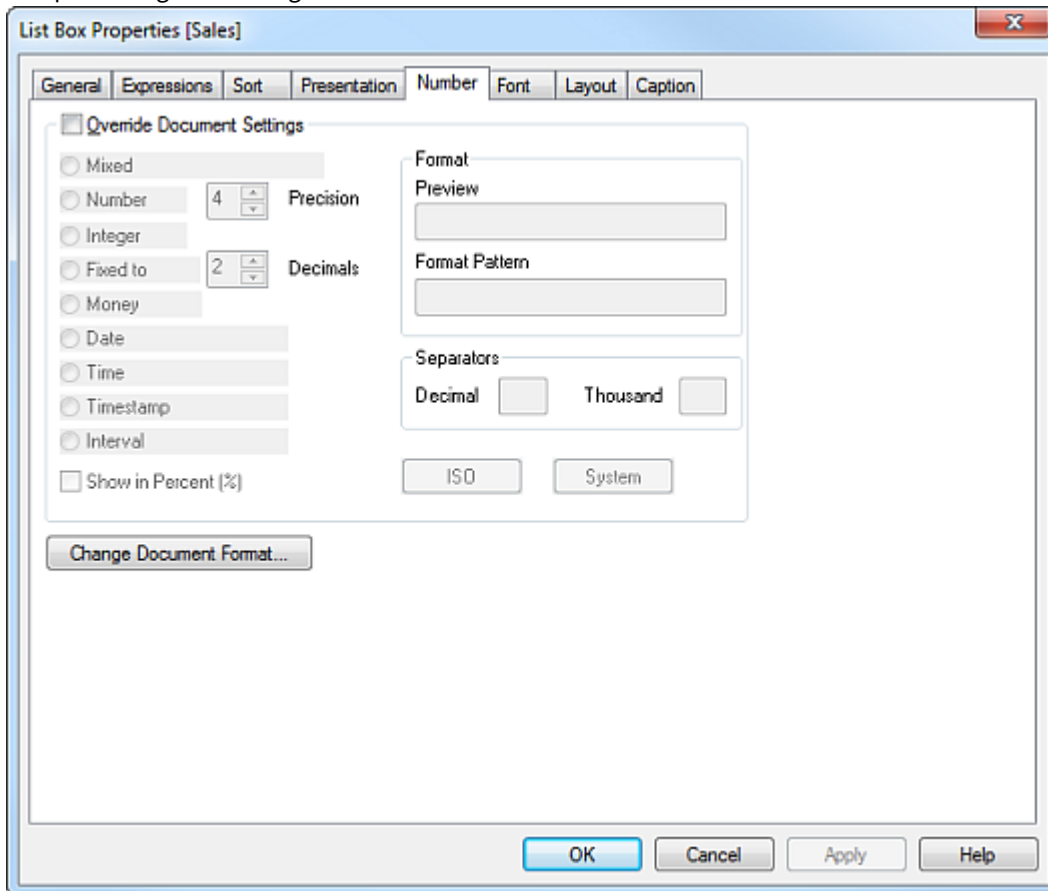
Changing the number format

Numeric data can be of different types and can be formatted in different ways.

Do the following:

1. Right-click the list box **Sales**, and choose **Properties**.
2. Click the **Number** tab.
The number format of the field **Sales** is disabled because all number formats are inherited from the document's default settings. Furthermore, the default settings in the document are affected by your

computer's regional settings.



3. To create a separate number format for the **Sales** list box, check **Override Document Settings**.

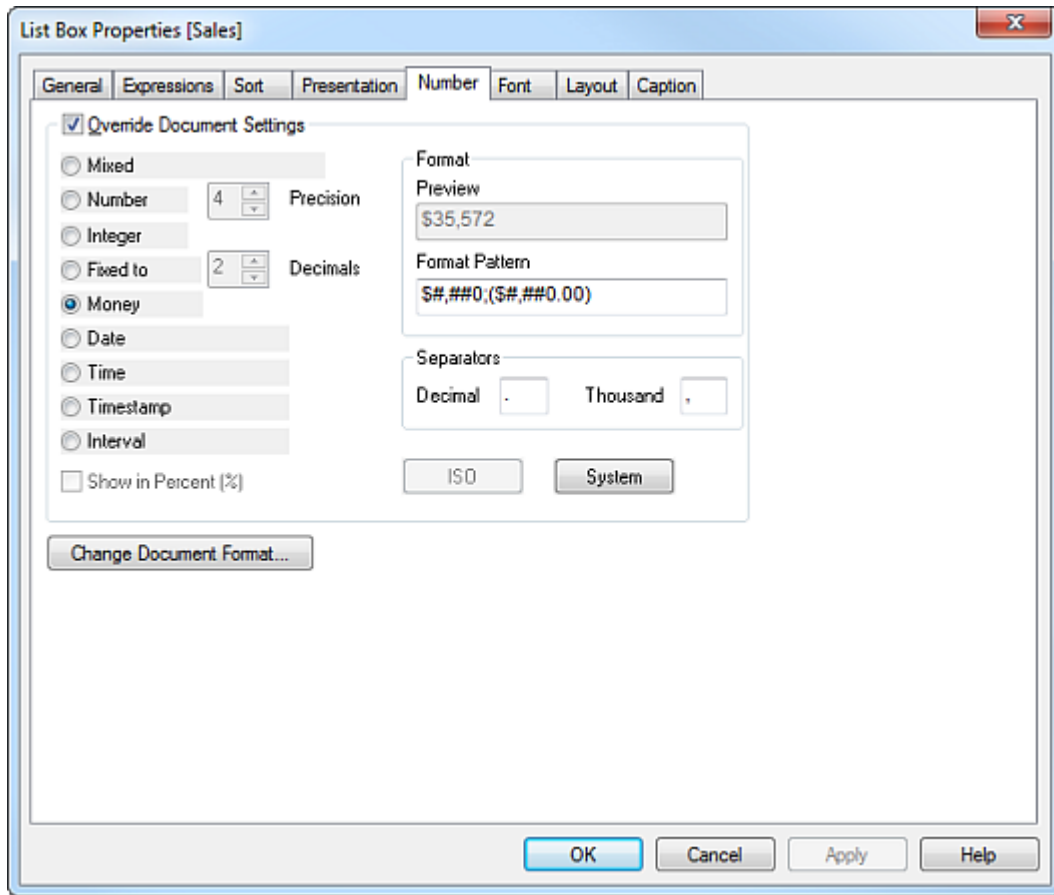
4. Select the option **Money**, then click **OK**.

The values in the list box **Sales** are now formatted differently (you may need to size it first): a comma has appeared as thousands separator and the values are preceded by a \$. Two decimals have been added.

Sales
\$990.00
\$999.00
\$1,000.00
\$1,010.00
\$1,019.00
\$1,030.00
\$1,039.00
\$1,059.00

5. Open the **Properties** dialog again.

6. Under **Format Pattern**, erase the two decimals (the zeros) and the decimal point that precedes them.



If you cannot erase the zeros, or have different number formats by default, you need to change your computer's regional settings.

7. Click **OK** to close the dialog.
The decimals are no longer visible.

Sales	
\$990	⌵
\$999	⌵
\$1,000	
\$1,010	
\$1,019	
\$1,030	
\$1,039	
\$1,059	⌵

Changing the sort order

A number of different sort orders are available for each list box. Numeric fields are usually sorted by numeric value, whereas fields containing text tend to be sorted in alphabetical order (Text). In addition, list boxes whose values are not all visible (list boxes with scroll bars) are set to **Sort by State**, which means that the values are sorted according to their logical state (selected, optional, excluded). This way, selected and optional values are always visible in the document.

Do the following:

1. On the *Sales* sheet, right-click the list box **Sales**, and choose **Properties**.
2. Click the **Sort** tab.

The list box **Sales** is sorted by **State** and **Numeric value**, Ascending. The order of the sort options in the list corresponds to the priority sort order.



As long as no selection is made, the values in the list box **Sales** are sorted by numeric value. When a selection is made, however, the state of the values determines the sort order.

3. Keep the option **Numeric value** selected, and click **Descending** from the drop-down box.
4. Click **OK**.
The highest number is now at the top. As soon as a selection is made, however, the selected (green) value (s) or optional (white) values will be placed at the top.
5. Make a selection in the list box and study the result.
6. Clear your selections.

Changing the number and order of columns

To display the contents of a list box in several columns.

Do the following:

1. Clear your selections.
2. On the *Sales* sheet, right-click on the **Day** list box, then choose **Properties**.
3. On the **Presentation** tab, clear the **Single Column** check box and select **Cell Borders**. Click **OK**.
4. If necessary, drag the border of the **Day** list box until its contents are displayed in seven columns.
The values are ordered by column, that is vertically.
You may prefer to have the values of the **Day** list box ordered by row:
5. Right-click the **Day** list box, then choose **Properties**.
6. On the **Presentation** tab, clear the **Order by Column** check box, then click **OK**.
The field values, instead of being ordered by column (vertically), are now ordered by row (horizontally).
Your list box now looks like this:

Day									
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31									



You can change the number of columns by changing the width of the list box. You change the width by dragging the borders with the cursor.

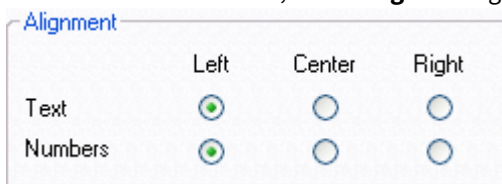
1. Adjust the **Month** list box so that the months are grouped by quarters.

Aligning the values

Text is usually left-aligned, numbers right-aligned. This setting can be changed on the **Presentation** tab.

Do the following:

1. Right-click the list box **Year**, and choose **Properties**.
2. On the **Presentation** tab, in the **Alignment** group, click **Left** for **Numbers**.



3. Click **OK**.

The statistics box

The statistics box is a compact way of showing a numeric field in which the separate records are not used until their sum or average has been calculated.


Sales	
Total count	713
Sum	2317233
Average	3,249.98
Min	690
Max	6990

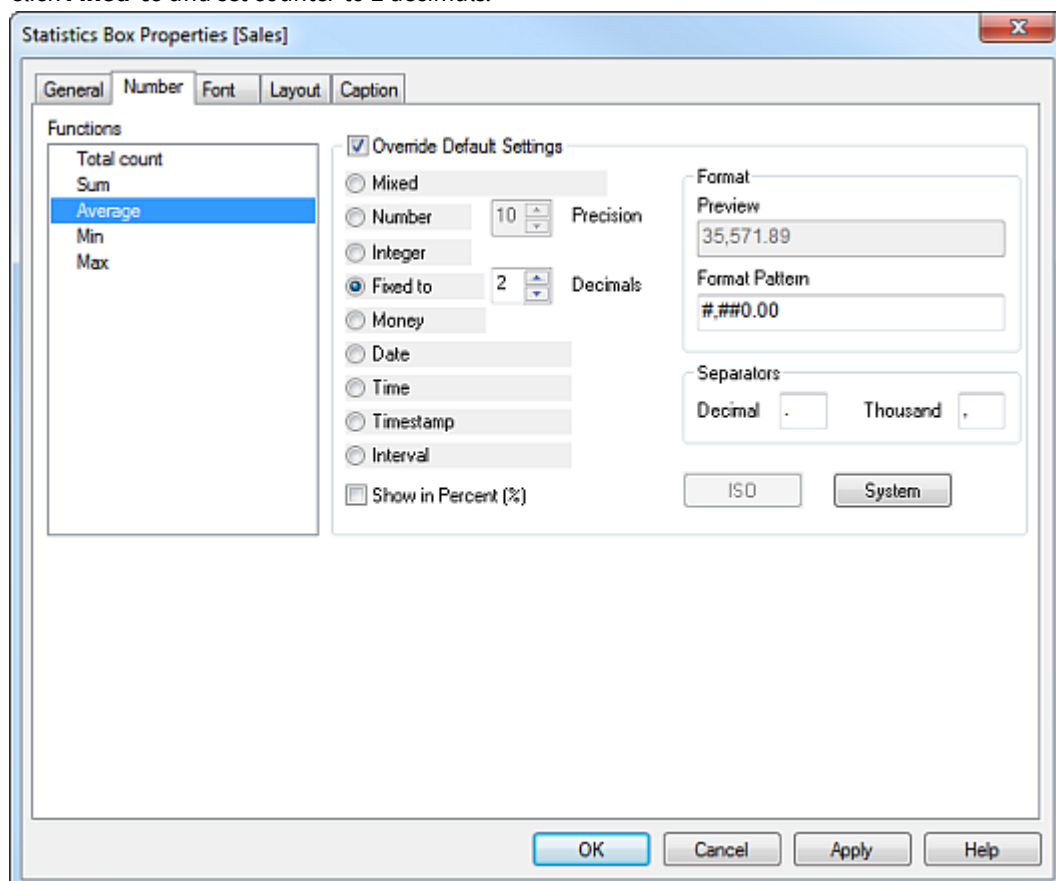
A number of different statistical functions can be used in a statistics box. It is also possible to make selections in the statistics box by clicking on some of the functions, for example **Min** or **Max**.

Creating a statistics box

1. Clear your selections.
2. On the *Sales* sheet, right-click the list box **Sales**, and choose **Create statistics box**.

A statistics box with the same name as the active list box appears on the screen. You might need to size it to see all the numbers properly.

3. Point to the right border of the statistics box. When it looks like the picture you can start dragging. 
The statistics box shows too many decimals at the moment.
4. To limit the number of decimals shown for each value, right-click the statistics box, and choose **Properties**.
5. Click the **Number** tab. Under **Functions**, select **Average** and check the **Override Default Settings**.
6. Click **Fixed to** and set counter to 2 decimals.



7. Click **OK**.
You immediately see that the average sales of a fictive company is USD 3,249.98. In addition, the you learn that the total sales is USD 2,317,233, and that 713 sales have been performed.



You can also create statistics boxes by choosing **New Sheet Object > Statistics Box** from the **New Sheet Object** menu or by clicking **Create Statistics Box** on the toolbar. 

Making selections in a statistics box

You can make selections in a statistics box by clicking on the non calculated functions, for example **Min** or **Max**.

Do the following:

1. In the statistics box, click the function **Max** to find the customer who made the biggest purchase. The selection is made in the list box to which the statistical value belongs.
2. Clear your selections.

Saving, closing and exiting

If you don't want to turn to the next lesson right away, you can close the document. You should also save the document, since the following lessons are based on the work you have done so far.

2.4 Bar charts and pie charts

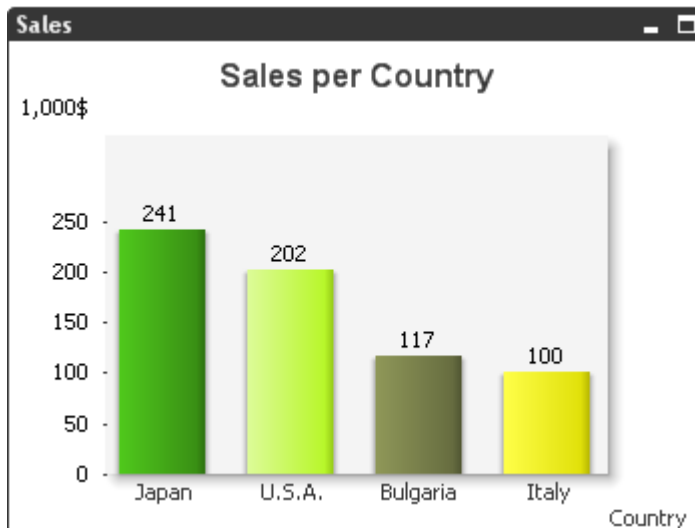
Due to the variety of chart subtypes, and considering the great number of available settings, the tutorial provides three lessons on charts. This lesson will start by giving you a general introduction to working with charts. Subsequently, you will create a simple bar chart. Once familiar with the basics, you will modify the properties of the chart and finally turn it into a pie chart.

Introduction

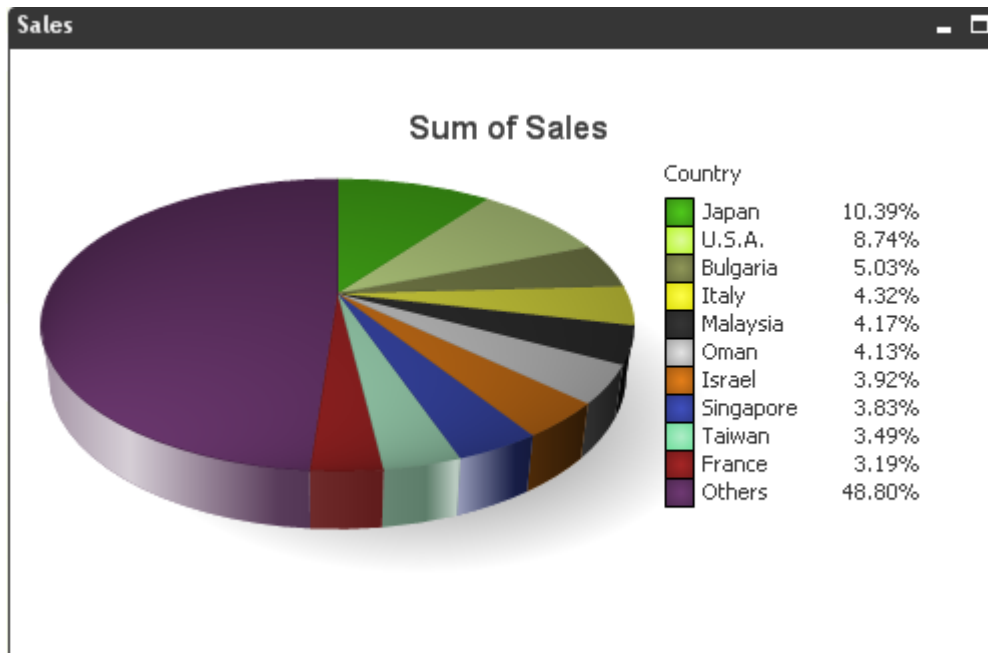
Charts and tables are sheet objects that can show numbers compactly. For example, you can show sums of money distributed over different fields such as year, month, account number. Numbers that are calculated using several records in the input tables (sums, averages, min, max) can only be shown in charts or statistics boxes.

Charts can be shown as:

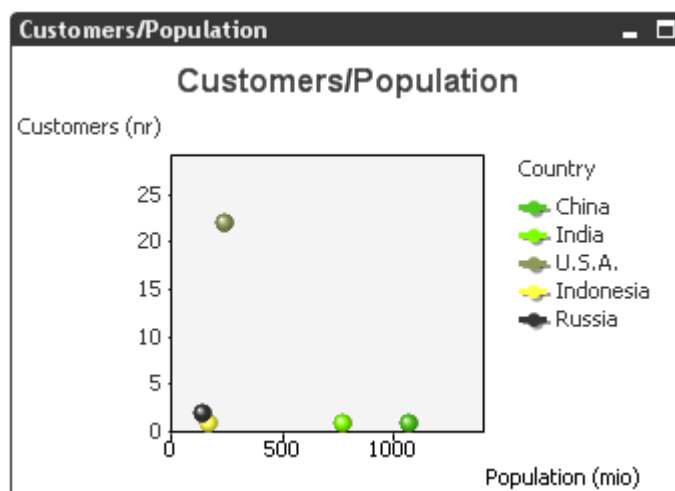
- Bar charts



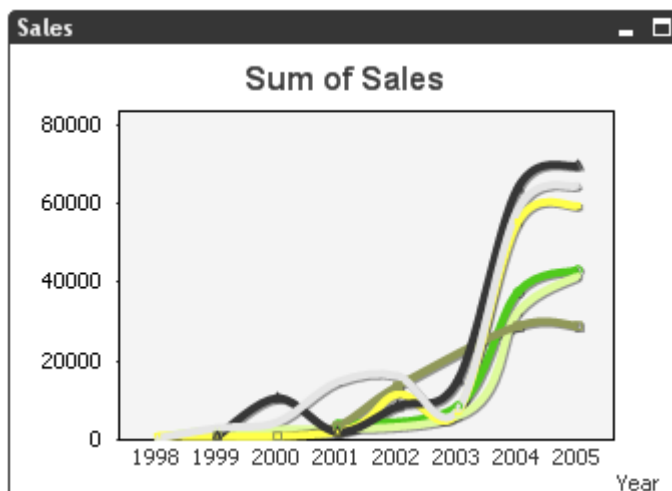
- Pie charts



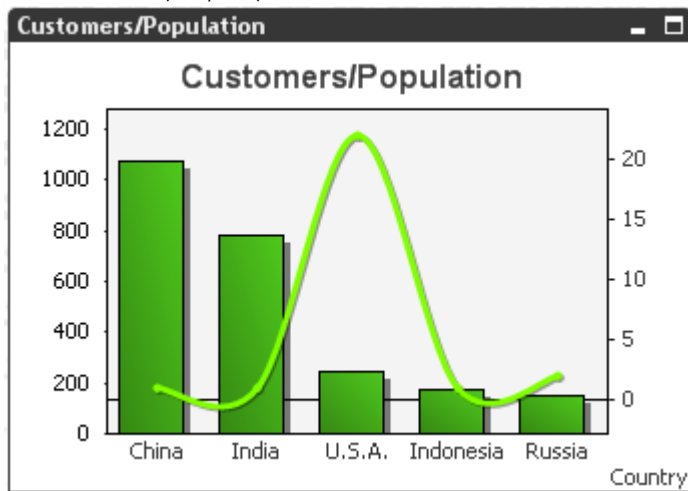
- Scatter charts



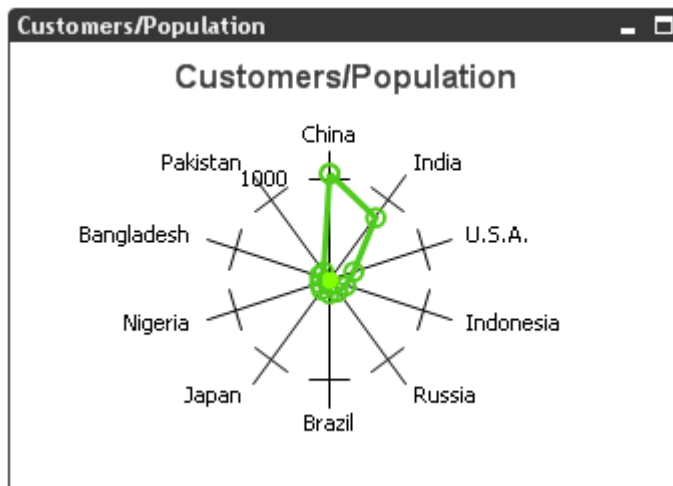
- Line charts



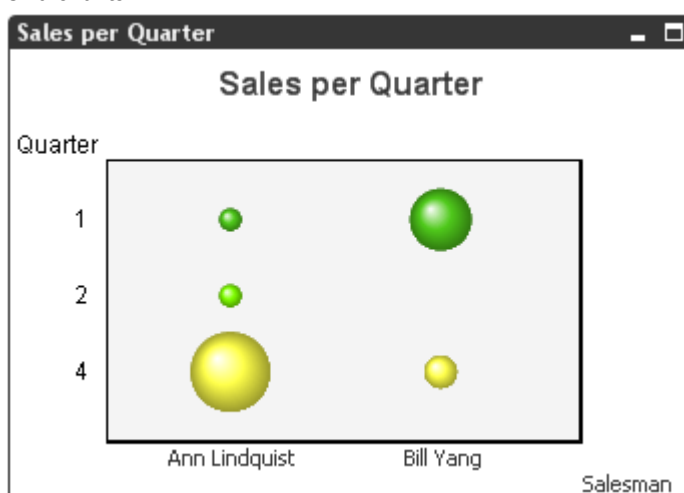
- Combo charts (bar/line)



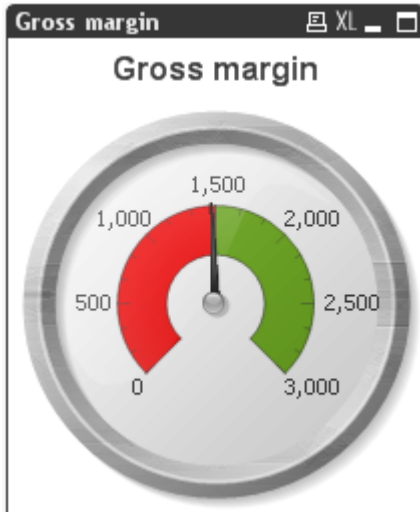
- Radar charts



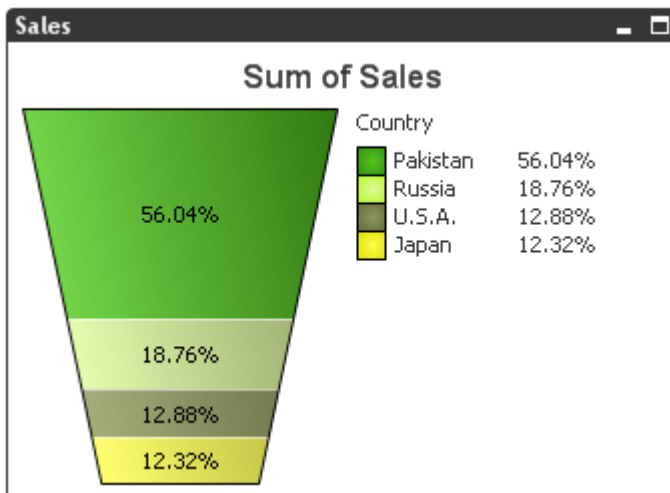
- Grid charts



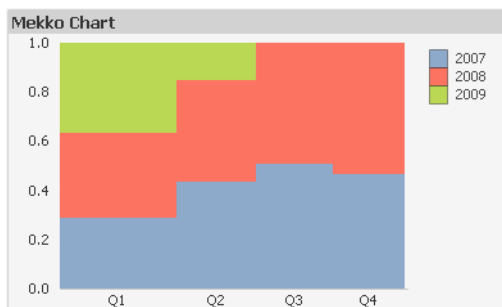
- Gauge charts



- Funnel charts



- Mekko charts



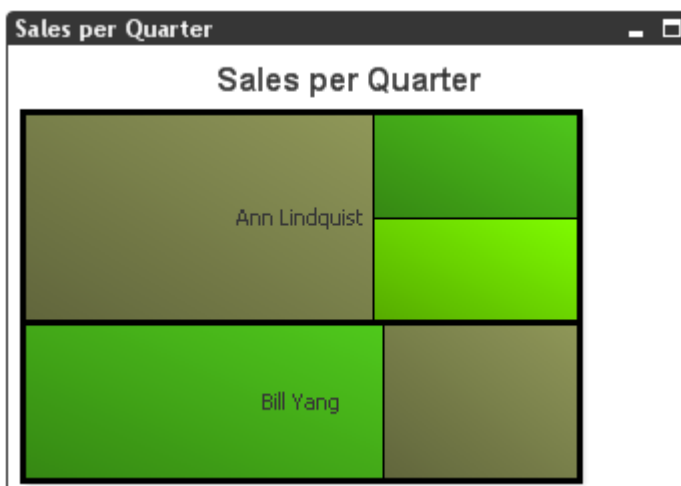
- Straight tables

Year	Salesperson	Country	Sales
			2317233
2004	Ann Lindquist	U.S.A.	3240
2006	Ann Lindquist	Bahrain	1090
2006	Ann Lindquist	Philippines	1270
2007	Ann Lindquist	Philippines	4150
2008	Ann Lindquist	Pakistan	2719
2009	Ann Lindquist	Pakistan	11379
2009	Ann Lindquist	Philippines	3290
2004	Bill Yang	Saudi Arabia	690
2005	Bill Yang	Greece	4720
2005	Bill Yang	Slovenia	859
2006	Bill Yang	Bulgaria	1290
2006	Bill Yang	Greece	900
2006	Bill Yang	Slovenia	1030
2007	Bill Yang	Russia	1850

- Pivot tables

Country	Salesperson	Year	Sales
Afghanistan			2,150
Albania			8,590
Armenia			1,850
Australia			2,240
Azerbaijan			5,329
Bahrain			1,090
Bangladesh			4,240
Belarus			26,065
Belgium	Charles Ingv...		8,059
	John Cleaves		2,550
		2008	2,500
	Tony Cedholt	2009	4,249
		Total	6,749
	Total		17,358

- Block charts

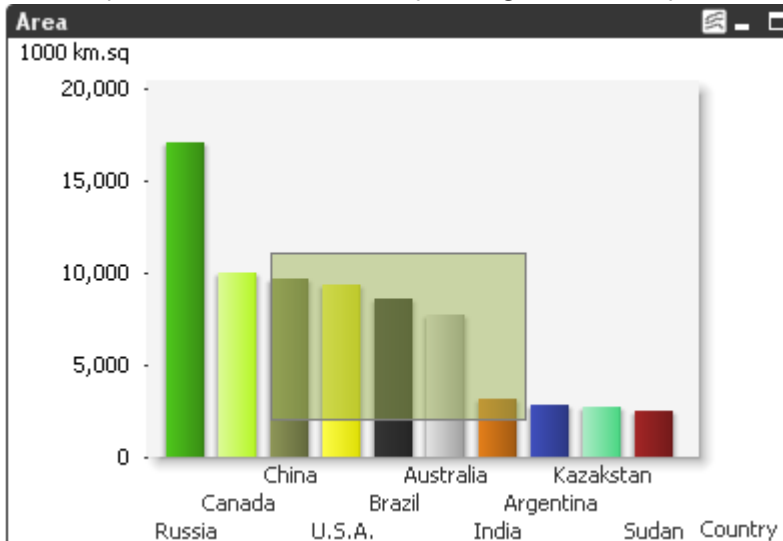


Making selections in a chart

Until now, we have only studied selections in list boxes. It is however also possible to select data in charts.

Do the following:

1. On the *Geography* sheet, place the cursor in the **Area** bar chart .
It shows the world's ten largest countries.
2. With the cursor, drag and select a few countries.
The countries represented by the bars have been selected. The change is reflected in the **Country** list box . It is also possible to make selections by clicking on the country names (labels) in the chart.



3. Select one or several countries.
4. Clear your selections.

Changing chart types using a fast type change

Some charts in QlikView are prepared to be displayed as more than one type. This is shown as a little icon, either in the chart's title bar or in the chart itself. The icon is a miniature representation of the next chart type that will appear if you click it.



Do the following:

1. Click the *Geography* sheet.
In the bar chart **Area** you will find a fast type change button next to the minimize button.
2. Click the **Fast type change** button.
The chart turns into a line chart. This chart has been prepared to change between three types of charts: bar, line and pie. If you click again the chart will turn into a pie chart.
3. Right-click the **Fast type change** button.
A drop-down menu will appear with the possible chart types.
4. Choose bar chart and you are back where you started.

All charts can be turned into any of the chart types available by going through the chart's **Properties** dialog that opens when you right-click a chart.

Creating a bar chart

The toolbars contain two options for creating charts.

- The **Quick Chart Wizard** button on the **Standard** toolbar 
The wizard helps you create some of the most common chart types in a few simple steps. The number of options is limited in the **Quick Chart Wizard**, but once the chart is finished, you can add all kinds of properties to it.
- The **Create Chart** button on the **Design** toolbar 
This option opens the full chart wizard in which you can set a greater number of properties from the very beginning.

If the toolbars are not visible, you display them by clicking **View > Toolbars**.

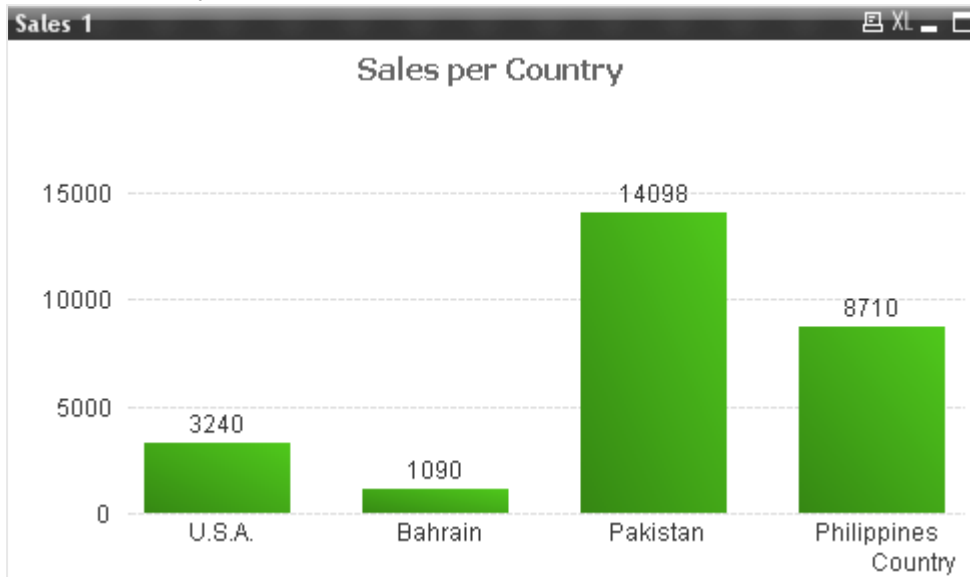
Creating a bar chart using the quick chart wizard

You will start by creating a simple chart showing the sum of sales per country.

1. Open the *Sales* sheet, and click **Quick Chart Wizard** on the **Standard** toolbar.
The **Quick Chart Wizard** opens.
Step 1 of the wizard contains icons representing different chart types.

The icon representing the bar chart is selected by default.
2. Click **Next >**.
The **Define dimension(s)** page opens.
To define the meaning of each bar in the bar chart, select a dimension. In this case each bar will correspond to a *Country*.
3. For **First Dimension**, select **Country** and click **Next >**.
The **Define Expression** page opens.
To define what value the height of the bars in the bar chart corresponds to, you need to define an expression. The answer, in this case, is the sum of sales for each country.
4. **Sum** is checked by default, and now you select *Sales* from the drop-down list and click **Next >**.
5. Keep the default settings for **Style**, **Orientation** and **Mode** on the **Chart format** page but check **Show Numbers** to show numbers above each bar.
6. Click **Finish**.
The chart now appears on your sheet. Due to different default settings on different computers, its colors may differ from the pictures in this tutorial.
7. To make additional adjustments to the chart, right-click it and select **Properties**.
8. On the **General** tab, type *Sales 1* for **Window Title**.
9. Make sure that **Show Title in Chart** is checked, and type *Sales per Country* in the box.
10. On the **Caption** tab, click **Auto Minimize**.
11. Click **OK**.
12. On the *Sales* sheet, select *Ann Lindquist* from the **Salesperson** list box.
The chart immediately displays the countries to which *Ann Lindquist* has sold products, as well as the

amounts of money involved.



Creating a bar chart using the full chart wizard

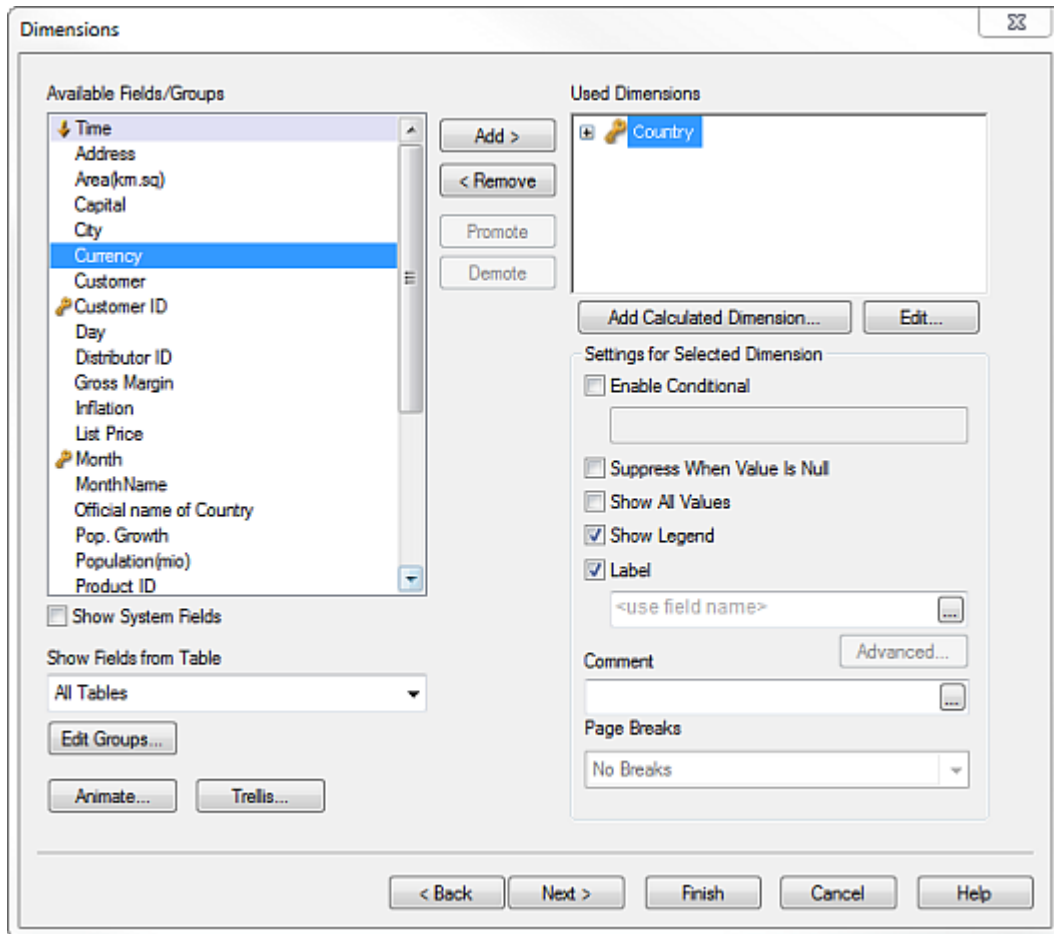
You will now create the same chart one more time - this time using the full chart wizard.

Do the following:

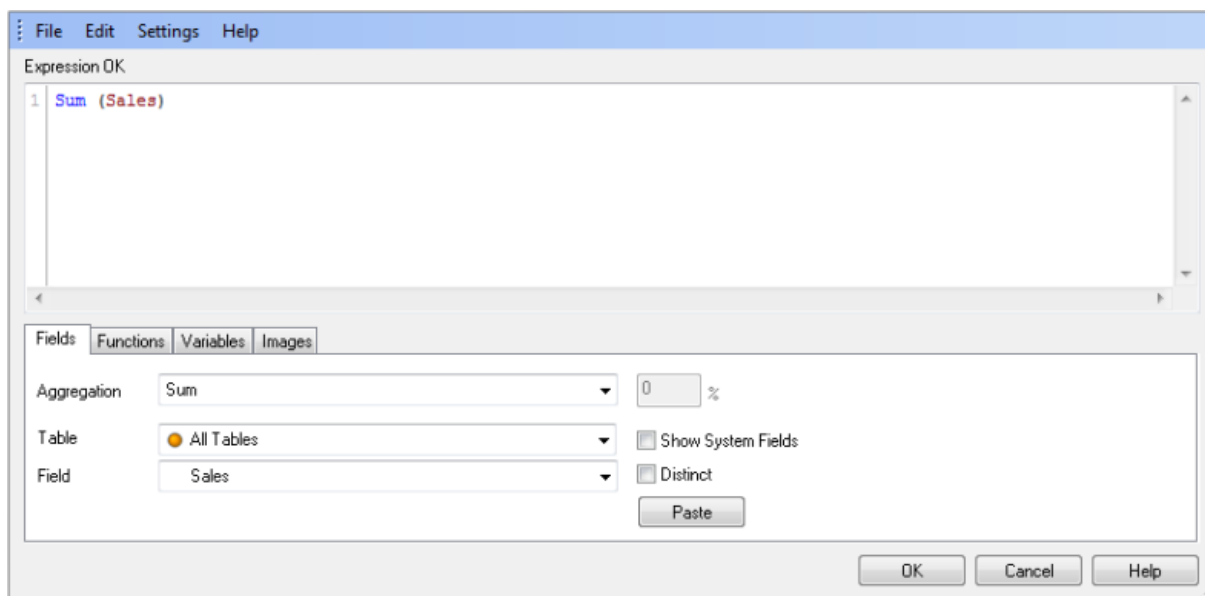
1. Open the *Sales* sheet, and click **Create Chart** on the **Design** toolbar.
The **General** page of the chart wizard appears. On this tab you can choose the type of chart you would like to work with. The bar chart option is selected by default. Leave it that way.
2. Type *Sales 2* for **Window Title**.
3. Make sure that **Show Title in Chart** is checked, and type *Sales per Country* in the box.
4. Click **Next >**.
The Dimensions page, where the dimensions to be shown on the x-axis is defined, opens.
5. Since you want each bar to represent a country, select **Country** from the list and click **Add>** to move it to the list of displayed fields.



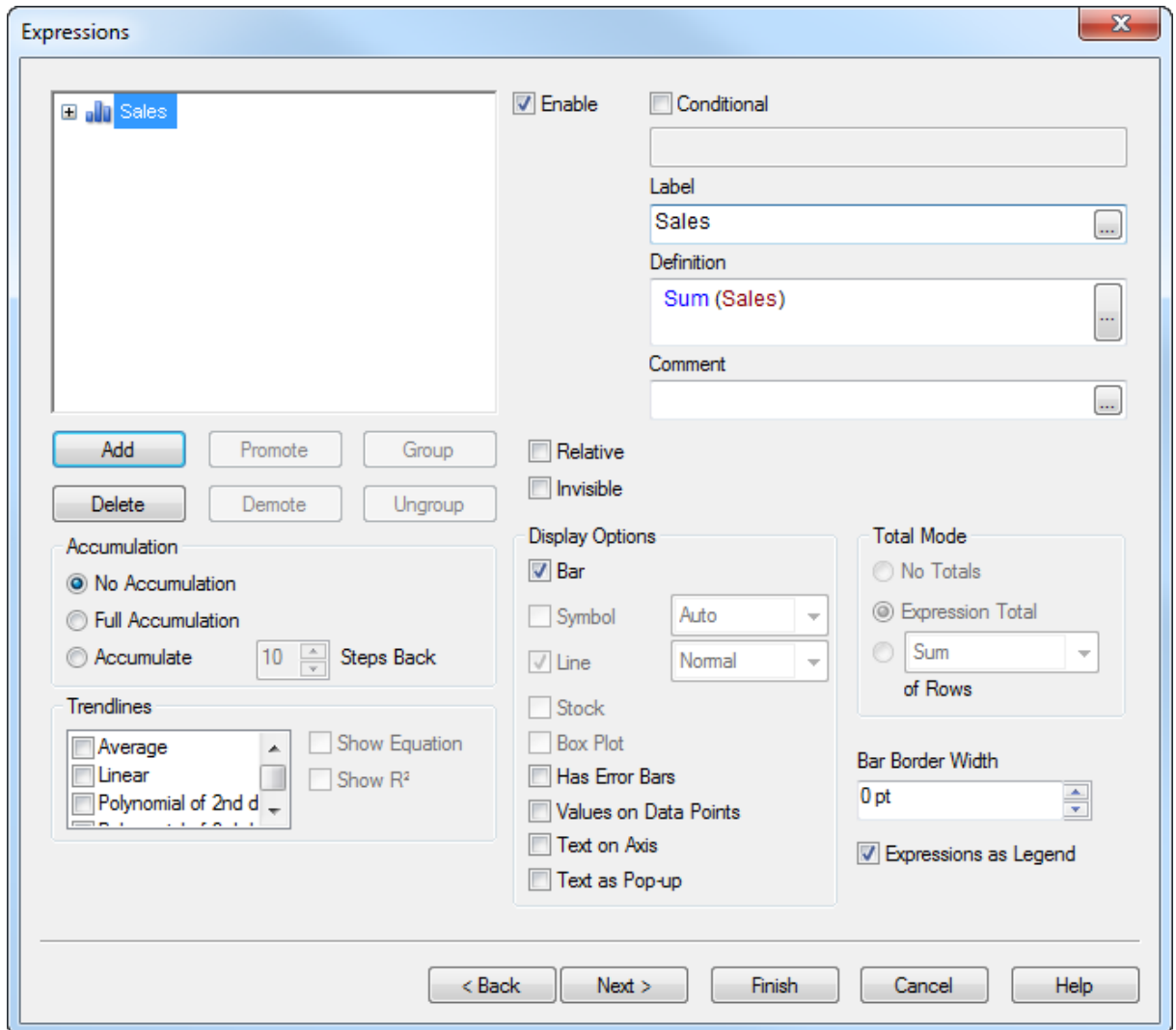
You can also double-click the field to add it.



6. Click **Next >**.
The dialogs **Expression** and **Edit Expression** open, for you to set one or more expressions to be displayed on the y-axis. You can type an expression directly into the text area in the **Edit Expression** dialog, but it is also possible to use predefined functions for **Aggregation** and select fields in the **Field** list.
7. To make the height of each bar to show the sum of sales for each country, select **Sum** in the **Aggregation** drop-down list and **Sales** in the **Field** list.



8. Click **Paste**.
The function and field that you selected appears as an expression in the edit box in the upper part of the dialog.
9. Click **OK**.
The dialog closes. The expression you just defined appears in the **Definition** field (the left part) of the **Expressions** dialog. You have now selected one dimension and one expression, and have performed the basic steps of chart creation.
10. In the **Label** box, type *Sales*.
This changes the name of the expression.



10. Click **Next >** until you reach the **Caption** page.
11. Check **Auto Minimize**.
12. Click **Finish** to close the wizard.

When you select *Ann Lindquist* in the **Salesperson** list box, and compare the two charts you just created, you will notice that there are no numbers displayed above the bars in the second bar chart. The bars are also sorted differently. This is due to different property settings.

Removing a chart

You only need one of the charts you created.

Do the following:

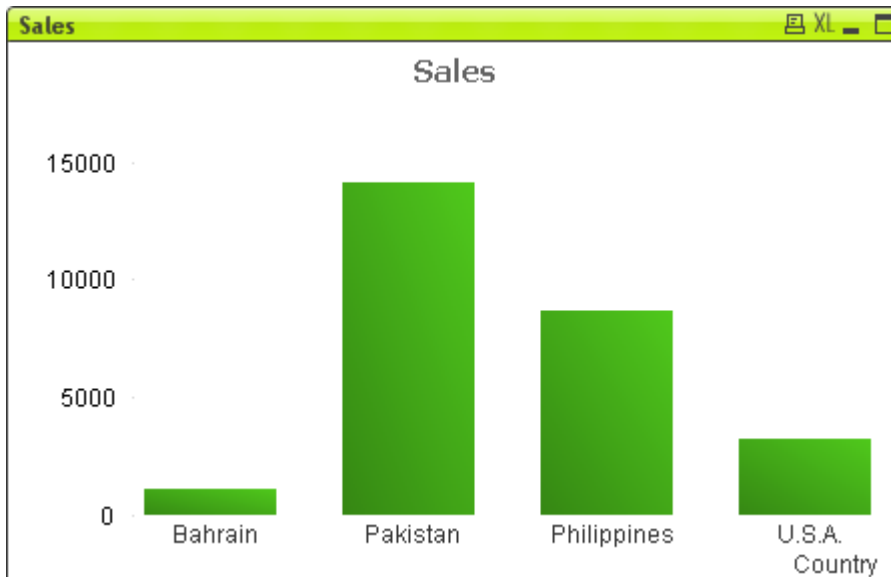
1. Right-click the first bar chart you created and choose **Remove**.
2. Confirm that you want to remove the chart.

Changing a few properties

The tabs of the **Properties** dialog differ a little depending on the chart type that you have chosen. However, they look the same no matter if you have used the quick chart wizard or the full chart wizard to create your chart. You will now use a few of the settings found on the remaining tabs.

Changing the sort order

The bar chart you just created is currently sorted in alphabetical order.



You may prefer to put the main customer country furthest to the left.

Do the following:

1. Right-click the bar chart, and click **Properties**.
2. On the **Sort** tab, select the option **Y-value** to sort the countries according to their total sales.
3. Click **OK**.

The bars are now sorted based on the expression **sum of sales**.



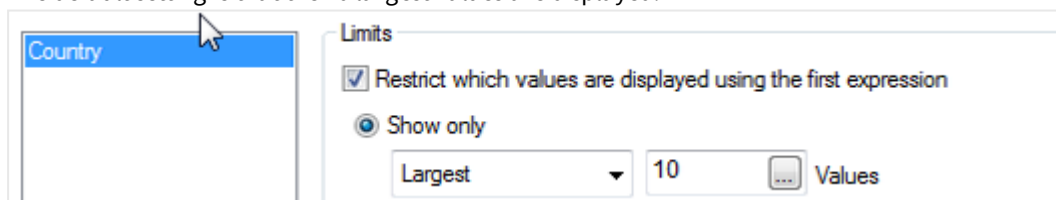
Limiting the number of bars

To improve the overview of the chart, you can limit the maximum number of bars to be displayed.

Do the following:

1. Clear the current selections and have a look at the bar chart you created before. Notice that it is difficult to interpret the bar chart with the large amount of bars.
2. Right-click the bar chart, and choose **Properties**.
3. On the **Dimension Limits** tab, check **Restrict which values are displayed using the first expression**.

The default setting is that the 10 largest values are displayed.



4. Click **OK**.
Now have a look at the bar chart again, and notice that the overview is improved as only 10 bars are shown.

Displaying numbers on the bars

The next thing we want to do is to display numbers above the bars in our chart.

Do the following:

1. Right-click the chart, and choose **Properties**.
2. On the **Expression** tab, check **Values on Data Points** in the **Display Options** group.

3. Click **OK**.

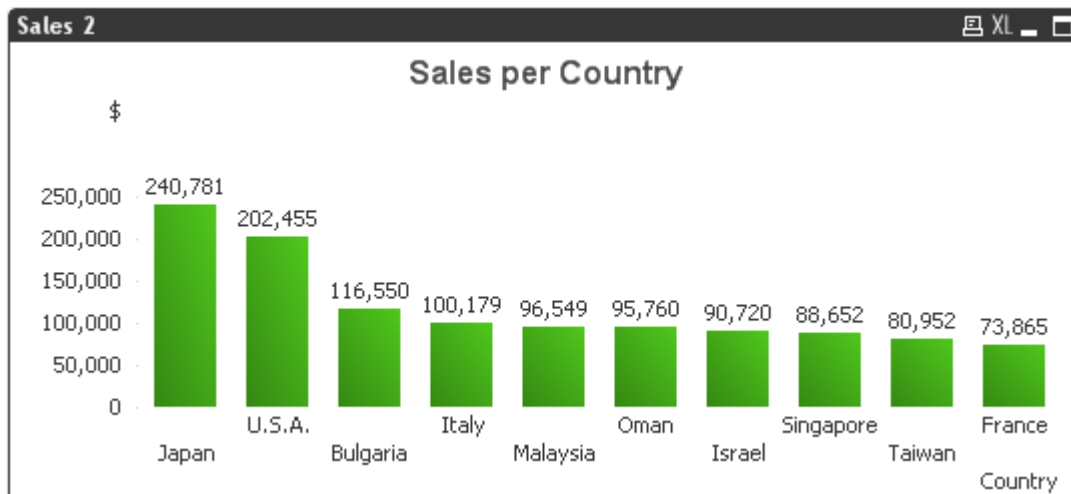
You have now added the y-value numbers (in this case sales figures) above the bars.

Changing the number format

Displaying the numbers above the bars is very useful, but when a large range of values is shown, there is not enough room for all the numbers. You can solve the problem by changing the number format:

1. Right-click the bar chart, and choose **Properties**.
2. On the **Number** tab, select **Sales**.
3. Select **Number** in the **Number Format Settings** group.
4. In the box **Symbol**, type \$.
5. Click **OK**.
6. Resize the chart to have all numbers displayed properly.

The numbers above the bars now have a thousand separator.



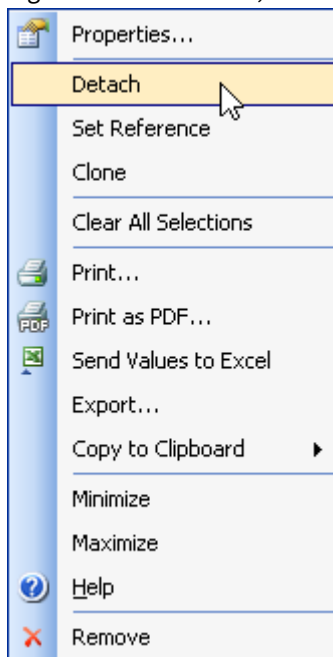
Cloning and detaching your chart

You can clone (copy) a chart in the same way as a list box (by Ctrl-dragging), but you can also right-click the chart and choose **Clone**.

You can detach the cloned chart, this means that the chart will not be updated when selections are made. This can be useful when you want to keep the overview while making selections.

Do the following:

1. Right-click on the chart, click **Detach** on the shortcut menu.

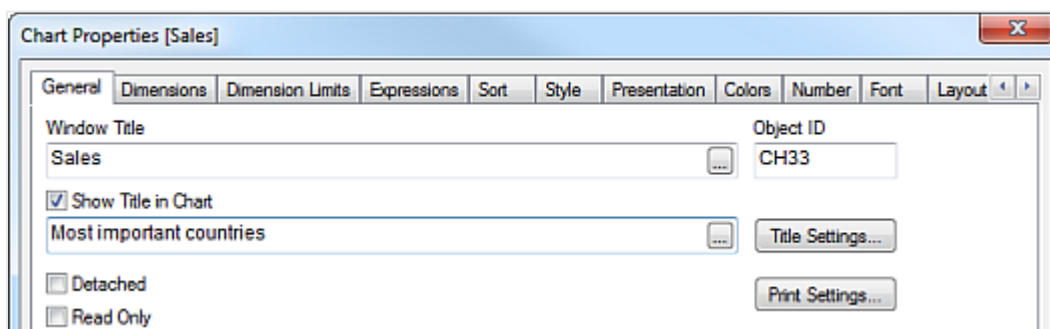


2. Make a few selections.
See how the original chart is updated, but the detached chart stays the same.
3. Attach the chart again by choosing **Attach** from the shortcut menu.
4. Clear your selections.

Turning the bar chart into a pie chart

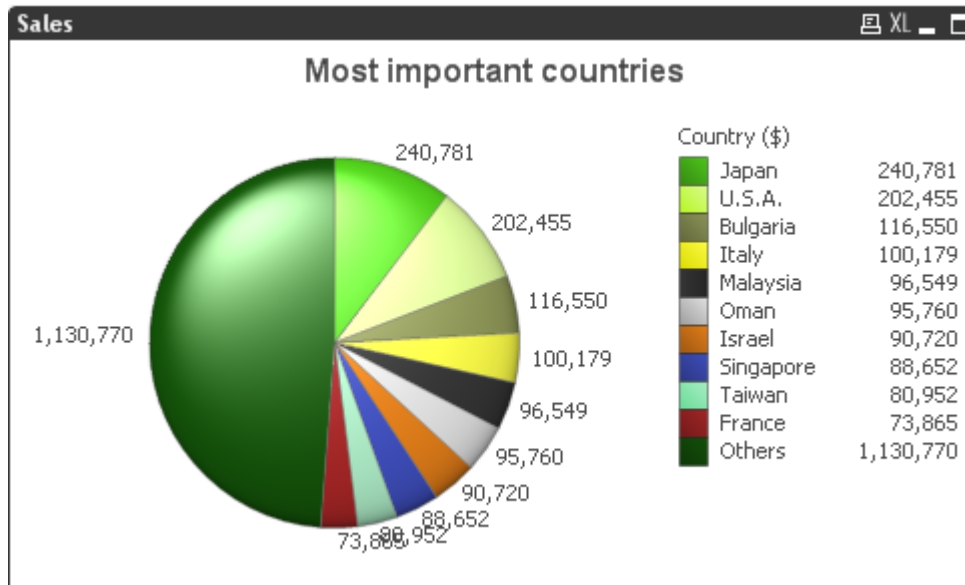
There are several different chart types to choose between, each one with properties that suit certain purposes. You will now turn the second bar chart into a pie chart.

1. Right-click the chart *Sales 2*, and choose **Properties**.
2. On the **General** tab, click the pie chart icon in the **Chart Type** group.
3. Change the **Window Title** to *Sales* and the chart title to *Most important countries*.



4. On the **Presentation** tab, check **Show numbers in Legend** (which corresponds to **Numbers on Data points** for bar charts).

5. On the **Style** tab pick a style of your choice for the pie chart.
6. Click **OK**. The result is a pie chart where each slice represents the sales in a particular country.

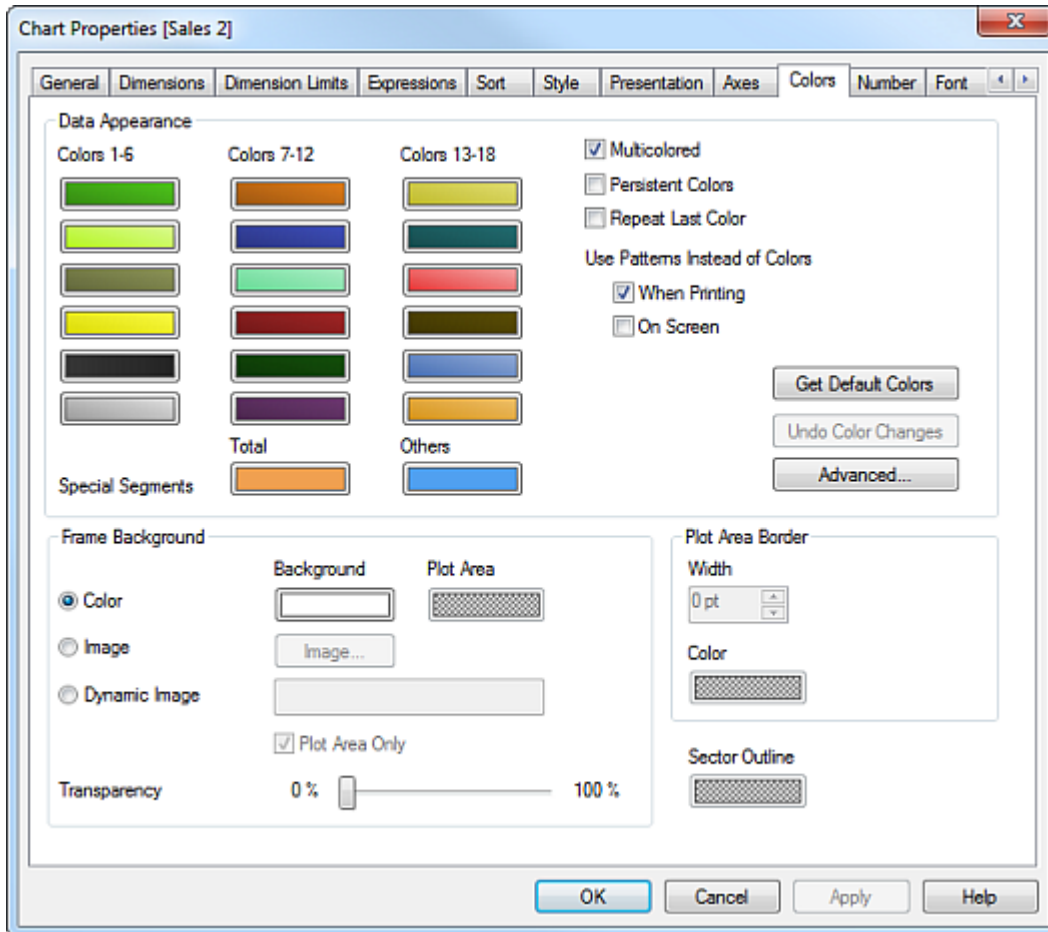


Changing the color settings

Go to the previously created bar chart (*Sales*). Note that all the bars have the same color. This can be changed on the **Colors** tab.

Do the following:

1. Right-click the chart, and choose **Properties**.
2. On the **Colors** tab, check **Multicolored**, and click **OK**.



Compare the colors used in the bar chart with those of the pie chart. You see that the same colors are used for the same countries. This default setting is very useful in that it enhances the consistency between different charts and sheets. The colors of the color map can be customized: on the **Colors** tab, click on the color that you would like to change and pick the color of your choice from the map that opens.

Showing the percentage

Since the pie chart illustrates proportions, you might be more interested in knowing the percentage than the actual sum of sales.

Do the following:

1. Right-click the chart, and choose **Properties**.
2. On the **Expressions** tab, check **Relative**, and click **OK**.
The percentage numbers now appear in the legend.

To save space, you can minimize the pie chart.

Do the following:

- Right-click the chart, and choose **Minimize**.
The chart turns into an icon and is placed where there is space on the screen. You can move the icon freely.

Repeat 1-3 to minimize the bar chart that you created in the previous lesson.

In the next lesson, you will add another dimension to an existing bar chart and create pivot tables and straight tables.

Saving, closing and exiting

If you don't want to turn to the next lesson right away, you can close the document. You should also save the document, since the following lessons are based on the work you have done so far.

2.5 Pivot tables and straight tables

In this lesson, you will continue creating and using charts. After adding a dimension to an existing bar chart, you will turn it into a pivot table. Subsequently, you will create a straight table containing the same information to compare these two ways of presenting data.

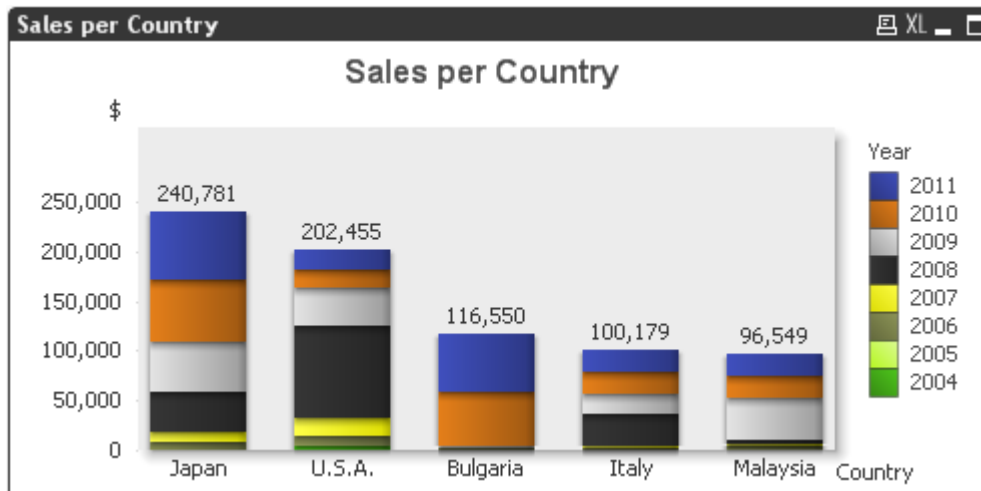
Adding a dimension to a bar chart

Until now you have worked with only one dimension and one expression. Charts can be very complex, though. They can show several dimensions and/or expressions simultaneously or sequentially.

You will start by creating a chart with two dimensions and one expression. It will still show the sum of sales per country, but grouped over different years.

Do the following:

1. On the *Sales* sheet you find the minimized chart *Sales per Country*.
It is very similar to the bar chart *Sales 2* that you created in the previous lesson.
2. Right-click the bar chart *Sales 2*, and choose **Properties**.
3. On the **Dimensions** tab, move **Year** to the list of **Used Dimensions**.
4. On the **Style** tab, set **Subtype** to **Stacked**.
5. On the **Dimension Limits** tab, check **Restrict which values are displayed using the first expression** and click **Show only**. From the drop-down list, select **Largest** and type the number 5 for the dimension **Country**.
6. Click **OK** to finish the chart.



Turning a bar chart into a multidimensional pivot table

Displaying data graphically is very illustrative, but you cannot show too much information at the same time without losing clarity. To display calculated data for several dimensions, your choice of chart may be a pivot table.

Do the following:

1. Right-click to open the **Properties** dialog of the bar chart you just added a dimension to (*Sales per Country*).
2. On the **General** tab, change the **Window Title** to *Pivot Table*.
3. In the **Chart Type** group, choose the pivot table icon.
4. On the **Dimensions** tab, add **Salesperson** to used dimensions.
5. On the **Sort** tab select the dimension **Country**. In the **Sort by** group, clear the check box **Y-value** to sort the values according to the text.
6. Click **OK**.

Expanding and collapsing dimensions

You have now created a pivot table with three dimensions, but you only see the dimension **Country** at the moment. Pivot tables provide a useful feature: the possibility of expanding and collapsing dimensions by value level. By collapsing the values you are currently not interested in, you considerably enhance the overview of your data. You have probably noted the plus sign in the **Country** column. It indicates that the next level is hidden (collapsed).

Do the following:

1. Right-click in the **Country** column, and choose **Expand all**.
2. Right-click in the **Year** column, then choose **Expand all**.
The table does not hold any more levels as there are no plus signs in the right-most column *Sales*. In the expanded levels, the values have a minus sign displayed next to them. It indicates that the next level is visible (expanded). Using the plus and minus signs you can expand and collapse single values in the table. Use them to look exactly at the data you are interested in.

3. Right-click in the **Year** column, and choose **Collapse all**.
4. Right-click in the **Country** column, then choose **Collapse all**.
Now, all the values of the dimensions **Year** and **Salesperson** are hidden again.
5. If you, for example, are only interested in the sales performed in Belgium, click the plus sign of the value *Belgium*.
6. Click the plus sign of the values *2008* and *2009*.

Pivot Table				XL
Country	Year	Salesperson	Sales	
Afghanistan			2,150	
Albania			8,590	
Armenia			1,850	
Australia			2,240	
Azerbaijan			5,329	
Bahrain			1,090	
Bangladesh			4,240	
Belarus			26,065	
Belgium	2006		1,210	
	2008	Charles Ingvar ...	3,159	
		John Cleaves	2,550	
	2009	Tony Cedholt	2,500	
		Charles Ingvar ...	3,690	
	Tony Cedholt	4,249		
Bhutan			6,260	

You are now showing only those values of the following columns that are related to the value *Belgium*. Details on salesmen are only visible for *2008* and *2009*.

Dragging dimensions

The pivot table is a very flexible sheet object that allows you to freely drag and drop the different dimensions and expressions to any position on the vertical or horizontal axis. In our case, you may prefer to present the dimension **Year** on the horizontal axis.

Do the following:

1. Position the mouse cursor on the field **Year**.
2. Press the mouse button and drag the field upwards, to the right, to the desired position (below the header row).

A blue arrow appears when the cursor is in the right place.

Pivot Table			
Country	Year	Salesperson	Sales
Afghanistan			2,150
Albania			8,590
Armenia			1,850
Australia			2,240
Azerbaijan			5,329
Bahrain			1,090
Bangladesh			4,240
Belarus			26,065

3. Release the mouse button.

The dimension **Year**, as well as the expression values, are now displayed on the horizontal axis.

Pivot Table							
Country	Salesperson	Year	2004	2005	2006	2007	2008
Afghanistan			-	-	-	2,150	-
Albania			-	-	6,000	-	-
Armenia			-	-	-	1,850	-
Australia			-	1,030	1,210	-	-
Azerbaijan			-	-	1,290	4,039	-
Bahrain			-	-	1,090	-	-
Bangladesh			-	-	-	-	-
Belarus			-	-	1,270	-	-
Belgium	Charles Ingvar ...		-	-	1,210	-	-
	John Cleaves		-	-	-	-	-
	Tony Cedholt		-	-	-	-	-
Bhutan			-	-	-	2,060	-
Bosnia-Herze...			-	-	-	1,580	-


The fields **Country** and **Salesperson** are shown as regular columns. The values in the field **Year** act as headers for the remaining columns. The columns contain the values of the expression (**Sum of Sales**).

4. Drag the dimension **Year** back to form a vertical column and place it to the right of the dimension **Salesperson**.

Adjusting the columns

The **Country** and **Salesperson** columns of the pivot table are not wide enough for certain values.

Do the following:

1. Place the cursor on the line separating the **Country** column from the **Salesperson** column.
2. When the cursor looks like the one shown in the figure, press the mouse button and drag. 
3. Adjust the **Salesperson** column accordingly.

All the columns can be sized this way. To adjust the rightmost column, place the cursor within the border (to the left of the scroll bar) and drag.

You can also adjust the columns using the command **Fit Columns to Data** in the shortcut menu that opens when you right-click the table.

Showing partial sums

At the moment, the table shows the sales for *Belgium* made by different sales persons during the years. Suppose you wish to know the sum of sales made by all sales persons and for all years together.

Do the following:

1. Right-click the pivot table and choose **Properties**.
2. On the **Presentation** tab, under **Dimensions and expressions**, select **Salesperson** and **Year**.
3. Select the check box **Show Partial Sums**.
4. Click **OK**.

The pivot table now shows partial sums per sales person and on year level.

Creating a straight table

In opposition to the pivot table, the straight table cannot display sub-totals or serve as a cross table. On the other hand, any of the columns of the straight table can be sorted and each of its rows contains one combination of dimension(s) and expression(s).

Do the following:

1. Minimize the pivot table on the *Sales* sheet to increase the free space.
2. Right-click in an empty space on the sheet and click **New Sheet Object**, then choose **Chart**.
3. In the wizard that opens, click the **Straight table** icon.
4. For **Window Title**, type *Straight table*.
5. Click **Next >**.
6. On the **Dimensions** tab, add these fields in the following order: **Year**, **Country** and **Salesperson** to move them to the **Used Dimensions** box. Click the **Promote** and **Demote** buttons to sort the dimensions as shown in the picture.
7. Click **Next >**.
The **Edit Expression** dialog opens.
8. Compose the expression *Sum (Sales)* by selecting the corresponding items from the **Aggregation** and **Field** lists.
9. Click **Paste**, and then **OK**.
10. For **Label**, type *Sales*.
11. Click **Finish**.

You now have a straight table containing the same information as the pivot table.

Compare the two tables. Notice that in the straight table, the total sum of sales is shown at the top, that each row in the straight table represents a possible combination of data (in the pivot table, data is grouped by field values), and that no partial sums are given.

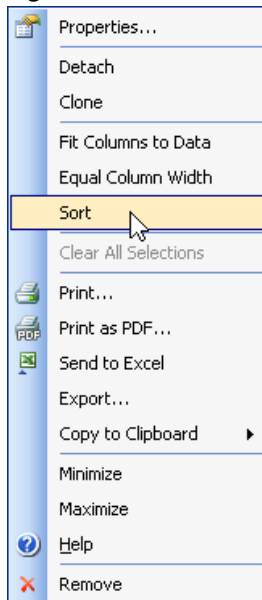
Sorting the table

The straight table provides excellent possibilities for sorting columns.

Currently, the column **Year** is placed furthest to the left, and the table is sorted according to the sort order specified for this field (on the **Sort** tab). You can see this from the little arrow sort indicator in the column header. You can change the sort order of the table with two simple clicks.

Do the following:

- Right-click in the column **Salesperson**, and then click **Sort**.



The order of the columns remains the same, but it is now the sort order defined for the field **Salesperson** that determines the order of the values in the table. Note how the sort indicator (arrow) has moved to the **Salesperson** column.

The sort priority can also be set on the **Sort** tab of the **Properties** dialog.

Moving a column

Suppose you want the dimension **Salesperson** to the left of the **Country** column.

Do the following:

1. Click the **Salesperson** header and drag the column to the desired position.
The selected column is highlighted and the target is marked with an arrow while you are dragging.

Sales			
Year	Country	Salesperson	Sales
			2317233
2004	U.S.A.	Ann Lindquist	3240
2006	Bahrain	Ann Lindquist	1090
2006	Philippines	Ann Lindquist	1270
2007	Philippines	Ann Lindquist	4150
2008	Pakistan	Ann Lindquist	2719
2009	Pakistan	Ann Lindquist	11379
2009	Philippines	Ann Lindquist	3290
2004	Saudi Arabia	Bill Yang	690
2005	Greece	Bill Yang	4720
2005	Slovenia	Bill Yang	859
2006	Bulgaria	Bill Yang	1290
2006	Greece	Bill Yang	900
2006	Slovenia	Bill Yang	1030
2007	Russia	Bill Yang	1850
2007	Slovenia	Bill Yang	1850
2008	Greece	Bill Yang	3100

2. Release the mouse button.
The dimension **Salesperson** is now placed further to the left.

Visual cues

You can use visual cues to select expression values in the table. Values belonging to different value categories can be given separate colors and/or font styles. Now you will learn to highlight certain values.

Do the following:

1. Right-click the straight table and choose **Properties**.
2. Go to the **Visual Cues** tab.
The **Sales** expression is available, and there are four value categories to choose between: upper, normal, lower and text.
3. To select all the expression values above 10,000, type *10000* in the **Upper>** box.
4. To apply a red color to the values belonging to the upper value category, click the **Text** button, choose a red color from the color map and click **OK**.
5. In addition, check **Bold**.
6. Click **OK**.

Straight table			
Year	Salesperson	Country	Sales
			2317233
2004	Ann Lindquist	U.S.A.	3240
2006	Ann Lindquist	Bahrain	1090
2006	Ann Lindquist	Philippines	1270
2007	Ann Lindquist	Philippines	4150
2008	Ann Lindquist	Pakistan	2719
2009	Ann Lindquist	Pakistan	11379
2009	Ann Lindquist	Philippines	3290
2004	Bill Yang	Saudi Arabia	690
2005	Bill Yang	Greece	4720
2005	Bill Yang	Slovenia	859
2006	Bill Yang	Bulgaria	1290

All expression values above 10,000 are now red.

Selections in table charts

It is possible to make selections in pivot tables and straight tables as well. Clicking a column containing a chart expression implies an indirect selection of those values in the dimension columns (rows) that are used to calculate that expression value.

Do the following:

1. In the straight table, click the value *2008* in the **Year** column. The effect is the same as selecting *2008* in the list box **Year**.
2. Clear your selections.
3. Click the value *\$11,379* in the column **Sales**.
You have now selected the value *2009* in **Year**, the value *Pakistan* in **Country** and *Ann Lindquist* in **Salesperson**.
4. Clear your selections.

Dropdown select

If you need to make more complex or multiple selections in a table chart there is yet another option, called drop-down select. This feature makes it possible to turn a dimension column into a drop-down list with full selection and search capabilities.

Do the following:

1. Right-click in the straight table, and click **Properties**.
2. On the **Presentation** sheet, under **Columns**, select **Year**. Select the check box **Dropdown Select**.
3. Repeat steps 1-2 for the **Country** and **Salesperson** columns.
4. Click **OK**.
You see that all three dimension columns have a drop-down icon to the right in the column header.
5. Click the icon for **Year** and a temporary list with all the years will appear. Press the Ctrl key and click the years *2006*, *2009* and *2010*. Then release the Ctrl key.
The three years are now selected and the drop-down list is closed.

Straight table		
Year	Salesperson	Country
2004		
2005		
2006	Ann Lindquist	U.S.A.
2007	Ann Lindquist	Bahrain
2008	Ann Lindquist	Philippines
2009	Ann Lindquist	Philippines
2010	Ann Lindquist	Pakistan
2011	Ann Lindquist	Pakistan
2009	Ann Lindquist	Philippines
2004	Bill Yang	Saudi Arabi

- Click the drop-down icon in the **Country** column. In the list, type *sw*. This text search will result in *Sweden, Switzerland* and *Swaziland*.
- Press Enter.
Now you see available information for these countries. Only *Sweden* and *Switzerland* are shown in the straight table because there are no sales in the other country.
- Clear your selections.

Moving the pivot table and the straight table to a new sheet

The *Sales* sheet is looking crowded. To improve the overview, you will create a new sheet for the tables.

Do the following:

- From the **Layout** menu, choose **Add Sheet**.
The tab *Sheet 3* appears to the right of the **Sales** tab.
- Right-click somewhere in the new sheet and choose **Properties**.
- On the **General** tab, type *Tables* for **Title**, and click **OK**.
- Go back to the *Sales* sheet.
- Drag the pivot table to the *Tables* sheet, and release the mouse button when the cursor turns into a white arrow.
- Drag the straight table to the *Tables* sheet using the same procedure as in step 5.
- Click the *Tables* sheet.
The pivot and straight tables are placed in the same position as on the *Sales* sheet. You may want to move them to a different position on the sheet.

There is now room for additional charts on the *Sales* sheet.

Auto Minimize

To improve the overview on the *Sales* sheet even more, you can set some of the charts to automatically minimize, meaning that only one of the them will be shown at any one time.

Do the following:

- On the *Sales* sheet, right-click the *Sales Forecast* chart and go to the **Caption** tab of the **Properties** dialog.

2. Check **Auto Minimize** and click **OK** to close the dialog.
3. Repeat steps 1 and 2 for the bar chart called *Drill-down*.
If a chart is minimized, you can right-click its icon to open the **Properties** dialog.
4. Restore the pie chart by double-clicking its icon.
Note that the other charts on the sheet are minimized and shown as icons.
5. Now restore the *Drill-down* chart.
The pie chart is automatically minimized.

You can also make this change for several charts at once.

Do the following:


1. “Paint” a rectangle with the mouse around the charts (or icons of minimized charts) that you want to modify.
Their captions or minimized icons turn green.
2. Right-click one of the selected charts or icons to open the **Properties** dialog for all the objects.
Note that the dialog in this case is limited to the **Font**, **Layout**, and **Caption** tabs.
3. On the **Caption** tab, check **Allow Minimize** and **Auto Minimize**.
If it is already selected, this means that one of the charts that you selected already has the **Auto Minimize** setting. In this case, you must first clear the **Auto Minimize** check box and then select it again.
4. Click **OK**.

2.6 More chart types

This lesson introduces additional chart types. The line chart is useful for showing trends or changes. Working with a combo chart, you can combine the features of the bar chart with those of the line chart. As for scatter charts, they show pairs of values from two expressions. Gauge charts are used for displaying one specific value. You will also encounter drill-down functionality in a hierarchic bar chart created out of a field group. At the end of the lesson, you will print a chart.

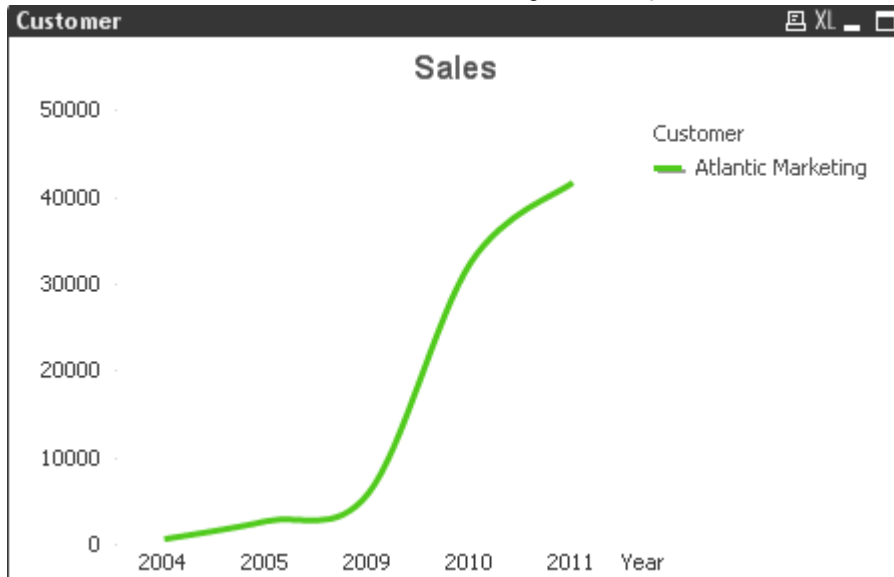
Creating a line chart

Instead of being displayed as bars, data can be presented as lines between value points, as value points only or as both lines and value points. Line charts are useful for showing changes or trends. You will create a line chart illustrating how the sales per customer have changed over the years.

1. On the *Sales* sheet, click **Create chart** on the toolbar. 
2. Select **Line Chart**, and type *Customer* as **Window Title**.
3. Click **Next >**.
4. On the **Dimensions** page, add **Year** and **Customer** to **Used Dimensions** box.
It is important that **Year** comes before **Customer** in this example. Use the **Promote** and **Demote** buttons to define the order.
5. Click **Next >** to create an expression in the **Edit Expression** dialog.
6. In the fields **Aggregation** and **Fields**, create the expression **Sum(Sales)**, then click **Paste**.
7. Click **OK**.

The **Edit Expression** dialog closes and you are back on the **Expression** page.

8. Type *Sales* for **Label**.
9. Under **Display Options**, select **Smooth** in the **Line** drop-down box.
10. Click **Finish**.
11. Clear your selections.
When no values are selected, the chart looks a bit overcrowded; as soon as you make a selection, though, the trends will appear very clearly.
12. In the list box **Customer**, select *Atlantic Marketing*, and study the result.



The line chart shows the sales fluctuation for the customer *Atlantic Marketing*.

14. Clear your selections.
15. In the list box **Salesperson**, select *John Doe*.
You see that John Doe has had business contacts with Carlsborg since 2005, and that the company Mary Kay has meant a lot to his career so far. You also see that he was not very successful with Captain Cook's Surfing School.
16. To find out if Captain Cook's Surfing School is still a customer after all, select it in the list box **Customer**.
17. In the list box **Customer**, right-click *Captain Cook's Surfing School* and click **Clear Other Fields**.
No need to worry: the surfing school is still a customer, even though it purchased less during 2010 and 2011. In the pivot table that you moved to the *Tables* sheet you can study the exact data.
18. Clear your selections and minimize the chart.

Adding an expression to a bar chart

Suppose you would like to see how the number of customers is related to the population of a certain country.

Do the following:

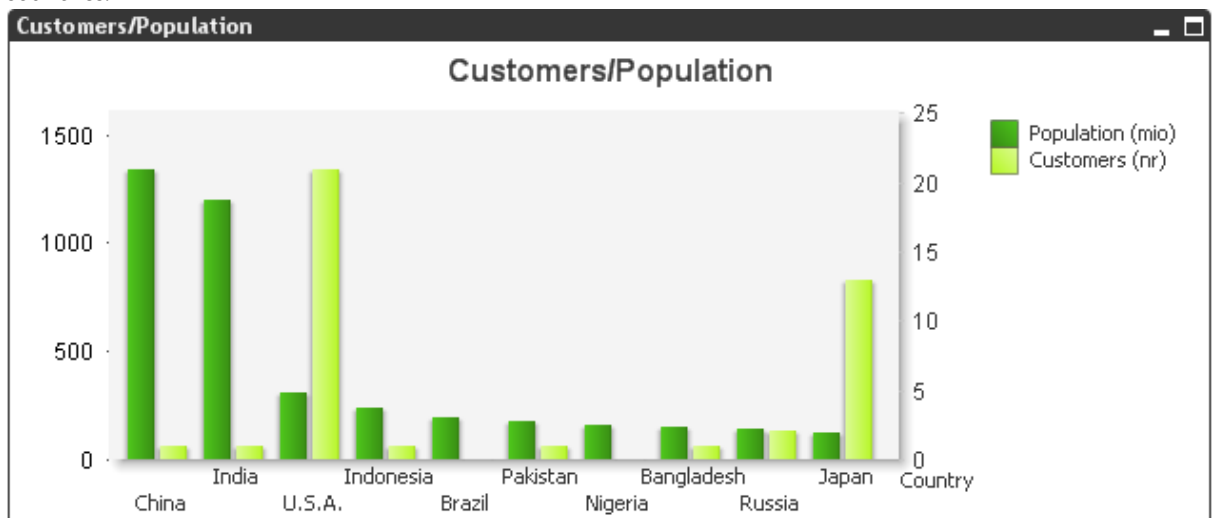
1. Click the *Geography* sheet where you find a bar chart called **Population**.
2. Copy the chart to the *Sales* sheet.

3. On the *Sales* sheet, right-click the chart and choose **Properties**.
4. On the **General** tab, for **Window Title**, type *Customers/population*.
5. Check **Show Title in Chart**, and type *Customers/population* in this box too.
6. On the **Expressions** tab, click **Add** to open the **Edit Expression** dialog.
7. Compose **Count (distinct Customer)** by selecting **Total Count** as **Aggregation** and **Customer** as **Field**.
8. Check **Distinct** to count customer names that occur several times only once. Then click **Paste**.
9. Click **OK** to close the **Edit Expression** dialog.
10. Select the expression **Count (distinct Customer)**, in the **Label** box, and type *Customers (nr)*.
11. Select the expression **Population** and in the **Label** box, type *Population (mio)*.
12. Click **OK**.

Study the chart. You have set both population and number of customers as expressions, but only the population is shown. The reason for this is that both expressions are shown on a single axis, and that the magnitude of the numbers of the two expressions differs so much that the number of customers is not visible.

13. Right-click in the chart, and choose **Properties**.
14. On the **Axes** tab, select *Customers (nr)*, and under **Position**, click **Right (top)**.
15. Click **OK**.

The chart shows the ten countries with the biggest population and the number of customers in these countries.

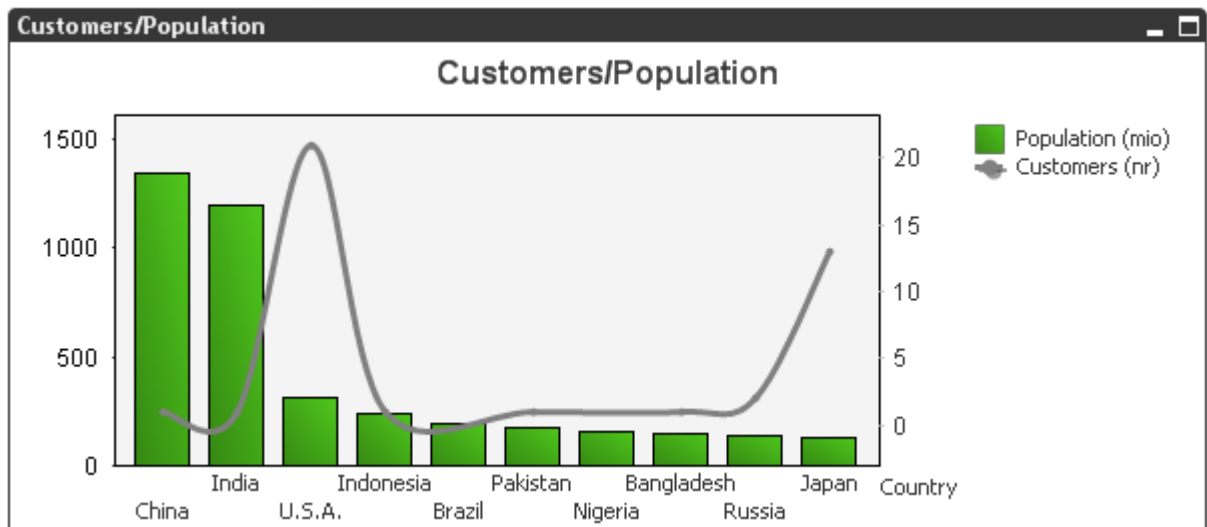


Turning the bar chart into a combo chart

You will now turn the bar chart above into a combo chart. In a combo chart, you can combine the features of the bar chart with those of the line chart, for example by showing one expression as bars and the second as lines and/or symbols.

Do the following:

1. Right-click the bar chart *Customers/population*, and choose **Properties**.
2. On the **General** tab, click the combo chart icon.
3. Click the **Expressions** tab.
The expressions *Population (mio)* and *Customers (nr)* are listed in the **Expressions** box.
4. Select *Population (mio)*, and under **Display options**, check **Bar**. Clear the **Line** check boxes .
5. Select *Customers (nr)*, and under **Display Options**, check **Symbol** and **Line**. In the list, select **Smooth Line**.
6. Click **OK**.
Instead of displaying both expressions as bars, the chart now shows how the population and the number of customers in different countries are related to each other.



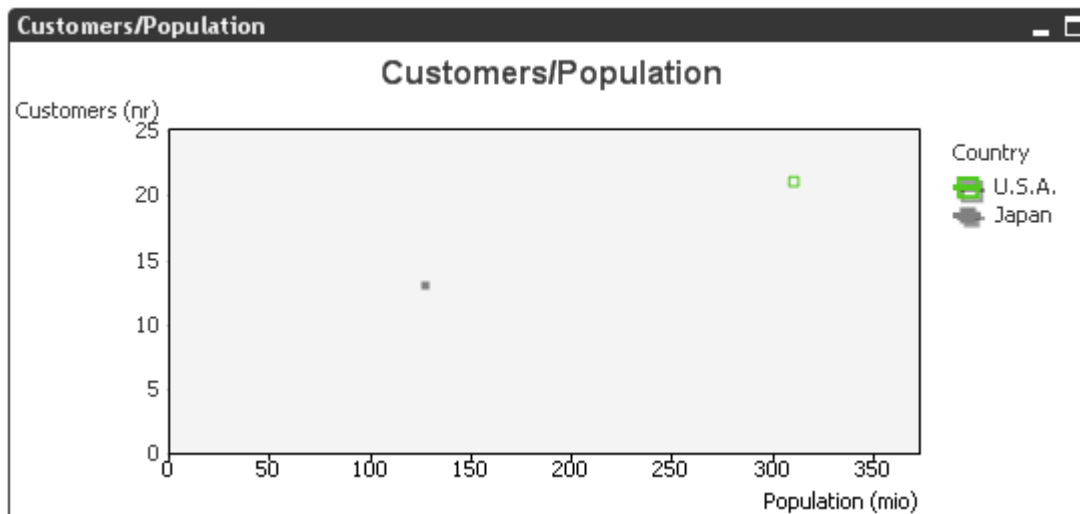
Turning the combo chart into a scatter chart

When showing data where each instance has two numbers, like in this case (each country has a number of customers and a population), you might find the scatter chart a useful representation form.

Do the following:

1. Right-click the combo chart, and select **Properties**.
2. On the **General** tab, click the scatter chart icon.
3. On the **Dimension Limits** tab, clear the **Restrict which values are displayed using the first expression** check box.
4. Click **OK**.
The dimension (**Country**) is represented by the symbols, and the expressions (**Population** and **Customers**) are displayed on the axes. You immediately see that some of the countries are placed far out to the right on the x-axis, which means that their populations are far above the average. In two countries we already have more than 10 customers.
5. Select the countries with the most customers by “painting” the area in the chart using the mouse button. You see that the countries are Japan and USA, and how population and number of customers are related

to each other.




6. Clear your selections and minimize the chart.

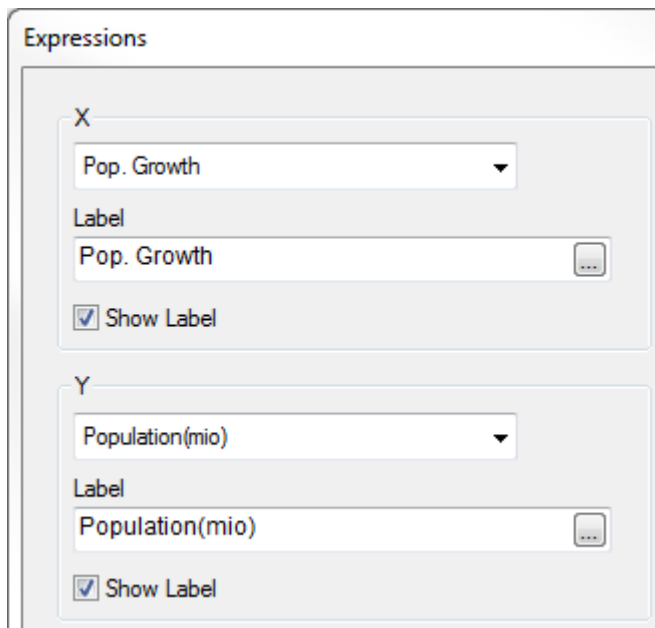
Creating a scatter chart from scratch

You will now create a similar scatter chart, showing population and population growth.

Do the following:

1. On the *Geography* sheet, click  on the toolbar.
2. On the **General** page, type *Population Growth* for **Window title** and **Show Title in Chart**.
3. For chart type, click the scatter chart icon and click **Next>**.
4. On the **Dimensions** page, move **Country** to the column of displayed fields and click **Next>**.
5. Choose **Next >**.

The **Expressions** page of the scatter chart differs from that of the other charts.




6. Choose **Pop. Growth** for **X**, and **Population(mio)** for **Y**.
7. Click **Finish**.
Your new scatter chart is finished. Move it, size it, and try it by making selections.
8. Clear your selections and minimize the chart.

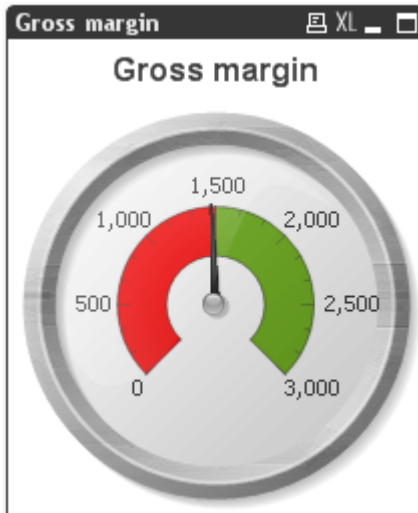
Creating a gauge chart

Quite often you want to view the changing value of a single measurement as you change your selections. For this purpose the gauge chart is ideal. QlikView offers a wide range of gauge charts for graphic visualization of values. In this section we will create a simple circular gauge chart indicating average gross margin for whatever set of customers and/or periods that we have selected.

Do the following:

1. On the *Sales* sheet, click  on the toolbar.
2. On the **General** page, type *Gross margin* for **Window title** and **Show Title in Chart**.
3. For chart type, click the gauge chart icon and click **Next>**.
4. On the **Dimensions** page, do nothing at all, as gauge charts are calculated without any dimensions resulting in one single value over the entire data set.
5. Click **Next >** to create an expression in the **Edit Expression** dialog.
6. Select **Average** as **Aggregation** and **Gross margin** as **Field** and click **Paste**.
The expression **Avg([Gross Margin])** is created. Click **OK**.
7. Label the expression *Gross Margin*, then click **Next >** and **Next >**.
8. The circular gauge is preselected on the **Style** page, leave it like that, and click **Next >**.
9. On the **Presentation** page, under **Gauge** settings, type 3000 for **Max**.
10. Change **Segment 1** to red and **Segment 2** to green by clicking the color matrix.

11. Still on the **Presentation** page, make sure that **Show Scale** is checked, and select **7Major Units, Show Labels on Every1Major Unit** and **2Minor Units per Major Unit**. Click **Next >** several times until you reach the **Caption** page.
12. On the **Caption** page, check **Auto Minimize**, and click **Finish**.
You now see your circular gauge with one red and one green segment.



Let us do a bit of analysis!

15. Clear your selections.
The gauge now shows the average gross margin for all customers.
16. In the **Customer** list box, choose *Atlantic Marketing*.
This is a good customer!
17. Select *Barley Foods* instead.
Room for improvement!

Working with drill-down functionality

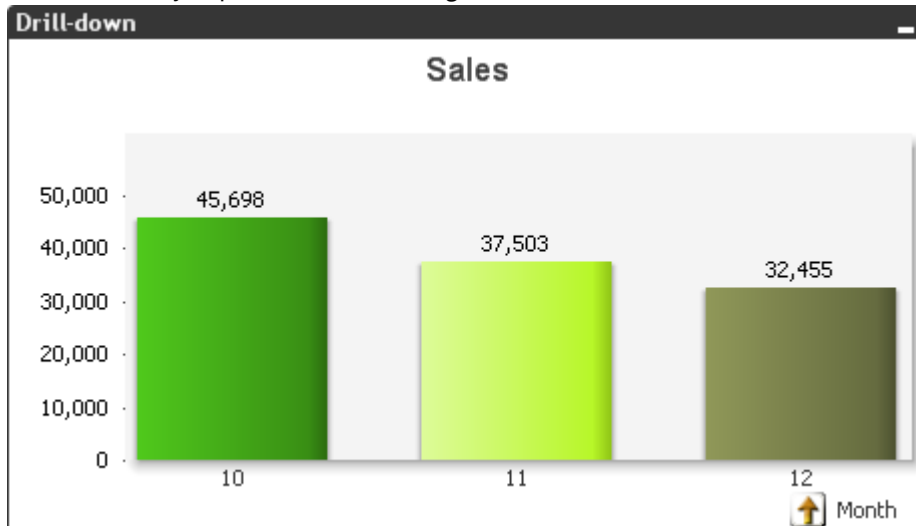
A dimension used in a chart is usually equivalent to a single field, for example **Year**. However, you will sometimes encounter charts created out of field groups. These charts can be of two types, drill-down or cyclic. In a drill-down chart, the field group defined usually consists of fields forming a natural hierarchy, for example **Year, Quarter, Month**. The *Sales* sheet in your document contains a minimized chart with drill-down functionality.


Do the following:

1. Clear your selections.
2. Click the *Sales* sheet, and double-click the minimized chart *Drill-down*.
The chart, showing the sum of sales per year, looks like any other bar chart. However, as soon as you make a selection causing the field **Year** to have only one possible value, you discover its drill-down character.
3. In the chart, click the *2008* bar.

An ordinary chart would now display one bar, representing the sum of sales for 2008. This chart, however, shows the sum of sales for each quarter of the year 2008. This is due to the fact that it holds a drill-down group as dimension. **Year** is the first field in the group and when selecting a single year, the display changes to the second field being **Quarter**.

4. Click the bar representing the fourth quarter.
The chart shows the sales for each month of the selected quarter. **Month** is the third, and last, field in the field group. Note the selections in the **Current Selections** box on the same sheet. Keeping track of selections is very important when working with drill-down charts.



5. To go back in the hierarchy, click  next to the field name.
As soon as more than one value becomes possible in the fields further up in the hierarchy, the chart is automatically drilled back up.

Copying to clipboard and printing

All sheet objects can be copied as images to the clipboard. Charts and tables can be printed. It is also possible to export the data values of charts and tables to the clipboard.

Copying a sheet object to clipboard


Do the following:

1. Right-click a any chart on the sheet, select **Copy to Clipboard**, and then click **Values**.
The values from the chart can be pastes into another program, such as **Word**.
2. Open a blank document in **Word**, and click **Paste** (in **Word**).
You now see the values from the chart in the **Word** document.

Instead of selecting **Values** you can select **Image** to copy the chart as an image to paste it into other programs as an image, or **Object** to be paste the chart into another QlikView document.

Printing

If you want to print a chart, right-click the chart and select **Print**.

It is also possible to print the entire QlikView document from the **File** menu or by clicking  on the standard toolbar. For more information, see the QlikView online help..

To quickly print charts that are printed often, you can display a little print icon in the caption of the chart. This is done under **Special Icons** on the **Caption** tab in the **Properties** dialog of the chart.

2.7 Multiboxes, table boxes and input boxes

This lesson features the multi box, which allows you to show data in a very compact way, the input box, which can be used for interactive input of data and the table box which presents data in table format.

The multi box

The multi box, or multiple drop-down list box, is a sheet object that shows several fields simultaneously in a very compact way.

The multi box makes it possible to show a great number of fields on a single sheet to get a overview.



How results of selections are shown in multi boxes

The *Geography* sheet contains a multi box showing country information.

For each field in the multi box, there is a selection indicator telling you if the values of the field are selected, optional or excluded.

A value will be shown in the multi box only if it is the single possible (optional or selected) one.

Do the following:


1. Clear all your selections.
2. In the **Currency** list box, choose *Aus Dollar*.
Most of the fields still have white selection indicators in the left column, and show nothing in the right column. This means that these fields contain several optional values. *Aus Dollar* and *Not known* being the only possible values in their respective fields, they are shown in the multi box.
3. In the **Country** list box, choose *Australia*.
Values appear in all the fields. The multi box allows you to display a great amount of information in a

limited space.

Multi box	
Capital	▼ Canberra
Country	▼ Australia
Official name of Country	▼ Commonwealth of Australia
Population(mio)	▼ 22.57
Pop. Growth	▼ 1.20%
Currency	▼ Aus Dollar
Inflation	▼ Not known

Creating a multi box

Do the following:

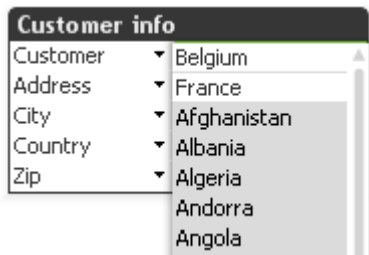
1. Click the *Customers* sheet.
2. Clear your selections.
3. Click  on the toolbar or choose **New Sheet Object > Multi Box** from the **Layout** menu.
The **General** page of the **Multi Box Properties** dialog now opens, where you can choose the fields to display in the multi box.
4. For **Title**, type *Customer info*.
5. In the **Available Fields** list, select **Customer** and then click **Add>**.
The field **Customer** is moved to the column of displayed fields, which means that it will appear in the multi box.
6. Press Ctrl while selecting a few more fields: *Address*, *City*, *Country*, and *Zip*.
7. Click **Add>** and then **OK**.
The multi box appears on your sheet.

Customer info	
Customer	▼ ○
Address	▼ ○
City	▼ ○
Country	▼ ○
Zip	▼ ○

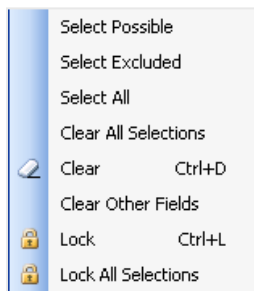
Making selections in the multi box

Do the following:

1. Clear your selections.
2. In the field **Customer**, choose *Gaston HiTech*.
There are optional values in all the boxes.
4. Click the field **Country**.
Belgium and *France* are optional.



5. The French address is the one you need, click *France*.
The requested information appears in the remaining fields of the multi box.
6. Right-click the multi box.
Have a look at the shortcut menu, then choose **Properties**. The **Properties** dialog of the multi box contains tabs that look similar to those of the list box. Here you can make changes that affect the entire multi box.
7. Close the **Multi Box Properties** dialog and right-click the field **Customer** in the multi box.
Look closely at the shortcut menu that opens. You will see that the commands in the second group (as shown in the picture) apply to the field you have clicked on, whereas the other groups of options are the same as for the entire multi box. These operate on all its fields.



Promoting a field

Maybe you would prefer to let the field **Zip** precede **Country**.

Do the following:

1. Click in the white area in the field **Zip** and press the mouse button while dragging upwards.
A blue arrow appears.



2. Release the mouse button when the arrow is above the field **Country**.
3. Clear your selections.

You can also change the order of the field using the **Promote** and **Demote** buttons on the **General** tab of the **Multi Box Properties** dialog.

The table box

The table box is a sheet object that shows several fields simultaneously. The contents are record-oriented in the same way as a normal table, that is the contents of one row are logically connected. The columns of the table box can be loaded from different input tables, which allows you to create a new table from the logically possible combinations of the input tables.

Capital	Country	Currency	Population(mio)
Abidjan	Ivory Coast	CFA-Franc	21.57
Abu Dhabi	United Arab Emirates	Dirham	4.71
Accra	Ghana	New Cedi	24.23
Addis Abeba	Ethiopia	Birr	79.46
Al Dawhah	Qatar	Riyal	1.7
Al Manamah	Bahrain	Dinar	0.81

At the first glance, the table box may look similar to the straight table, both are record-oriented, that is each row contains a possible combination of data. However, there are fundamental differences between the two sheet objects, the most important one being that table boxes cannot show calculated values.

Making selections in a table box


The sheet *Geography* contains a table box called *Table Box*. Just like the other sheet objects, the table box immediately reflects selections made in other sheet objects.

Do the following:

1. In the list box **Country**, choose a few countries and study the result.
You can make selections in a table box by clicking any of the available field values or by “painting” an area.
2. Select a range of values in the table box.
See how the contents change.
3. Clear your selections.

Creating a table box

Do the following:

1. Click the sheet *Customer*.
The sheet contains a multi box with the fields **Customer**, **Address**, **City**, **Zip**, and **Country**. You will now create a table box with the same fields.
2. Click  on the toolbar.
The **General** page of the **New Table Box** dialog appears on the screen.
3. For **Title**, type *Customer info*.
4. Double-click the fields **Customer**, **Address**, **City**, **Zip**, and **Country**. Use the **Promote** and **Demote** buttons if you need to change the order of the fields, and then click **OK**.
A table box containing the selected fields now appears on your screen.
5. Size it until you see all the columns, and move it to an appropriate position.

As you see, the field values found in one and the same row are logically connected just like in a straight table.

Customer	Address	City	Country	Zip
Adder Inc.	9, rue de la Poste	Montreal	Canada	
Adder Inc.	14 George Washington Avenue	San Francisco	U.S.A.	
Al Akbar News Services		Kabul	Afghanistan	
Alf Jequitaine	Rue de Gaulle 13	Paris	France	75664
Asian Pizza		Chittagong	Bangladesh	
Asian Pizza		Rangoon	Burma	
Asian Pizza		San'a	Yemen	
Asian Pizza		Thimpu	Bhutan	
Asian Pizza	55, Han Kow St.	Taipei	Taiwan	
Atlantic Marketing	174, rue Duchamp	Liège	Belgium	
Atlantic Marketing	Bahnhof Strasse 3	Berlin	Germany	74933
Atlantic Marketing	Westkapelseweg 5	Arnhem	Netherlands	

Adjusting columns

The columns of the table box can be adjusted just like those of the other tables.

Do the following:

- To adjust a column, place the cursor on one of the vertical lines, then drag.
- To adjust the rightmost column, place the cursor as far to the right as you can, but within the border and the scroll bar.
- To adjust all the columns, right-click in one of the columns, and choose either **Fit Columns to Data** or **Equal Column Width**.



The shortcut menu of the table box has different appearances depending on whether you right-click on the title bar or on a field. Field-specific commands such as **Select Possible**, **Sort** and so on are either non-existent or dimmed when you right-click the title bar of the table box. The options in the **Object** menu are equivalent to those in the shortcut menu of the currently active object.

Sorting the table box

Just like the straight table, the table box provides excellent possibilities for sorting.

Do the following:

1. Right-click the column header of the column **Country**, then choose **Sort**.
Customer is still the first column of the table box, but the values are now sorted according to the sort order of the field **Country**. Note how the sort indicator in the table header has changed position. Since this sheet mainly contains customer information, it makes more sense to have the table sorted by customer, though.
2. Double-click the header of the column **Customer**.
The table is now again sorted according to the sort order of the field **Customer**.



The sort order of the different fields can be set on the **Sort** tab of the **Table Box Properties** dialog. Here you can also change the sort priority of the columns by means of the **Promote** and **Demote** buttons.


Printing a table box

Suppose you want to print a list of all the French customers.

Do the following:

1. Clear your selections.
2. On the *Customers* sheet, in the list box **Country**, choose *France*.
The table box now shows all the customers that have offices in France.
3. Right-click the table box *Customer info*, and choose **Print**.
The **Print** dialog opens.
4. Click **Print Preview** to have a look at the list over French customers.
5. Click **Print**



It is also possible to print the document from the **File** menu or by clicking  on the toolbar.

Exporting values from a table box

Instead of printing the table box, you can export its contents to a file.

Do the following:

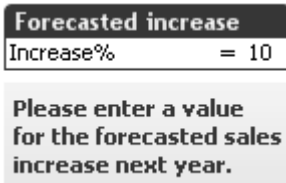
1. Right-click the table box, and choose **Export**.
In the dialog that opens, *qvo* is preselected as type of file. This is a QlikView-specific type, which can be freely associated with any program, for example Excel.
2. For **File name**, type *Customers in France.qvo*.
3. Click **Save**.
You can now open the Windows Explorer (Window 7) or File Explorer (Windows 8.1 and 10) and double-click the *qvo* file to open it with Excel.
4. Close Excel and go back to QlikView.

Using an input box

Sometimes there is a need to enter data interactively into the QlikView document. It is normally not possible to change data in the fields (list boxes and so on) interactively. However, in QlikView you can use variables, which can be changed at any time. The typical way of entering data in a variable is through the input box.


Entering data in an input box

In this section we will use an input box to enter a forecasted sales increase and see the result in a chart.

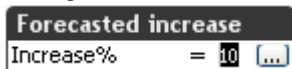


Do the following:

1. Clear your selections.
2. Go to the *Geography* sheet where you find an input box and a text object.
3. Select the input box and the explanatory text object below. Move both objects to the *Sales* sheet.
4. Click the *Sales* sheet.
The input box and the text object are now found on this sheet.

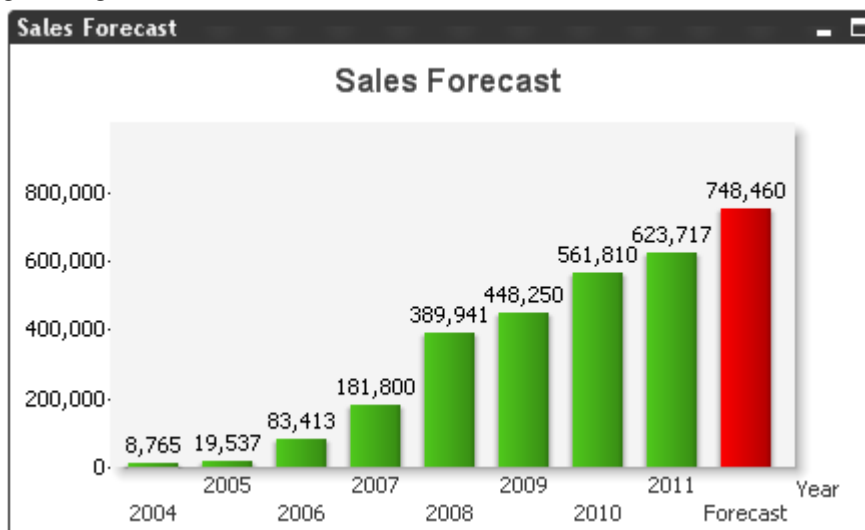
5. Double-click the minimized chart *Sales Forecast*.  **Sales Forecast**
Sales Forecast shows sales per year as well as a red bar for a forecast of next year's sales to the right. The forecast is calculated using an expression based on the sales in the current year, increased by a percent factor in a variable called *Increase%*.
This percent factor is the variable shown in the input box. It is currently set to 10 percent. Since we are optimistic about sales, we will now raise the forecast to 20 percent sales increase.

6. Click in the area to the right of the "=" in the input box.
The figure "10" is marked.



You are now in edit mode for the input box.

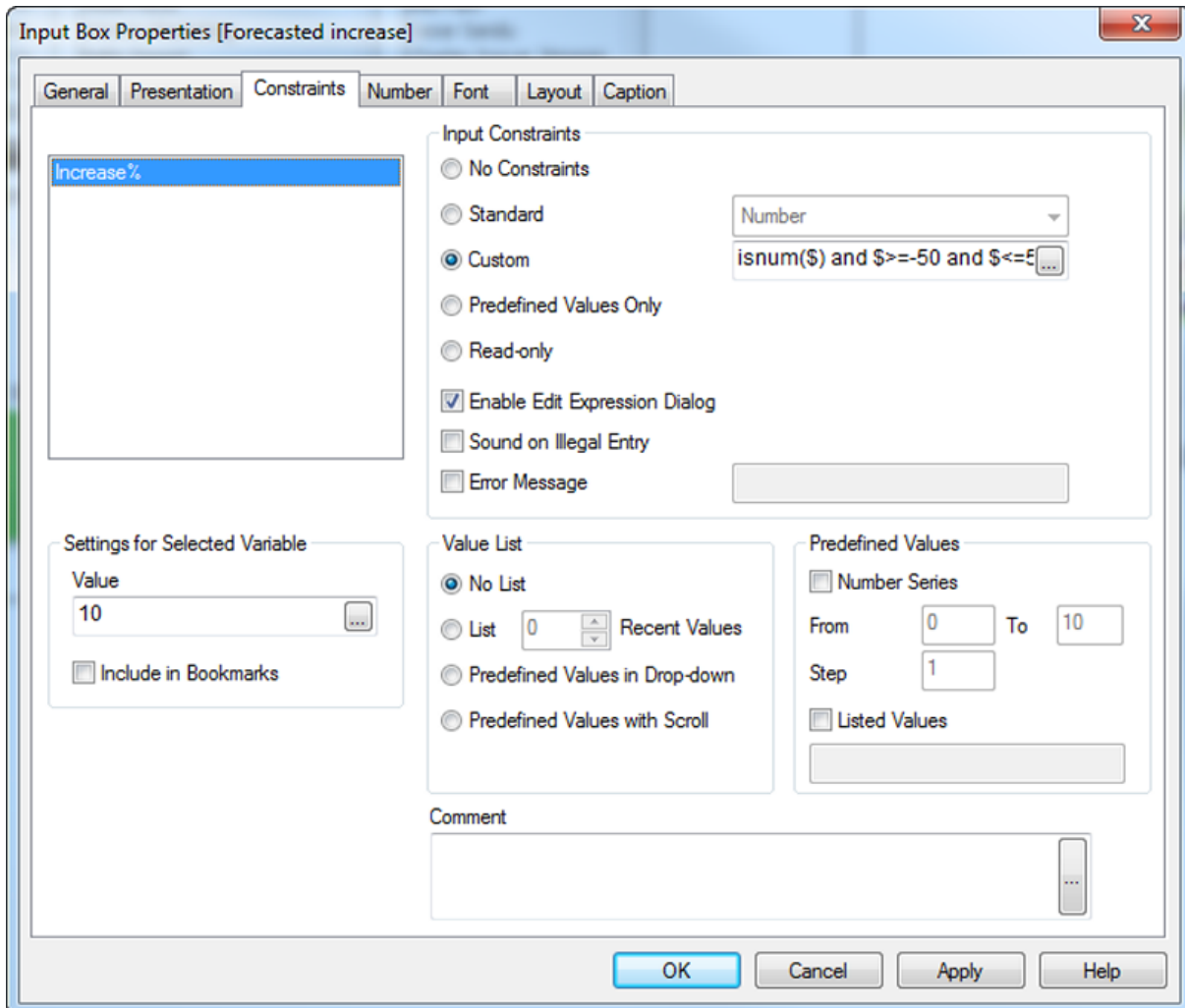
7. Type 20 and press Enter.
The value of the variable has changed and the chart is recalculated. You can see how the *Forecast* bar grows higher.



8. Minimize the chart.

Input box constraints

In principle variables in input boxes can hold any data. The document designer often sets limits to what is allowed to enter. In the example in front of you a non-numeric value would not make sense, so this input box has a constraint only allowing input of numbers between -50 and 50.



Now you will try to enter a value outside the constraints.

Do the following:

1. Click inside the input box and type 99. Press Enter.
The input box will not accept this value as it falls outside the set constraints. You will remain in edit mode in the input box with the old value marked.
2. Type 10 and press Enter and you are back where you started.

2.8 Buttons, text objects and line/arrow objects

In this lesson, you will learn how to create buttons, text objects and line/arrow objects. These objects are not displaying any data. Instead they are used to enhance the layout and usability of the document.

Buttons are used for carrying out commands in an easy way, or for exporting data. Text objects also have several areas of use. Among other things, you can improve the appearance of your document by displaying text or pictures in text objects. Lines and arrows can be used for different layout purposes.


The text object

Text objects can be used in several different ways, for example for displaying explanatory text or pictures or for creating multi-colored sheet areas.

Creating a text object

You will use text objects to display text and images for the layout of a welcome page for the document.


Do the following:

1. On the **Layout** menu, choose **Add Sheet**.
A new sheet appears.
2. Right-click somewhere in the new sheet to open the **Properties** dialog.
3. On the **General** tab, type *Welcome* for **Title** box, and click **OK** to close the dialog.
4. Click  on the design toolbar.
The **New Text Object** dialog opens.
5. Type *QlikView Tutorial* in the **Text** area.
6. Under **Background**, set the **Transparency** slider to *100 %*.
7. On the **Font** tab, select *36* for **Size** and choose a grey color.
8. Click **OK** to close the dialog.
9. Size and position the text object on the sheet.

Using a function in a text object

Now, you will create another text object showing information about the latest document.


Do the following:

1. Click  on the design toolbar.
The **New Text Object** dialog opens.
2. Type `=Last update: '&reloadtime()`.
This is an expression for a calculated text. It delivers the text "*Last update:*" followed by the timestamp of the last reload of the document. The timestamp is calculated by the function **reloadtime()**.
3. Under **Background**, set the **Transparency** slider to *100 %*.
4. On the **Font** tab, select a font of your choice, and click **OK** to close the dialog.
5. Size and position the text object on the sheet.

Using the text object to include an image

Now you will create a third text object, showing an image.


Do the following:

1. Click  on the design toolbar.
The **New Text Object** dialog opens. This time you will leave the **Text** area empty as this text object should not show any text.
2. Under **Background**, select **Image** and click **Change**.
3. Browse to the folder *Working with QlikView*, select the file *QlikViewWater.gif* and click **Open**.
4. Click **OK** to close the dialog.
5. Position the text object on the sheet.

The line/arrow object

Line/arrow objects can be used for example for dividing the sheet into different areas or to visualize relations between certain sheet object. You will use a horizontal line to enhance the layout of the *Welcome* sheet.

Do the following:

1. Click the *Welcome* sheet.
2. Click  in the design toolbar.
The **New Line/Arrow** dialog opens.
3. Set **Line Weight** to *1 pt*.
4. On the **Layout** tab, select **Bottom** in the **Layer** group, and click **OK**.
A black horizontal line appears on the sheet.
6. Enlarge the line/arrow object.
7. Place it above the text object showing the reload date.



*It could be that the line/arrow object overlaps the text objects next to it. In this case you can either make the line/arrow object narrower, or you can rearrange which layers the text objects reside in. To make a partly hidden text object appear on top of the line/arrow object, open the properties dialog of the text object and choose **Normal** in the **Layer** group on the **Layout** tab.*


The button

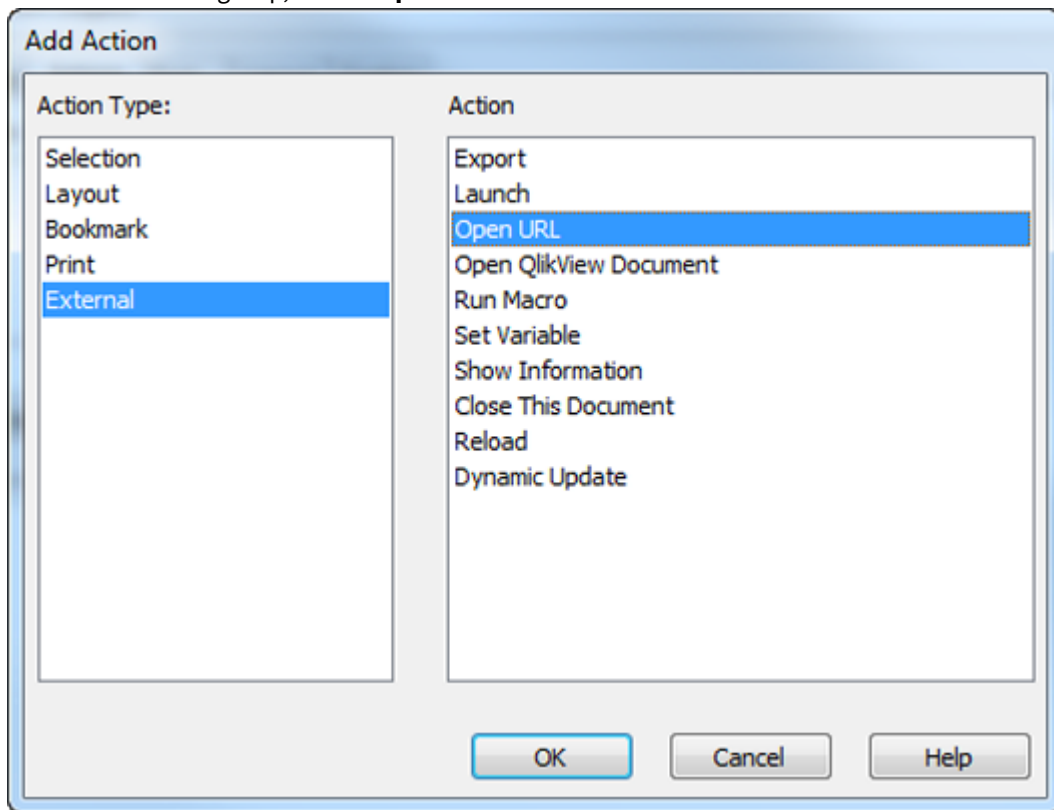
Buttons can be used in QlikView to perform commands or actions, for example exporting data to files or launching other documents. For more information, see the QlikView online help.

Creating a launch button

You will now create a button on the *Welcome* sheet.

Do the following:

1. On the *Welcome* sheet, click  on the design toolbar.
The **New Button Object** dialog opens.
2. On the **General** tab, type *Go to QlikView Homepage* in the **Text** box, and choose a green color for the text.
3. On the **Actions** tab, click **Add**.
The **Add Action** dialog opens.
4. From the **External** group, choose **Open URL**.




8. Click **OK** to close the **Add Action** dialog.
9. On the **Actions** tab, type *www.QlikView.com* for **URL**, and click **OK**.
10. Size and position the button on the sheet.
11. Try clicking your new button.
The web page opens in your regular browser.

Creating an export button

You have already learned how to export data from a table box. It is also possible to use a button to export data from specific fields.

Do the following:

1. On the *Sales* sheet, click  on the design toolbar.
The **New Button Object** dialog opens.
2. Type *Export* in the **Text** area and choose a green color for the button.

3. On the **Actions** tab, click **Add**.
The **Add Action** dialog opens.
4. From the **External** group, choose **Export** and click **OK**.
5. Click **Setup** to open the **Export Action Settings** dialog.
All the fields in the document are listed under **Fields**.
10. Double-click the fields **Customer, Country, Salesperson, Year, and Sales** to add them to the **Export Lines** list.
11. Check **Include Labels**, and choose **Records**.
12. Click **OK** twice to close the dialogs.
13. Select a few values on the *Sales* sheet, and then click the *Export* button.
The possible values in the specified fields have been copied to the clipboard. To see the result, open another software, for example Excel, and click **Paste**.

Exporting data to a file

You can also export the data to a file, similar to exporting values from a table box in the previous lesson.

Do the following:

1. Right-click the *Export* button, and choose **Properties**.
2. On the **Actions** tab, select **Export**, and click **Setup**.
The **Export Action Settings** dialog opens.
3. Under **Export to**, choose **File**.
The **Export File** dialog opens.
4. Browse to the location of your *Tutorial.qvw* file, and type a name, for example *Export*.
5. Select **Comma Delimited (csv, txt)** as file type.
6. Click **Save** to close the **Export File** dialog.
You see the path to the file on the **Export Action Settings** dialog.
8. Click **OK** twice to close dialogs.
9. Test the functionality of your button.
Every time you click the *Export* button, all combinations of the possible values of the specified fields will be copied to this file.

Launching an export application

If you want the application to be launched as soon as you click the export button, you can specify this by creating a **Launch** action.

Do the following:

1. Right-click the *Export* button, and choose **Properties**.
2. On the **Actions** tab, select **Add**.
The **Add Action** dialog opens.
3. From the **External** group, select **Launch** and click **OK**.

The **Actions** tab opens, displaying settings relevant to the **Launch** action.

4. Click **Browse** next to the **Application** box and browse to your export file *Export.csv*. Make sure that **All files** are selected as file type in the **Select Program** dialog.
5. Click **OK** to close the **Button Properties** dialog.
6. Select a few values on the *Sales* sheet again, then click the *Export* button. The file *Export.csv*, containing your exported data, opens.
7. Close the export file and clear your selections.



If you want your newly created buttons to look like the one on the Geography sheet, you can use the format painter to copy the format from one button to the other.

2.9 Sliders, current selection objects and bookmark objects

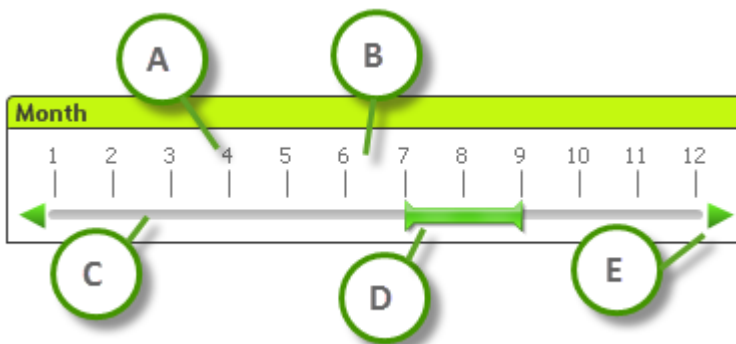
This lesson features a few additional types of sheet objects which can be used to make QlikView documents more user-friendly. The slider/calendar object offers a graphical way of manipulating selections in a field or data in a variable. The current selections box and bookmark objects makes it possible to move menu functionality to a more visible position in the QlikView layout.

The slider/calendar object (in slider mode)

A slider allows you to make selections in fields or variables while showing the selection graphically. Slider objects are very versatile and useful.

In this tutorial we are only showing one of their possible uses: to connect a slider object to a field. For more information, see the QlikView online help..


A slider consists of several parts that can all be formatted and defined.



A	Ticks
B	Scale background
C	Slider background
D	Thumb tack
E	Scroll arrows

Slider objects can be used to control a field or one or two variables. In this example, we will use it for controlling selections in the **Month** field.

Do the following:

1. Go to the *Sales* sheet.
2. Clear your selections.
3. Click  on the design toolbar or right-click somewhere on the sheet and choose **New Sheet Object > Slider/Calendar Object**.

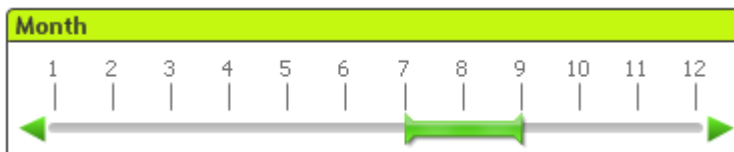
The **General** tab of the **New Slider/Calendar Object** dialog opens.

4. Choose **Month** for **Field**, and **Multi Value** for **Mode**.
5. On the **Presentation** tab, choose **Use Custom Scale**.
6. Select **12Major units, Labels on every1Major Units** and **0Minor Units per Major Unit**.
7. On the **Sort** tab, check **Numeric Value**.
8. On the **Layout** tab, check **Use borders** and ensure **Solid** is selected as the **Border Style**.
9. On the **Caption** tab, check **Show Caption**, and type *Month* for **Title Text**.

Click **OK**.

The slider object appears on your sheet. To show the ticks, you may need to size the slider object by dragging its border.

10. In the **Months** list box, select the months 7, 8 and 9.
A thumb tack appears in the slider object.




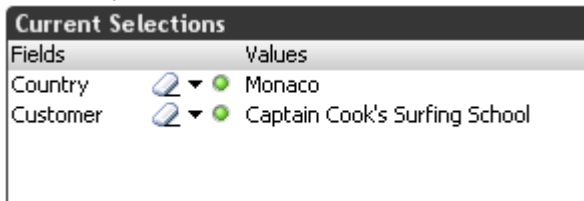
13. Point at the thumb tack and drag it.
Note the pop-up showing the months corresponding to the current position of the thumb tack.
14. Release the mouse button.
The selections in the list box shift in line with the slider position.
15. Position the cursor on one of the slider thumb tack's short ends. Click and drag.
The range of selections will narrow or widen accordingly.
16. Release the mouse button.
The new selection takes effect.
17. Clear your selections.
The thumb tack disappears from the slider object.
18. Position the cursor inside the slider area (between the arrows).
The thumb tack reappears.

Creating a current selections box

You learned about current selections boxes under *Selections* (page 13). A current selections box provides a quick overview of the selections made in the document at any time.

Do the following:

1. Click the *Customers* sheet.
2. Click  on the design toolbar or choose **New Sheet Object > Current Selections Box**.
3. On the **General** tab, check **Use Column Labels**, and click **OK**.
The current selections box appears on the sheet.
4. Now select a few values in the fields.
Note how your choices are reflected in the current selections box.




5. Clear your selections.

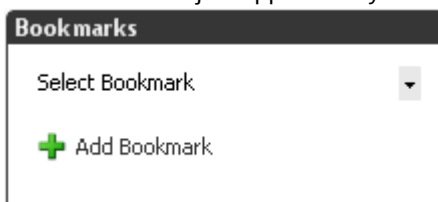
Creating a bookmark object

In the **Bookmarks** menu, you can create and use personal bookmarks that are stored on your own computers as well as document bookmarks that are stored with the QlikView file. For more information, see the QlikView online help.

However, it is sometimes more convenient to be able to handle bookmarks directly in the QlikView document. In a bookmark object you can select existing bookmarks from a drop-down list and, depending on configuration, add new and delete old bookmarks.

Do the following:

1. Click the *Customers* sheet and clear your selections.
2. Click  on the layout toolbar or choose **New Sheet Object > Bookmark Object**.
3. On the **General** tab, type *Bookmarks* for **Title**, and click **OK**.
The bookmark object appears on your sheet.



6. Make a few selections in some list boxes and then click **Add Bookmark** in your new bookmark object.
The **Add Bookmark** dialog opens.
7. Type a name for the new bookmark and click **OK**.
8. Clear your selections.
9. Select your bookmark in the drop-down list in the bookmark object.
The selections made when you created the bookmark are restored.

2.10 Document properties, user preferences and reload

In the previous lessons, you have been working with the different sheet objects. Among other things, you have changed the appearance and behavior of the objects using their **Properties** dialogs. In this lesson, which is the final lesson of this section *Working with QlikView*, you will learn how to change the properties of all the objects in the document at the same time.

Furthermore, some settings that affect not only the current document, but all the work performed in QlikView, will be introduced.

At the end of the lesson, you will learn how to update your document, that is how to reload data from the data sources that contain the data shown in your QlikView document. You might say that this lesson is a stepping-stone to the next part of the tutorial where you learn to create a document by loading data from different data sources.

Setting document properties

Until now, you have been changing the properties of individual sheet objects. However, you will often find yourself in a situation where you would like to give the same appearance to all the sheet objects of the document or format several fields at the same time. You might want to set background colors for all the sheets in the document. This is when the **Document Properties** dialog is useful. You can also use this dialog to attribute an opening sound or an opening picture to your document.

Setting an opening sound

You can further improve your document by choosing a picture and/or a sound to be shown or played, respectively, when the document is opened. You will now learn how to play a sound when opening the document.

Do the following:

1. In the **Settings** menu, choose **Document Properties**, and click the **Opening** tab.
2. Check **Sound**, and click **Select**.
3. Browse to the file *tada.wav*. It is located in the same folder as your tutorial file. Click **Open**.
4. Under **Sound**, click **Play**, then click **OK**.
5. Save the document.

Setting properties

Several of the tabs in the **Document Properties** dialog contain settings similar to those of the **List Box Properties** dialog. The difference is that when you change the settings in the **Document Properties** dialog, all the sheet objects containing the selected field are affected. The settings are either applied immediately or only on new sheet objects that are created after the changes were made. For more information, see the QlikView online help.

Choosing a different selection style

The selections in a QlikView document are by default visualized by a color coding: green for selected values, white for possible values and grey for excluded values. This color scheme can be slightly modified, but the basic colors will always remain. As an alternative, Windows check boxes may be used to show the logical state of a value.

Do the following:

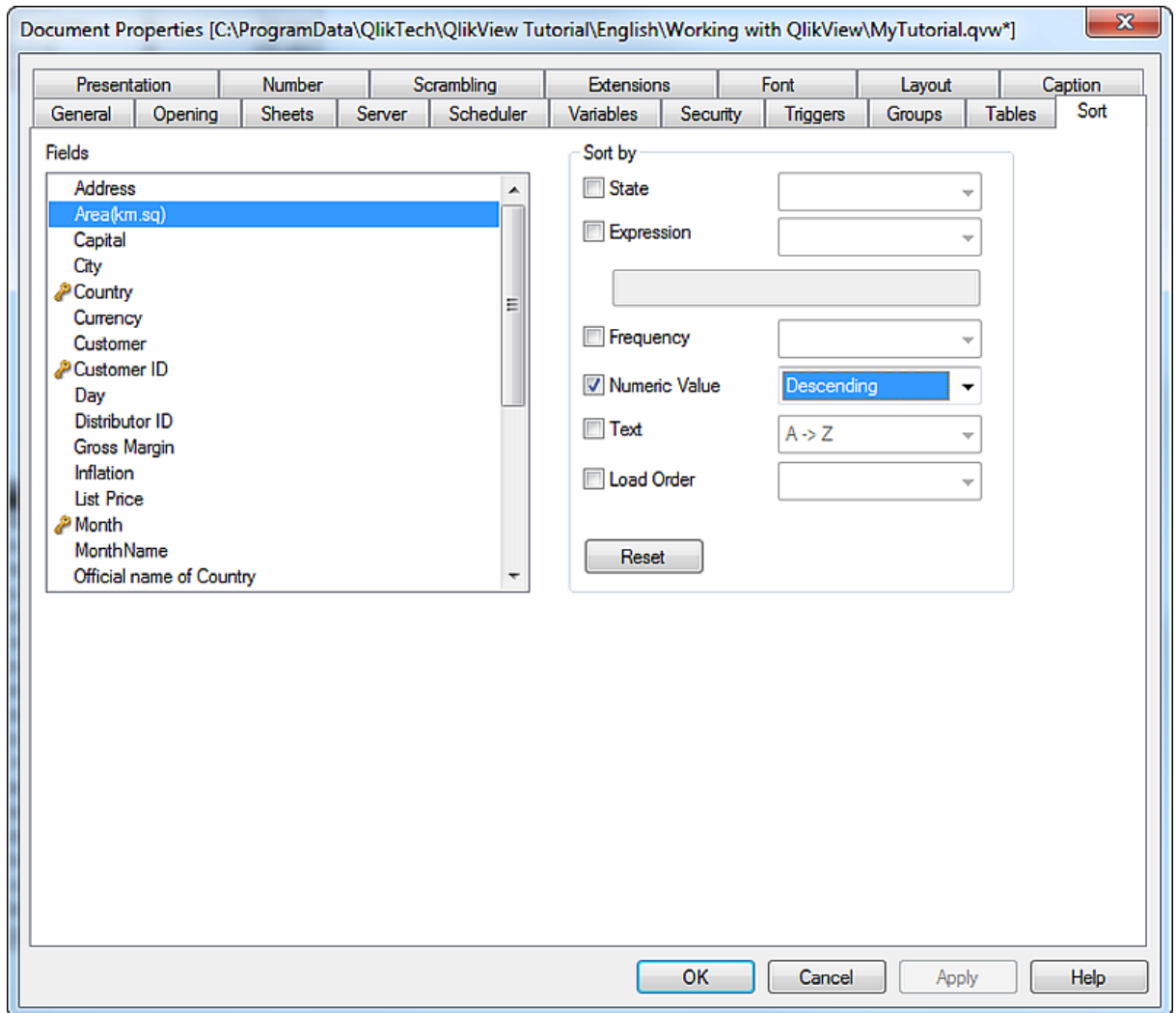
1. In the **Settings** menu, choose **Document Properties**.
2. On the **General** tab, select a different color scheme or a different style under **Selection Appearance**, and click **OK**.
3. Make some selections to view the visualization in different object types.

Sorting all future list boxes containing a particular field

You can select to sort all list boxes that you create going forward, based on a specific field. In this example, list boxes will be sorted on the field **Area(km.sq)**.

Do the following:

1. In the **Settings** menu, choose **Document Properties**.
2. Click the **Sort** tab.
You recognize the sort options from the **List Box Properties** dialog, with the list of all the fields in the document.
3. Select the field **Area(km.sq)**, then check **Numeric Value** and select **Descending**.



4. Click **OK**.
5. Create a new list box containing the field **Area(km.sq)** and note its sort order.
6. Delete the new list box.

Applying the same border settings to all the sheet objects

The **Layout** tab of the **Document Properties** dialog is identical with the corresponding tab in the **List Box Properties** dialog. However, a setting changed here will affect the entire document. Let us give objects (except buttons, text objects and line/arrow objects) a walled border with slightly rounded corners.

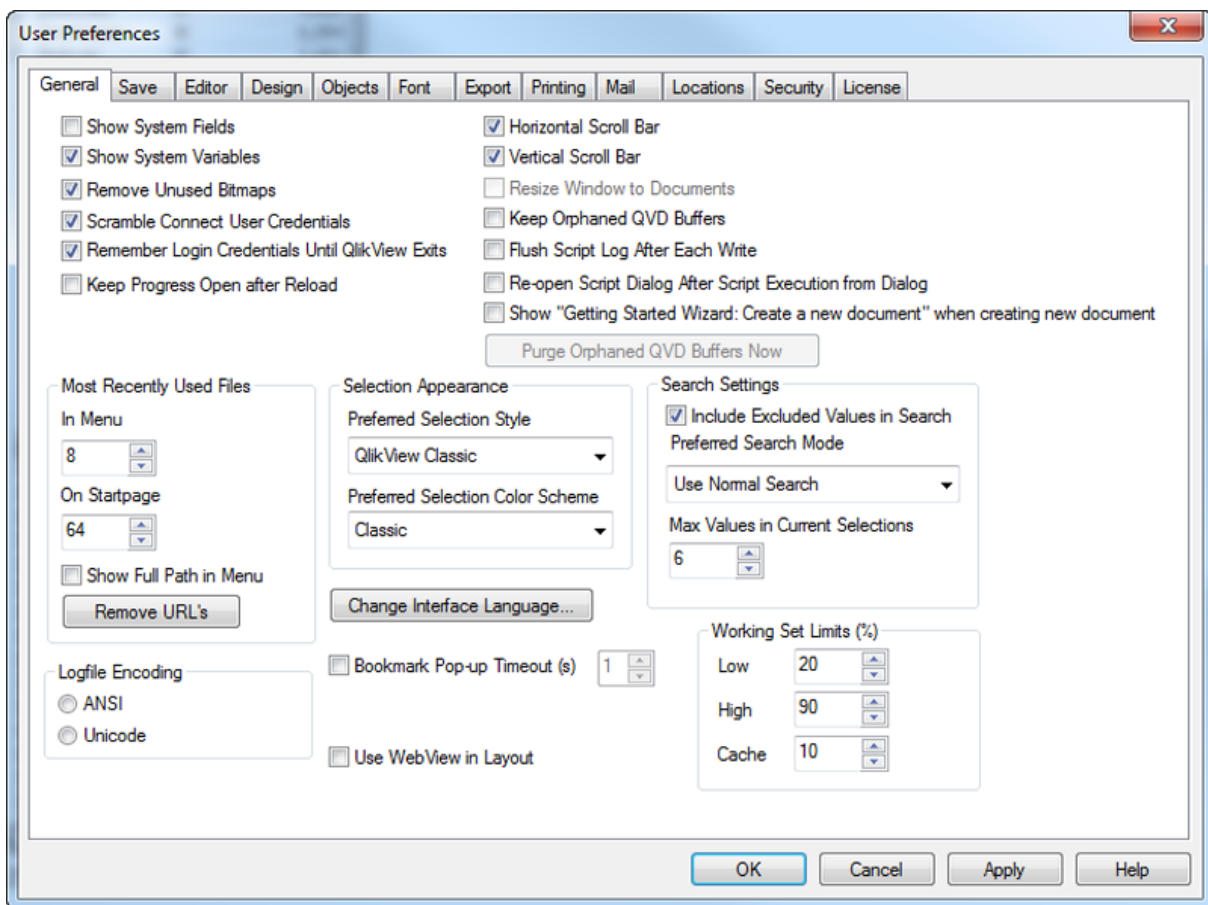
1. In the **Settings** menu, choose **Document Properties**.
 2. Click the **Layout** tab.
 3. Select the **Use Borders**, choose a style and width.
 4. Click the **Apply To** button, and click **OK**.
The change is implemented throughout the entire document.
1. Revert to the original layout settings.
 2. Save the document.

Themes

Another even quicker way of applying changes to an entire document is by creating and applying a QlikView theme. For more information, see the QlikView online help.

User preferences

The **User Preferences** dialog, found in the **Settings** menu, contains a number of settings concerning your way of working with QlikView. Settings changed here remain the same regardless of the document you work with. One example is the language of the QlikView interface that you can change here.



Checking your work

The folder *Working with QlikView* contains a file called *TutorialFinal*. If you want to, you can open this file to compare it with the one you just saved.

Classroom training

More layout options and settings as well as design fundamentals and best practices for building good user interfaces are covered in the classroom training course *QlikView Designer I*.

The classroom course *QlikView Designer II* - for advanced designers - presents charts with advanced display options, more object types, complex calculations in objects and report generation.

E-learning

Several e-learning courses are available free of charge at www.qlik.com, under **Free Training**.

3 Creating a document

3.1 Introduction

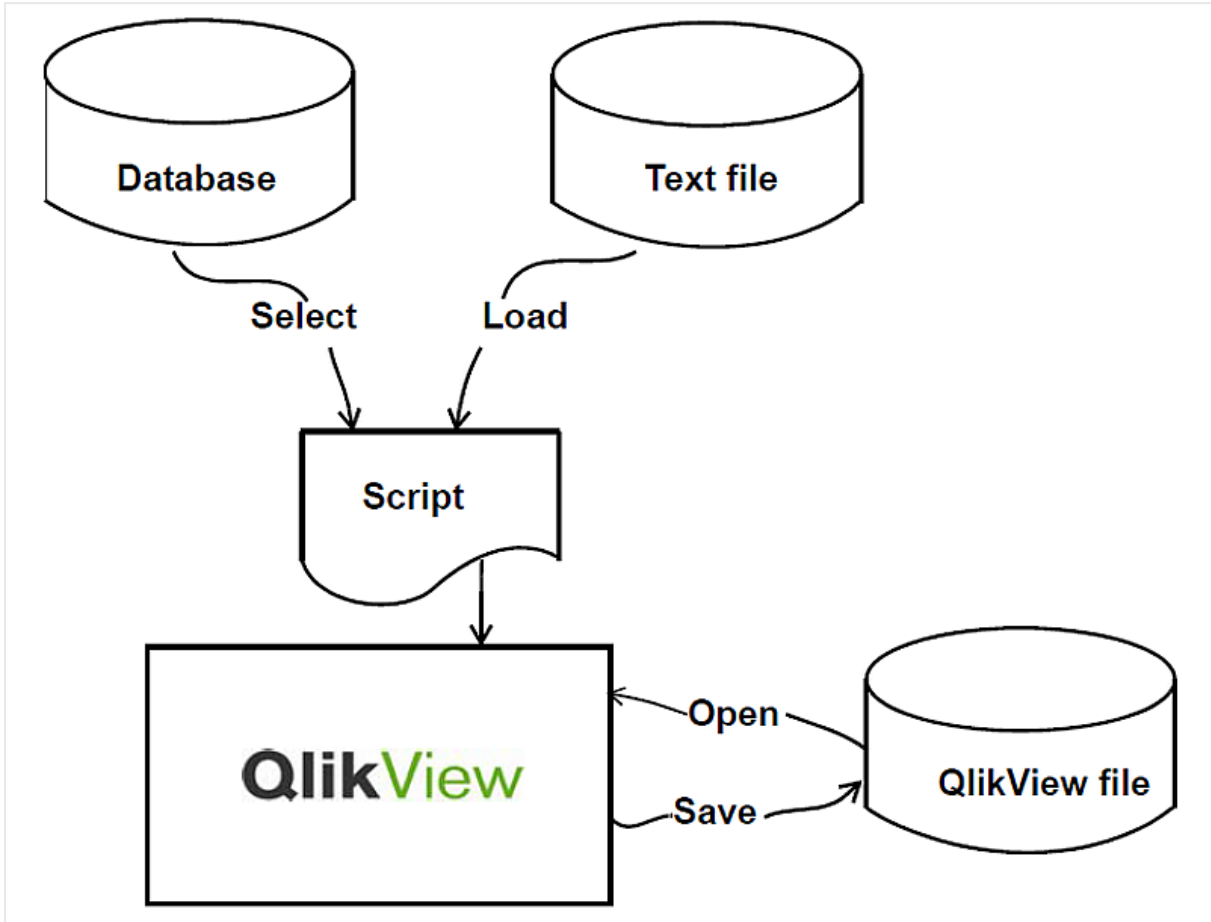
In the *Working with QlikView (page 11)* part of the tutorial you learn how to work with an existing document. It already contains data that you display in list boxes and other sheet objects. In this part, you will learn how to create a QlikView document from scratch. Loading data and associating data tables are two of the main topics to be treated. There will be a step-by-step presentation of the procedures.

It is possible to use a **Getting Started Wizard** in QlikView, but you will not use it in the tutorial. The exercises in this part of the tutorial aim to educate you in scripting.

The source data files used in this part are found in the ...*Tutorials source\Creating a Document* directory. The sample represents a customer database of a fictive company.

3.2 Loading data into QlikView

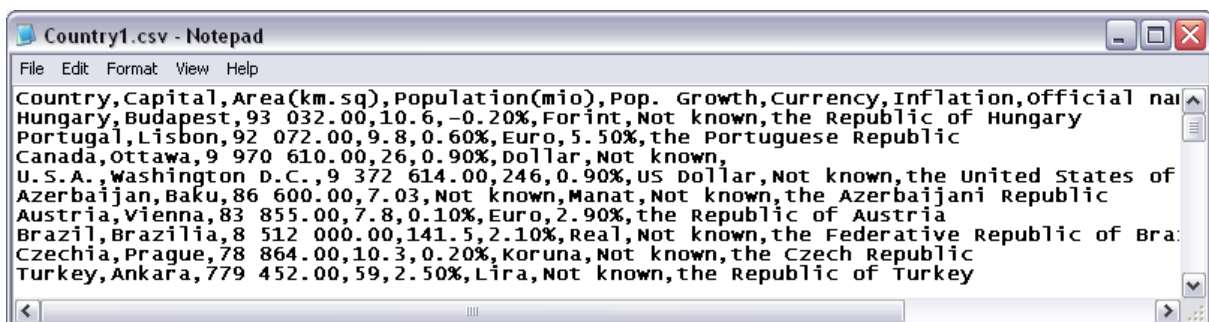
A QlikView document is created by retrieving data from one or several sources, for example from a relational database or from text files containing data tables. This retrieval is done by writing and executing a script, in which the database, the tables and the fields to be retrieved are specified. The script can be generated automatically with the tools included in QlikView. QlikView in itself is not a traditional database, you cannot add or alter data in the source database. In this lesson, you will create a simple document consisting of one data table.



Data can be imported from text files, or from databases using the ODBC or OLEDB interface. The imported data, together with the layout, can be saved as a QlikView document.

Looking at a delimited text file

The type of file that will be used in the examples is a csv (comma separated value) file, which uses comma as delimiter. The fields (columns) can also be separated by other special characters, for example semicolon or tab.



One representation of a table - a comma separated file viewed in a simple text editor.

Comma separated value files and text files with other delimiters can often be imported to, and exported from, spreadsheet programs.

Do the following:

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1. Start a spreadsheet program, for example, Excel.
2. Open the file *Country1.csv* from the `..\Tutorials source\Creating a Document\Data Sources` directory (In the **Files of Type** box, choose **All Files**.)

The contents of the file are logically a table, where each row, or record, describes a country and its properties. The first line contains the column (field) names.



3. Close the spreadsheet program.

	A	B	C	D	E	F	G	H	I	J	K
1	Country	Capital	Area(km.s	Populatio	Pop. Grow	Currency	Inflation	Official name of Country			
2	Australia	Canberra	7 682 300	22.57	1.20%	Aus Dollar	Not know	Commonwealth of Australia			
3	Macedoni	Skopje	25 713	2.04	Not know	Denar	Not know	Former Yugoslav Republic of Macedonia			
4	Bosnia-He	Sarajevo	51 129	3.84	Not know	Dinar	Not know	Republic of Bosnia and Herzegovina			
5	Croatia	Zagreb	56 538	4.43	-0.05%	Dinar	Not know	Republic of Croatia			
6	Serbia	Belgrade	77 474	9.86	Not know	Dinar	Not know	Republic of Serbia			
7	Montenes	Podgorica	14 026	0.64	Not know	Euro	Not known				

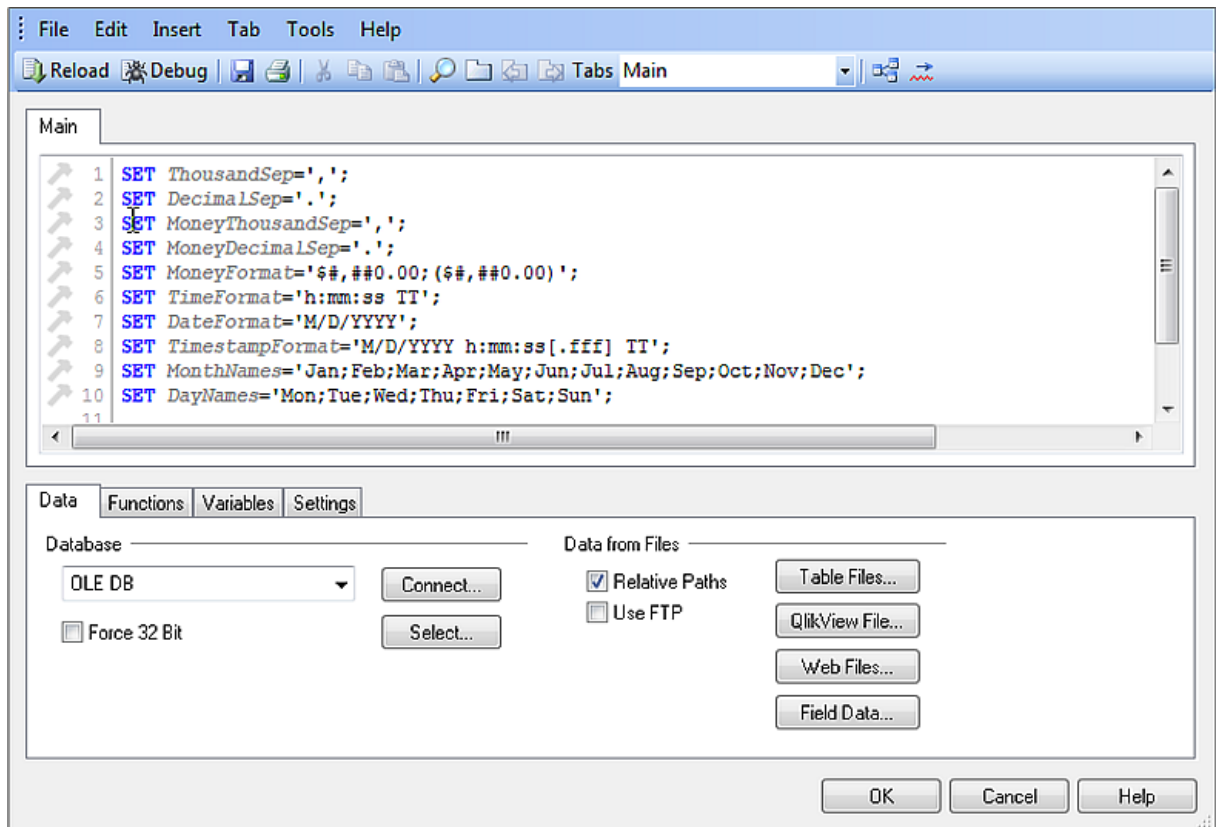
The comma separated file viewed in a spreadsheet program.

Creating a document and loading a text file into QlikView

Do the following:

1. Start QlikView.
2. On the **Settings** menu, choose **User preferences** and deselect **Getting Started Wizard: Create a new document** at the bottom of the tab. Close the dialog.
3. Choose **New** on the **File** menu or from the toolbar. 
4. Choose **Save** from the **File** menu. Save the file in the `..\Tutorials source\Creating a Document` folder and name it *MyDocument.qvw*.
5. Choose **Edit Script** from the **File** menu or from the toolbar. 

The **Edit Script** dialog opens. The script will be created in the **Edit script** dialog. A number of rows starting with SET have already been generated in the script pane. At the bottom of the dialog you will find a row of tabs containing functions for script generation.



6. Make sure that the check box **Relative Paths** is checked.

7. Choose **Table Files**.

This opens the **Open Local Files** dialog box, in which you can browse for the file you wish to load. Make sure that the control **Files of type:** is set to **All Table Files**.

8. Open the file *Country1.csv* located in the `..\Tutorials source\Creating a Document\Data Sources` directory.

The file is now opened in the **File Wizard**, which interprets the contents of the file and helps you to load the data into the script.

The file wizard interprets the file to be a comma separated (delimited) file using the Western European (ANSI) character set. This is a correct interpretation. The wizard also state that the header size is **none**, which means that the file contains no initial information to be omitted.

You want to use the field names **Country > Capital** etcetera. as labels, or heading in your file.

9. In the **Labels** drop-down, select **Embedded Labels**. The field names move to the top row and is marked gray.

10. Since the program has made a correct interpretation of the file, you can click **Finish**.

11. A script similar to the one below has been generated in the **Edit Script** dialog:

```

Directory; LOAD Country, Capital, [Area(km.sq)], [Population(mio)], [Pop. Growth], Currency, Inflation,
[Official name of Country] FROM [Data Sources\Country1.csv]
(txt, codepage is 1252, embedded labels, delimiter is ',', msq);

```

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Study the script. In the **LOAD** statement, the fields of the selected file are listed. Some of the field names are enclosed by square brackets. This is required when a field name contains spaces. The **FROM** statement is followed by the path to the file. In the Tutorial we use relative paths.



*The words **SET**, **LOAD** and **FROM** are highlighted. This means that they are keywords and have a special meaning in the QlikView script.*

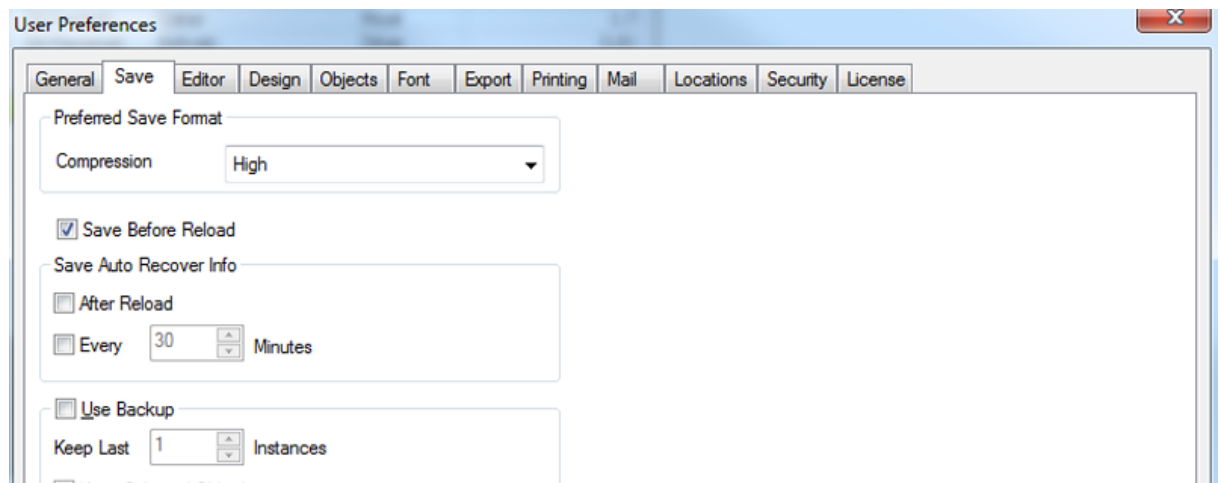
The final parenthesis contains additional information about the file, specifying, among other things:

- File type - *txt, ooxml, biff/xlsx* etcetera.
- Character set: the character set used ANSI, or Windows 1252.
- Embedded labels: the first row of the file contains field names (column headings). If there are no embedded labels, placeholders will be used as headings instead.
- Delimiter: semicolon, comma or tab are examples of characters separating the field value.
- *msq* stands for modern style quoting.

You recognize these terms from the file wizard.



*If you save your changes while still in the **Edit Script** dialog before you reload it, you can easily go back and make changes if the reload is not be successful. Your QlikView documents can also be automatically saved just before the script is reloaded. On the **Settings** menu, click **User Preferences** and then the **Save** tab. Select **Save Before Reload** and close the dialog.*



The Save Before Reload setting is recommended.

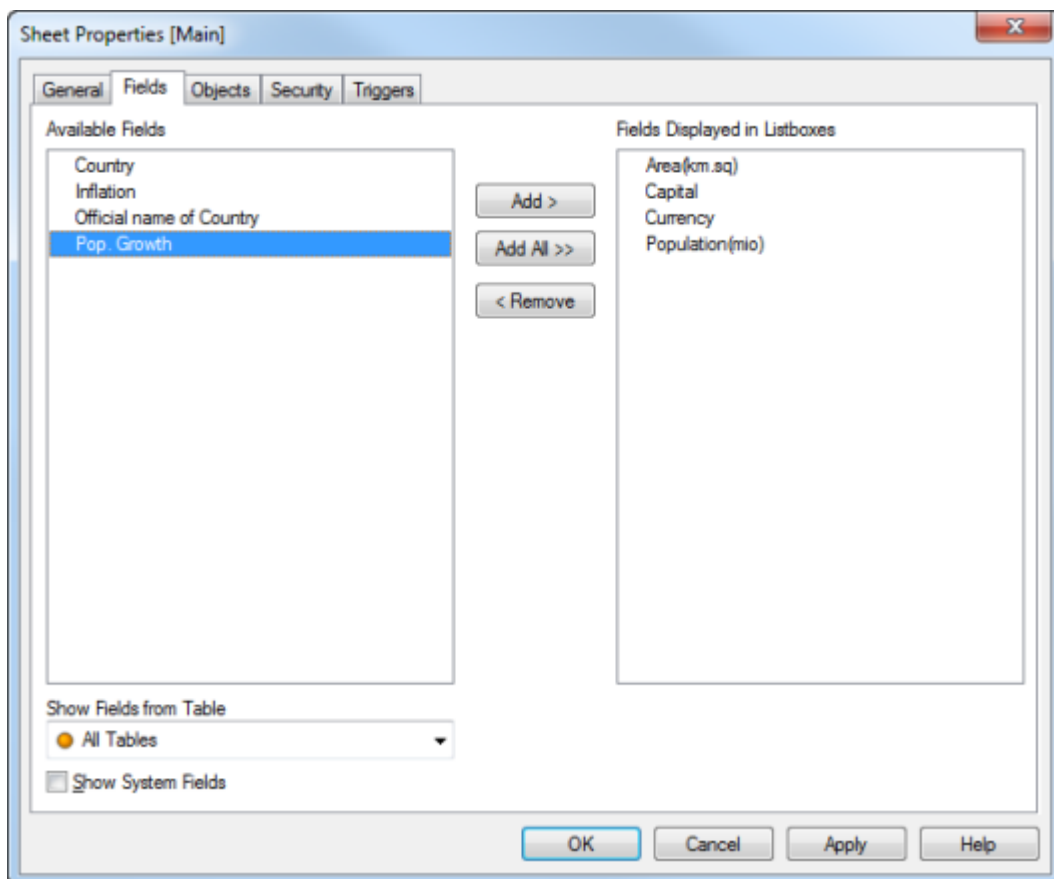
12. Click **Reload**. 

The data is now loaded into QlikView, and a dialog box in which it is possible to select the fields to be displayed is opened.

There are two ways to add fields to the list of displayed fields:

- Double-click the field name. The field is immediately put in the list of displayed fields.
 - Select a field and click **Add >** (If you want to select several fields, press Ctrl and then select the fields).
13. Add the following fields to the list of displayed fields:
- **Area (km.sq.)**
 - **Capital**
 - **Currency**
 - **Population (mio)**

If some field names is starting with “\$”, deselect the check box **Show System Fields** below the field list.




You select fields to display on the current sheet from the **Fields** tab of the **Sheet Properties** dialog. Here you select the fields to display on the current sheet.

14. Close the dialog and save your document.
15. Move and size the list boxes so that the data is entirely visible.
Your document looks similar to the "A simple QlikView document" shown below. All the fields in the column **Fields Displayed in Listboxes** are displayed as list boxes on the active sheet.
If you want to add or remove fields, you can open the **Sheet Properties** dialog again. Right-click on the sheet and click **Properties** from the shortcut menu.
16. Click on a capital in the **Capital** list box.

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Information is connected to the capital in the other list boxes, for example the currency used in that country.

 All the information refers to the countries, because every record in the table that was loaded represents a country. Thus, clicking on Paris does not mean that you get the population of Paris. It is still the population of France that is shown.

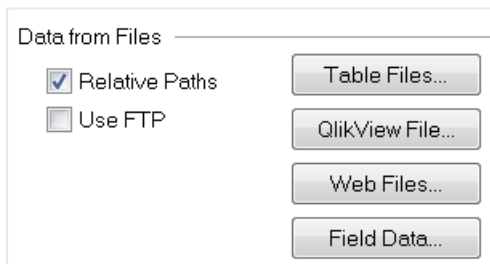
Capital	Area(km.sq)	Population(m...)	Currency
Amsterdam	0.44	0.001	Aus Dollar
Andorra La Vella	61	0.03	Denar
Ankara	160	0.04	Dinar
Astana	195	0.08	Dollar
Athens	316	0.32	Dram
Baku	468	0.42	Euro
Belgrade	622	0.5	Forint
Berlin	2 586	0.64	Franc
Bern	14 026	1.34	Hryvnia
Bratislava	20 251	2.04	Koruna
Brazilia	25 713	2.05	Krona
Brussels	28 748	2.23	Krone
Bucharest	29 800	3.2	Kroon
Budapest	30 518	3.25	Lari
Canberra	33 700	3.84	Lat
Chisinau	41 293	4.3	Lek
Copenhagen	41 863	4.43	Leu
Dublin	43 075	4.44	Lev

17. Clear your selections.

You have now created a document and loaded a text file into QlikView.

Relative paths and absolute paths

In the Tutorial we use relative paths, meaning that QlikView will look for files relative to the directory where the current QlikView document is stored. To use relative paths, select the check box **Relative Paths** in the **Edit Script** dialog. It is also possible to edit a path directly in the script.



An example of a relative path: ...|Tutorials source|Creating a Document|Data Sources.

A statement using a relative path is preceded by a **directory** statement in the QlikView script. For more information, see the QlikView online help.

An absolute path, on the other hand, gives an exact specification of the location of the file. If you move the file to another location (for example to a user directory or to another hard disk), the program will no longer be able to find related files and run the script.

An example of an absolute path is *C:\Program data\QlikTech\QlikView Tutorial\English\Creating a Document\Data Sources*.

Saving, closing and exiting

If you don't want to turn to the next lesson right away, you can close the document. You should also save the document, since the following lessons are based on the work you have done so far.

3.3 Associating data from many tables

What you usually want to do is to load and associate data from a number of tables. In this lesson, you will be familiarized with QlikView's way of automatically associating related tables. You will also learn how to rename fields to assure or prevent associations.

Associations

If you have two tables listing different things, for example, if you have one list of customers and one list of invoices, and the two tables have a field (column) in common, for the customer number, this usually means that there is a relationship between the two tables.

If such a relationship exists, associations are made between the fields that are common to the tables. QlikView assumes that the two fields are one and the same thing, and the two fields are treated as one. Such a field connecting two or more tables is called a key.

There are two basic rules for associations:

- For two fields to be associated, they need to have the exact same name (case sensitive). Name and name are not the same and will not be associated. The numbers 123 and 00123 are the same and are associated.
- If a certain field has the exact same value in several different input tables, QlikView will treat it as one value and also assume that the records (rows) containing the value should be associated. For two field values to be associated, they either need to
 - have exactly the same spelling (case sensitive), or
 - have exactly the same numeric value

For a further illustration of the basic rules, study the following example:

Table 1:		Table 2:		Table 3:	
Name	Number	Number	Age	Name	ID
John	1	3	28	Phil	ab
Phil	2	4	35	john	xy
Betty	5	2	42		

3 Creating a document

In Table 1 and Table 2, the field **Number** has the value of 2. Which means that *Phil* is assumed to be associated with the age 42.

In Table 1 and Table 3, the field **Name** has the value of *Phil*. Which means that *Phil* is assumed to be associated with the number 2 and the ID *ab*. *John* in Table 1 is not the same as *john* in Table 3, so there is no association.

Table 1:		Table 2:		Table 3:	
Name	Number	Number	Age	Name	ID
John	1	3	28	Phil	ab
Phil	2	4	35	john	xy
Betty	5	2	42		

An association means that links are built between the fields in the tables, so that logical connections can be studied. This way several tables from one or several databases can be included in the QlikView logic simultaneously.

Loading and associating a second table

In this lesson, you will load an additional table representing a list of customers. The country table and the customer table will be associated through the common field **Country**. As a result of this association, you can study customers registered in different countries and the relation between country properties and customer.

The new table is found in an Excel file, you load it in the same easy way as a text file.

Do the following:

1. Start QlikView and open the file *MyDocument.qvw*.
2. Click **Edit script**.
3. Place the cursor at the end of the script and press Enter to get an empty row.
4. Click **Table Files** and open *Customer.xlsx*



*In the file wizard, note that Excel (xlsx) is set as file type this time, and that the **Tables** box contains the name of the worksheet. This Excel document contains only one worksheet. If there had been several sheets or named tables, the **Tables** box would have made it possible to choose from which one of them data should be retrieved.*

5. In the **Labels** drop-down, select **Embedded Labels**.
6. Click **Finish**.

Your script will now look similar to the one below:

```
Directory; LOAD Country, Capital, [Area(km.sq)], [Population(mio)], [Pop. Growth], Currency, Inflation, [Official name of Country] FROM [Data Sources\Country1.csv] (ooxml, codepage is 1252, embedded labels, delimiter is ',', msq); Directory; LOAD [Customer ID], Customer, Address, City, Zip, Country FROM [Data Sources\Customer.xlsx] (ooxml, embedded labels, table is [CUSTOMERS]);
```

Study the script. You see that both *Country1.csv* and *Customer.xlsx* contain a field named **Country**. QlikView will associate the two tables using this field, according to the association rules described above.

7. Reload the script.

The dialog in which you select the fields to display now appears. The fields from the file have been added to the column of available fields. The field **Country** has been associated with the previously loaded fields with the same field name. **Country** is now a key field, which is symbolized by the small key icon in front of it.

8. Add the fields **Customer** and **Country** to the column of displayed fields.
9. Close the dialog and save your document.

It is now possible to click on a capital and find the customers that reside in the country of this capital. At the same time, they are found in the customer register. This is possible although the fields **Customer** and **Capital** are found in different tables. The only prerequisite is that there is a field, **Country**, common to both tables.

10. Select *Astana*, the capital of Kazakhstan.



The fictive company has two customers in Kazakhstan.

11. Clear your selections.

You have now built a simple QlikView document containing data from two tables. Several tables can be linked (associated) this way, which makes it possible to study complex relationships in data from many tables.

Renaming fields

Associations between tables in QlikView are made using key fields that are common to the tables. The criterion for two fields to be associated (to be treated as one and the same field) is that they have the same name.

Renaming fields to stop or create associations is an important part of creating a QlikView document. Fields that should be associated do not always have exactly the same name in different tables. Fields that you do not want to associate might have the same name. Renaming fields is a common procedure when building the QlikView data structure.

Do the following:

1. Click **Edit Script**.
2. Place the cursor at the end of the script and press Enter to get an empty row.
3. Click **Table Files** and open the file *Transact.csv*.
4. In the file wizard, make sure that **Delimited** is set as the file type, **Comma** as delimiter and that **Embedded Labels** is selected.

In the file *Customer.xlsx* that we loaded before, there was a field named **Customer ID**. The new file contains a field named **ID Customer**. These two fields should be associated and treated as one. To make the association you must rename one of the fields.

5. Click in the **ID Customer** table header, then type the new name *Customer ID*.



Make sure not to forget the space between the words: any misspelling prevents QlikView from interpreting the fields as being one and the same.

6. Press Enter the name of the field has been changed.

7. Click **Finish**.

The automatically generated script looks similar to the one below:

```
Directory; LOAD Country, Capital, [Area(km.sq)], [Population(mio)], [Pop. Growth], Currency, Inflation, [Official name of Country] FROM [Data Sources\Country1.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq); Directory; LOAD [Customer ID], Customer, Address, City, Zip, Country FROM [Data Sources\Customer.xlsx] (ooxml, embedded labels, table is [CUSTOMER$]); Directory; LOAD [Transaction ID], Year, Month, Day, [Salesperson ID], [Product ID], [Serial No], [ID Customer] as [Customer ID], [List Price], Sales, [Gross Margin] FROM [Data Sources\Transact.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq);
```



The line [ID Customer] as [Customer ID] has appeared as a result of the change you made in the file wizard, and means that the field [ID Customer] will be loaded into QlikView with the name Customer ID (thus assuring the necessary association).

8. Reload the script.

9. Add one field from the file *Transact.csv* to the column of displayed fields, for example **Sales**.

10. Close the dialog and save your document.

You have now loaded three different tables. By associating the tables in the way described, QlikView allows you to find all the relevant information from all the tables at the same time - using a single click.

11. Select *Finland* in the **Country** list box. The program immediately provides the geographical data stored in the country tables - but also displays the names of the customers residing in Finland, as well as the sales values related to them.

12. Clear your selections.



It is easy to associate tables in QlikView. As a result, it is possible to link fields and tables that should not be linked. If this is done, QlikView will give you irrelevant results. Think carefully before assigning field names to fields of different tables, thereby defining the associations.

Saving, closing and exiting

If you don't want to turn to the next lesson right away, you can close the document. You should also save the document, since the following lessons are based on the work you have done so far.

3.4 Concatenating tables

Different tables can be associated, but tables can also be merged. If two input tables are lists of the same things, but contain different values, for example if one is a list of countries in Europe and the other one a list of countries in North and South America, the second table can be seen as a continuation of the first. The tables should then be concatenated.


Automatic concatenation

If two tables that have exactly the same set of fields are loaded, QlikView automatically treats the second table as a continuation of the first. This is called concatenation of tables.

Any number of tables can be concatenated into one table.

Your QlikView document retrieved data from a file with a limited number of countries. The `..\Tutorials source\Creating a Document\Data Sources` directory contains a second file listing countries, the field names correspond exactly to those of the already loaded `Country1.csv`. When you load the second file, the two tables will be automatically concatenated.

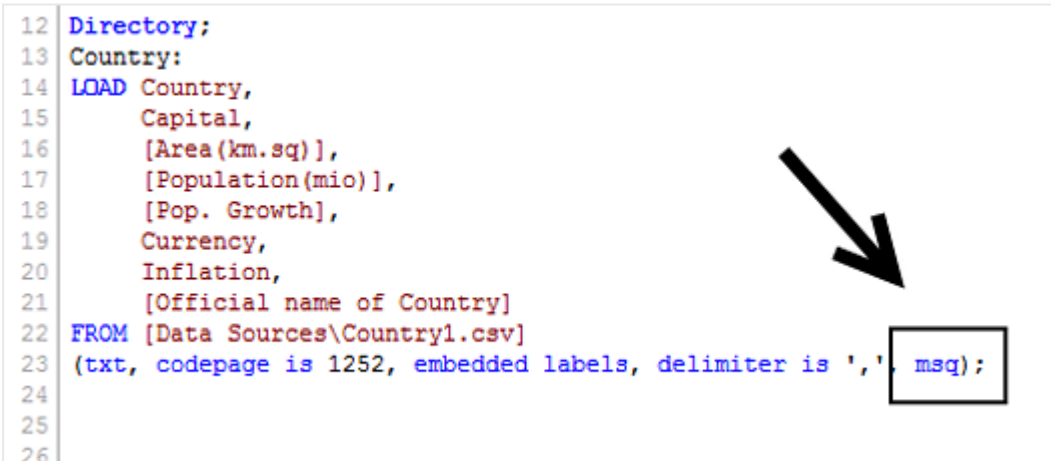
Do the following:

1. Open your file `MyDocument.qvw` and open the **Edit script** dialog. 
2. Position the cursor after the **LOAD** statement loading the file `Country1.csv` (all statements end with a semicolon) and press Enter to get an empty row. The order of the load statements is arbitrary, but you get a better overview of your script by keeping the country files together.

```

12 Directory;
13 Country:
14 LOAD Country,
15     Capital,
16     [Area(km.sq)],
17     [Population(mio)],
18     [Pop. Growth],
19     Currency,
20     Inflation,
21     [Official name of Country]
22 FROM [Data Sources\Country1.csv]
23 (txt, codepage is 1252, embedded labels, delimiter is ',', msq);
24
25
26

```



3. Click **Table Files** and open `Country2.csv`.
4. In the **File Wizard**, make sure that **Delimited** is set as the file type, **Comma** as the delimiter and that **Embedded Labels** is selected.
5. Click **Finish**.

The added script should look similar to this:

```
Directory; Load Country, Capital, [Area(km.sq)], [Population(mio)], [Pop. Growth], Currency, Inflation, [Official name of Country] FROM [Data Sources\Country1.csv] (txt, codepage is 1252, embedded labels,
```

```
delimiter is ','; msq); Directory; LOAD Country, Capital, [Area(km.sq)], [Population(mio)], [Pop. Growth], Currency, Inflation, [Official name of Country] FROM [Data Sources\Country2.csv] (txt, codepage is 1252, embedded labels, delimiter is ','; msq); Directory; LOAD [Customer ID], Customer, Address, City, Zip, Country FROM [Data Sources\Customer.xlsx] (ooxml, embedded labels, table is CUSTOMER$); Directory; Load [Transaction ID], Year, Year as YearForecast, Month, Day, [Salesperson ID], [Product ID], [Serial No], [ID Customer] as [Customer ID], [List Price], Sales, [Gross Margin] FROM [Data Sources\Transact.csv] (txt, codepage is 1252, embedded labels, delimiter is ','; msq);
```



The sets of fields in Country1.csv and Country2.csv are exactly the same further below.

6. Reload the script.

The fields you selected last time are already in the column of displayed fields. No new fields have appeared in the list of available fields. Only the field values of *Country2.csv* have been added to the corresponding fields of *Country1.csv*.

7. Click **OK** and save your document.

At a first glance, your document will look very much like it did before. However, there are more entries in most list boxes. Some list boxes may have become wider or obtained scroll bars due to longer field contents.


Forced concatenation

Sometimes you want to concatenate tables also when they have different sets of fields. QlikView will then not automatically *concatenate* the two tables: you need to use the concatenate statement, which concatenates a table with the last created logical table.

In the Automatic concatenation section, two tables with identical sets of fields, *Country1.csv* and *Country2.csv*, are concatenated. There is also a third file, *Country3.csv* that contains only a subset of the fields. All three files are lists of countries. Furthermore, they contain different countries, so it is certainly relevant to concatenate the three files into one logical table.

The values of the missing fields in the concatenated table will be NULL, QlikView will treat these fields as having no value.

Do the following:

1. Open **Edit script**. 
2. Position the cursor after the statement loading *Country2.csv*.



This time the order of the statements is not arbitrary, because the concatenate statement forces concatenation with the last created logical table in the script.

3. Click **Table Files** and open *Country3.csv*.

In the **File Wizard**, make sure that the wizard has made a correct interpretation and click **Finish**. This generates a script similar to the one below:

```
Directory; LOAD Country, Capital, [Area(km.sq)], [Population(mio)], [Pop. Growth], Currency, Inflation, [Official name of Country] FROM [Data Sources\Country1.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq); Directory; LOAD Country, Capital, [Area(km.sq)], [Population(mio)], [Pop. Growth], Currency, Inflation, [Official name of Country] FROM [Data Sources\Country2.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq); Directory; LOAD Country, [Official name of Country], [Area(km.sq)] FROM [Data Sources\Country3.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq); Directory; LOAD [Customer ID], Customer, Address, City, Zip, Country FROM [Data Sources\Customer.xlsx] (ooxml, embedded labels, table is CUSTOMER$); Directory; Load [Transaction ID], Year, Year as YearForecast, Month, Day, [Salesperson ID], [Product ID], [Serial No], [ID Customer] as [Customer ID], [List Price], [Sales, [Gross Margin] FROM [Data Sources\Transact.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq);
```

Study the script. The three fields in the file *Country3.csv* are all found in *Country1.csv*, which constitutes the last created logical table. However, since the set of fields is not exactly the same, you need to add the word concatenate for the tables to be merged.

4. Position the cursor in front of the load statement that loads *Country3.csv* and type *CONCATENATE*. The word concatenate will turn blue, since it is also a keyword. Make sure there is a space between concatenate and load.

```
... CONCATENATE LOAD Country, [Official name of Country], [Area(km.sq)] FROM [Data Sources\Country3.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq); ...
```

5. Reload the script.
6. Click **OK** to close the **Fields** tab in the **Sheet Properties** dialog.
The document has not changed very much. There are, however, a few more countries.
7. Select the country *Seychelles*.
Seychelles is a country that is listed in *Country3.csv*, and you can now see that only the list box **Area** contains optional data.
8. Create a table box to get a clear picture of the contents of the concatenated table. The box should contain the fields in the country files (*Country, Capital, Area (km.sq), Population(mio), Pop.Growth, Currency, Inflation, Official name of Country*).
9. Use the scroll bar to browse through the data of your table box. You will note that some of the rows are not complete, but contain a 'Not known' instead of a value. This is the case for all the countries from the third country file, containing only a subset of the fields: the values of the missing fields are treated as NULL.
10. Save the document.


3.5 The table structure

In this lesson you will take a look at the structure of the tables loaded so far. The **Table Viewer** is a good tool to keep track of tables and fields in your document, especially when you are working with bigger and more complex documents. Finally, you will learn how to assign names to the tables while loading them to get a table structure with suitable table names.

Using the Table viewer

The tables and their associations can be shown graphically in the built-in **Table Viewer**.

Do the following:

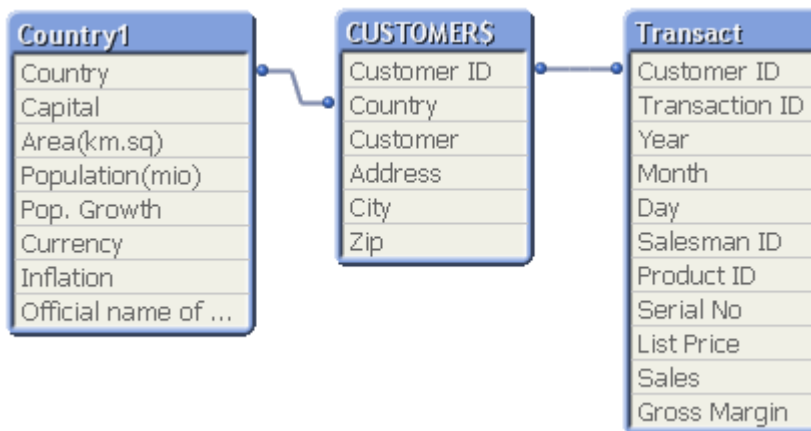
1. On the **File** menu, choose **Table Viewer**. 

The **Table Viewer** shows the three logical tables have been loaded so far:

Country1(concatenation of **Country1**, **Country2** and **Country3**) is a table listing countries. Each row contains information concerning a specific country.

CUSTOMER\$ is a table that lists customers. Each row contains information concerning a specific customer. This table is associated to the table above through the field **Country**, which is found in both tables.

Transact is a table listing transactions. Each row contains information concerning one sold unit. This table is associated to the table above through the field **Customer ID**, which is found in both tables.



The associations made in the example that loads the tables **Country1**, **CUSTOMER\$** and **Transact**.

Associations are shown with lines connecting the associated fields in the respective tables. When a selection is made in one of the tables, QlikView analyzes how the result of the selection affects the next logical table. When this table is analyzed, QlikView continues with the next logical table, and so on. The result of the selection propagates through the chain of tables involved. The tables in the **Table Viewer** can be positioned by dragging them with the mouse.



Structures with circular references, when the chain becomes a ring, should usually be avoided. These are sometimes a sign of an incorrect data model, in which two similar fields that have slightly different interpretations are treated as one and the same field. If QlikView discovers the circular reference during the execution of the script, the tables will be set to loosely coupled. For more information, see the QlikView online help.

2. Click on the header of the table **Country1**.
All tables directly associated with this table (only one actually) will be highlighted.
3. Click on the field **Customer ID** in one of the tables where it appears.
The field name will be highlighted in all tables where it appears.



4. Position the mouse pointer over the field **Currency** in the **Country1** table.
QlikView shows information for this field in a pop-up. The information density is 98 %, which means that 98 % of the records in the **Country1** table have a value in this field. The records coming from the file *Country3.csv* do not have a value in this field, therefore the density is not 100%. Furthermore it is indicated that **Currency** is a text field.
5. Right-click the header of the **Transact** table and choose **Preview**.
QlikView displays the first lines of the **Transact** table. This is a useful feature to get a quick overview over the content of a table in complex data structures with many tables.
6. Close the table preview and the **Table Viewer**.
The table view can be copied to the clipboard for inclusion in documentation or printed with the help of toolbar buttons available.

Labeling tables in the script

When loading data from files, QlikView uses the file names as table names in the document. Data source files do not always have meaningful, self-explanatory names. In this case you can and should assign adequate table labels to the tables when loading them in the script. This is done by stating the table label followed by a colon before the **load** statement loading the table.

In our document, the tables are called **Country1**, **CUSTOMER\$** and **Transact**. **Country1** holds data from three files and would better be named just **Country**. **CUSTOMER\$** is capitalized and holds an unnecessary dollar-sign that comes from the Excel load. **Transact** is very general, a more specific name, like **Sales**, would certainly be better.

Do the following:

1. Open **Edit Script**. 
2. Position the cursor after the **Country1** directory statement and press Enter to add a new line.
3. Type *Country*:. Do not forget the colon after the table name.
The script looks like this:
... Directory; Country: LOAD Country, Capital, [Area(km.sq)], ...
4. Name the customer table as follows:
... Directory; Customer: LOAD [Customer ID], Customer, Address, ...
5. Name the sales transactions table as follows:
... Directory; Sales: LOAD [Transaction ID], Year, Year as YearForecast, ...
6. Reload the script and close the **Fields** dialog.
7. Open the **Table Viewer**. 
8. Check that your tables have the names that you assigned to them.
9. Close the **Table Viewer** and save your document.

You have now labeled tables in the script.

3.6 Layout themes

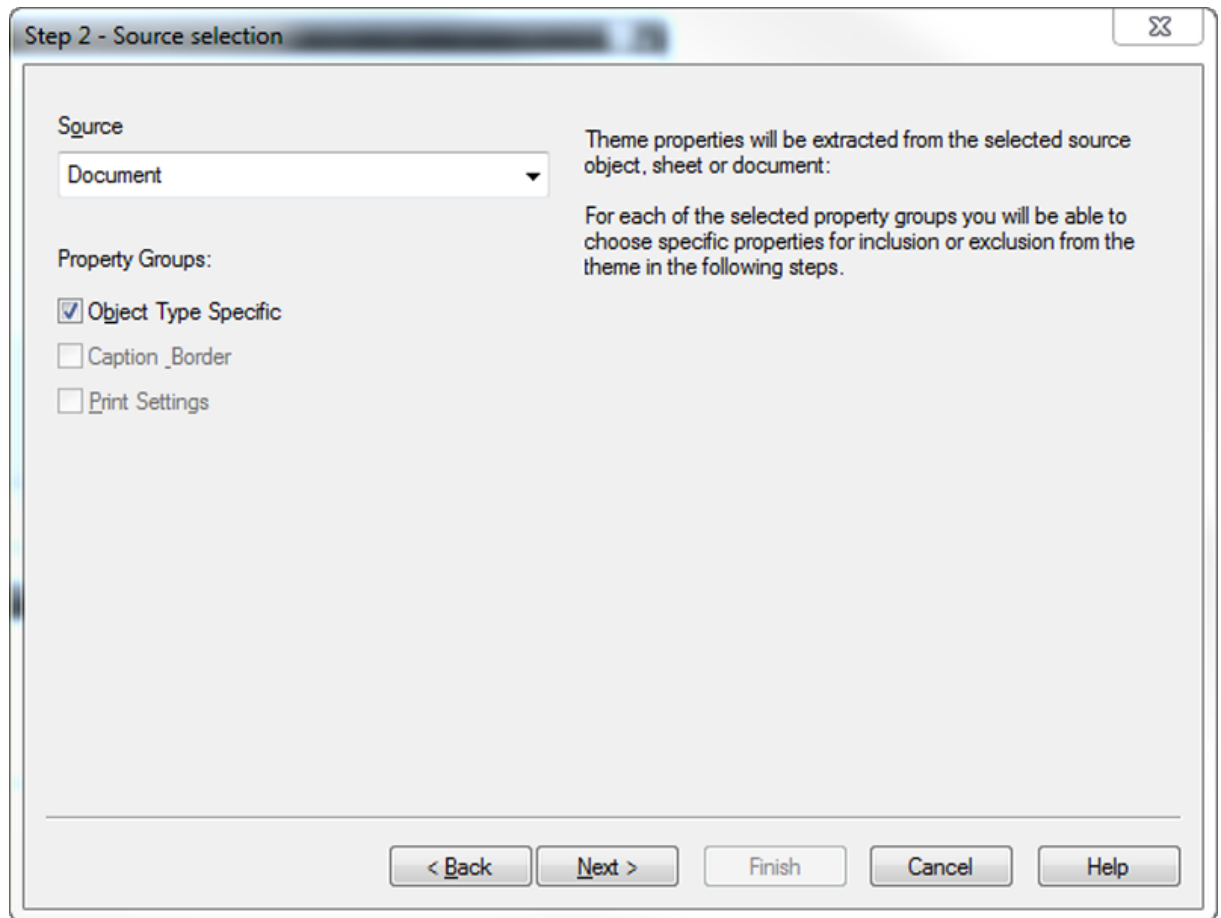
Themes are very useful because you only need to create a layout formatting once, then copy it to any new documents that you create. The basic idea is to “extract” layout settings from an existing QlikView document to a theme file, and then apply the same settings to the new document.

Creating a theme

You will now create a very basic layout theme containing layout settings for the sheet background and list boxes. The file *Tutorial.qvw* that you used in the first part of the Tutorial contains all the layout settings that you need for your new document: a QlikView swirl in the background of the sheets, gray captions for inactive objects and green captions for active ones.

Do the following:

1. Open the file *Tutorial.qvw*. You find it in the folder *Working with QlikView (page 11)*.
2. On the **Tools** menu, choose **Theme Maker Wizard**.
3. Make sure that **New Theme** is selected and click **Next >**.
4. Name the theme file *MyTheme.qvt* and save it in the *..\Tutorials source\Creating a Document* folder.
5. In the drop-down list **Source**, select **Document**.
6. Make sure check box **Object Type Specific** is selected and click **Next >**.



The Theme Maker Wizard

7. Make sure that only the following check boxes are selected:

- **Color Map**
- **Document Background**
- **Tabrow**
- **Custom Selection Colors**
- **Sheet Object Styles**
- **Tabrow Style**

8. Click **Next >** and then click **Finish** to save the theme and close the dialog.

You have now created a very basic theme containing the sheet background, sheet object styles and tabrow settings. Now you want to add green and gray captions for relevant sheet objects to the theme.

Modifying a theme

Still in the *Tutorial.qvw*, do the following:

1. Open the **Theme Maker Wizard** again.
2. Click **Next >** and select **Modify Existing Theme**, open the theme you have created and click **Next >**.
3. Under **Source**, select a list box with the correct caption color. In this case you pick the list box **Country**.

Mark the check boxes **Object Type Specific** and **Caption Border**. Click **Next >**.
The layout settings from the list box are now added to the theme.

4. Click **Next >** until you reach **Step 4 - Insertion of properties in theme**.

Here you mark check boxes to select what objects the caption and border settings should apply to.

5. Select all objects - except buttons, text objects and line/arrow objects - you might want a different layout for these.
6. Click **Next >** and then click **Finish** to save the theme and close the dialog.

You have now created a theme.

Applying a theme

To apply the settings saved in the layout theme to another document.

Do the following:

1. Open the file *MyDocument.qvw* that you created in the previous section of the tutorial.
2. On the **Settings** menu, choose **Document Properties**, then click on the **Layout** tab.
3. Click **Apply Theme** and open your theme *MyTheme.qvt*.

If you want to apply a theme to a single object, open its properties dialog, go to **Layout** tab and click **Apply theme**.

You can go back and adjust your theme at any time and as often as you like. You may also want to add layout properties for other sheet objects, such as buttons. For more information, see the QlikView online help. If you like, you can compare your layout with the layout in the file *SampleDocument.qvw* that you find in the **Creating a Document** folder.

Saving, closing and exiting

If you don't want to turn to the next lesson right away, you can close the document. You should also save the document, since the following lessons are based on the work you have done so far.


3.7 Loading additional files

In this lesson, you will learn how to load a tab separated text file without field names. You will also get an introduction to loading files using the ODBC interface.

Loading a tab separated file without labels

The `..\Tutorials source\Creating a Document\Data Sources` directory contains a file with information on the markets to which the different countries belong. Just like the files you have loaded so far, *Markets.tab* is a text file. However, instead of being separated by commas, its field values are tab delimited. Furthermore, the file does not contain any labels (field names). The loading procedure is similar to the one you have encountered in the previous lessons.

Do the following:

1. Start QlikView and open the file *MyDocument*.
2. Open **Edit Script**. 
3. Position the cursor at the end of the script and press Enter to get an empty line.
4. Choose **Table Files** and open *Markets.tab* under *..\Tutorials source\Creating a Document\Data Sources*. In the **File Wizard**, **Delimited** is still set as type, but this time **Tab** is selected as the delimiter. For QlikView to find relations between the new file and those that have already been loaded, you need to give the fields appropriate names. Naming the first field *Market* seems like a good choice. The second one should be named *Country* to be associated with the **Country** fields of the files *Country1.csv* and *Customer.xlsx*. Do the following:
 5. Click **@1** in the header of the first column . Type *Market* and press Enter.
 6. Click **@2** in the header of the second column . Type *Country* and press Enter.
 7. Click **Finish**.
Your script now looks similar to the one below:
Directory; LOAD @1 as Market, @2 as Country FROM [Data Sources\Markets.tab] (txt, codepage is 1252, no labels, delimiter is '\t', msq);



*The contents of the final parenthesis: the delimiter is not comma (,), but tab (\t), and **no labels** appears instead of the usual **embedded labels**.*

8. Reload the script.
9. Move the new field **Market** to the column of displayed fields, then click **OK**.
You can now study the sales development for different markets during different years.

Loading a file using OLE DB

Until now you have always loaded files directly into QlikView. If you want to access general databases or files that are not stored in a format that QlikView can read, you need to use OLE DB or ODBC (Open DataBase Connectivity).

In this example, we will only create an OLE DB connection. For more information, see the QlikView online help.



*QlikView works with both 32-bit and 64-bit ODBC drivers. It is however important to use the correct versions of the ODBC drivers. The 32-bit version of QlikView will only work with the 32-bit ODBC drivers. The 64-bit version of QlikView works with 64-bit ODBC drivers by default, but can be set to use 32-bit ODBC drivers. In this case, use the option **Force 32 Bit** in the **Edit Script** dialog.*

In the *..\Tutorials source\Creating a Document\Data Sources* directory you will find an **Access** file named *Salesperson.accdb*, which contains the names of the salesperson who performed the sales described in the file *Transact.csv*. The names of the salesmen are of great importance, so you would like to associate *Salesperson.accdb* to the data in your document.

One possible way of doing this is to export the database table to a character separated text file, that is a file that QlikView can read by means of a **LOAD** statement.

It is also possible to load the file using OLE DB, which is what you will do in this example.

Do the following:

1. Open **Edit Script** and place the cursor at the end of the script.
2. In the **Database** drop-down select **OLE DB** and click **Connect** to establish a connection with the data source.
3. In the **Data Link Properties** dialog, make sure that the **OLE DB Provider for ODBC Drivers** is selected, then click **Next >>** to get to the **Connection** page.
4. Since you are working with a generic data source not yet defined, select **Use connection string**, then click **Build**.
5. In the **Select Data Source** dialog, choose the **Machine Data Source** tab.
6. Select **MS Access Database**, then click **OK**.
7. In the **Login** dialog, click **Database....**
8. In the **Select Database** dialog, open *Salesperson.accdb* under *..\Tutorials source\Creating a Document\Data Sources* directory. Once you find the correct location, the Salesperson file should be the only one available in the list on the left. Select it and close the dialog.
9. Close the remaining dialogs.

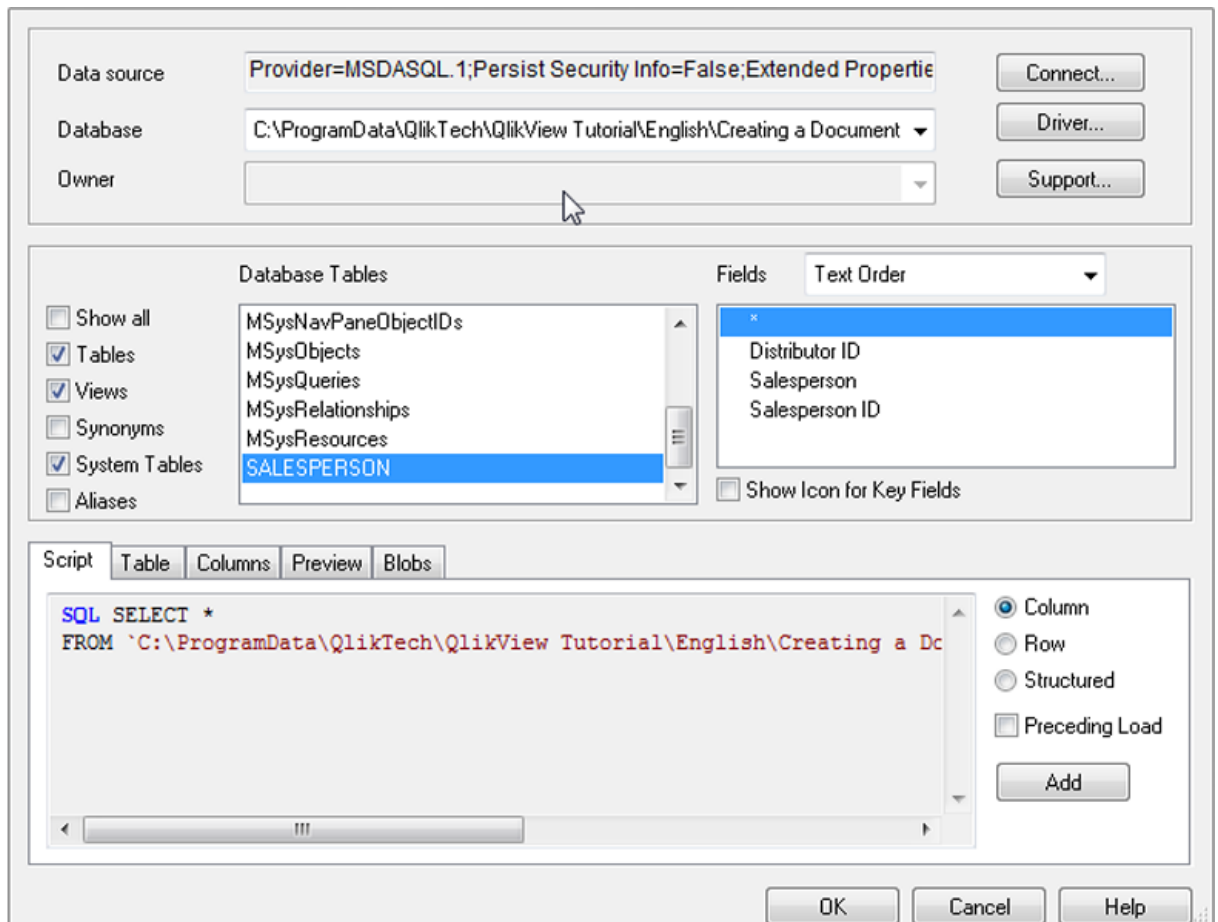
Your script now contains a **CONNECT** statement, connecting you to the selected data source. The statement looks similar to this:

```
OLEDB CONNECT TO [Provider=MSDASQL.1;Persist Security Info=False;Extended Properties="DSN=MS Access Database;DBQ=C:\ProgramData\QlikTech\QlikView Tutorial\ Creating a Document\Data Sources\Salesperson.mdb; DefaultDir=C:\ProgramData\QlikTech\QlikView Tutorial\ Creating a Document\Data Sources;DriverId=281;FIL=MS Access;MaxBufferSize=2048;PageTimeout=5;UID=admin;"];
```

The next step is to select the tables (in this case there is only one, but if you access a database you usually have a great number of tables to choose from) and fields to load.

Do the following:

10. Click **Select...**
The **Create Select Statement** dialog is now opened. The **Fields** box lists the available fields, whereas the **Database Tables** box contains the available tables. At the bottom of the dialog, you get a preview of the statement (a standard **SQL SELECT** statement), which will appear in your script as soon as you click **OK**. By default, a star is selected in the fields list. The star is equivalent to all fields. You want to load all fields, but for a better understanding of the script select them to make their names appear in the script:
11. Select **Salesperson** in the **Database Tables** list to the left.
12. Click on the field **Distributor ID**, then press the Shift key and hold it down while clicking **Salesperson ID**.



13. Click **OK**. Your script now looks like the following:

```
SQL SELECT `Distributor ID`, Salesperson, `Salesperson ID` FROM `C:\ProgramData\QlikTech\QlikView Tutorial\English\Creating a Document\Data Sources\Salesperson.accdb`.Salesperson;
```

The Salesperson table is associated with the existing data through the field **Salesperson ID**, which it has in common with *Transact.csv*.

14. Reload the script.
15. Add the new field **Salesperson** to the *Sales* sheet.
16. Make a few selections and study the relations.
17. Clear your selections.

Now you know how to load data from different kinds of files and formats. In the next lesson you will learn how to link external information to field values using a special kind of load process.

3.8 Linking external information to a document

Besides associating and concatenating tables that contain data, it is also possible to link information to field values in the data. The links are defined in information tables which must be loaded in a special way. In this lesson you will link flags to specific values in the **Country** list box.

Looking at an info table

Let us start by looking at the file containing the information that we want to link.

Do the following:

1. Open a text editor, for example Notepad, and choose **Open** from the **File** menu.
2. In the box **Files of type**, select **All files**.
3. Open the file *FlagsOECD.csv* in the `..\Tutorials source\Creating a Document\Data Sources` directory.

	A	B	C	D	E
1	Country,Flag				
2	Australia,Flags\aus.bmp				
3	Austria,Flags\aut.bmp				
4	Belgium,Flags\bel.bmp				
5	Canada,Flags\can.bmp				
6	Chile,Flags\chi.bmp				
7	Czechia,Flags\cze.bmp				
8	Denmark,Flags\den.bmp				
9	Estonia,Flags\est.bmp				
10	Finland,Flags\fin.bmp				

Information table defining bmp files that should be linked to countries

It is a two-column table, in which different values of the field **Country** are associated with different files. Each value must be put on a separate row. The file associated with a field value will be shown, played, executed, etc. depending on the file type. Some file types, for example files of the *bmp* or *wav* (sounds) type are handled internally in QlikView. For other file types, the associated program is used to open the document.



*To associate a file type (with no association) with a program, open the Windows Explorer (Windows 7) or File Explorer (Windows 8.1 and 10). Select a file of the concerned type in the structure and double-click it. This opens a list of available programs. Pick an appropriate program, preferably Notepad or Excel, then click **OK**. All files with this extension will from now on be opened with the program you selected.*

4. Close the editor.

Loading the info table

To load the info table, Do the following:

1. Open QlikView and open your file *MyDocument.qvw*
2. Open **Edit Script**.
3. Position the cursor at the end of the script and press Enter to get an empty row.
4. Click **Table Files** and open the file *FlagsOECD.csv* in the `..\Tutorials source\Creating a Document\Data Sources` directory.
5. In the **File** wizard, **Delimited** is set as type, **Comma** as delimiter. **Embedded Labels** is selected as label.
6. Click **Finish**.
The statement generated will load the file *FlagsOECD.csv* as a regular data file. This is not what you want to do: you would like QlikView to use *Flags OECD.csv* to link information to specific field values.

Change the script manually

Do the following:

1. Type *INFO* before the **LOAD** statement.
As the word *INFO* is a keyword in the script, it will turn blue. The script will look like this:
Directory; INFO LOAD Country, Flag FROM [Data Sources\FlagsOECD.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq);
2. Reload the script.
3. Close the **Field** page and save your document.

Viewing the linked information

To view the information you have linked, Do the following:

1. Select *Germany* from the list of countries.
2. Click on the small info symbol in the upper right corner of the list box.
An independent window containing Germany's flag now appears in the document.



The relative paths from the QlikView document to the image files must be stated correctly in the info table for this to work.

3. Close the window.
4. Select *France* from the list of countries and click the info symbol to make the specified picture appears.
5. Close the flag and clear all selections.

Pictures and multimedia presentations can be shown in the right contexts, other applications can be started, and specific documents opened. You can link almost any type of file to field values. It is also possible to simply type words in the second field of the info table instead of specifying a path to a file. In that case, QlikView will show the text in an internal text viewer.

For more information, see the QlikView online help.

Embedding external info

In many cases it is good that pictures etc. do not have to be stored inside a QlikView document and take up space in memory and on disk. If there are not too many pictures and you want to be able to send a QlikView document without worrying about sending the picture files as well, you can embed the info in the QlikView file.

Do the following:


1. Open **Edit Script**.
2. Find the statement that starts with **Info Load**.
3. Type *Bundle* in front of **Info Load**.
4. Reload the script and save your document.

The flag pictures are now stored inside the QlikView document itself and do not need to be moved with the QlikView document.

Displaying info in a text object

Instead of displaying the picture in a separate window that you need to open manually by clicking the info symbol, you can also display the picture in a text object that is permanently visible and that is updated automatically according to your selections.

Switch to the *Tutorial.qvw* file. Do the following:

1. Go to the **Geography** sheet.
2. Select *Canada* in the list box **Country** and click **Create Text Object** in the design toolbar. 
3. In the **Text** edit box enter `='qmem://Country/'&only(Country)`.
This syntax is a reference to the pictures. The equal sign indicates that the text is an expression. *qmem* stands for a reference to an internal file, that is a file stored in the QlikView document. **Country** is the name of the field to which the pictures are related. *only(Country)* is an expression returning the value currently selected in the field **Country**.
The expression is evaluated each time the logical state in the field **Country** changes. For example, when you select *Italy* in the list box **Country**, the expression evaluates to `qmem://Country/Italy`. This is the place where the file is stored in the document.
4. In the drop-down **Representation**, select **Image**.
5. In the drop-down **Image Stretch**, select **Keep Aspect**.
6. Under **Background** set the **Transparency** to 100%.
7. Close the dialog.
Now your sheet shows a text object displaying the Canadian flag.
8. Move and size the text object so that the content is entirely visible.
9. Try another selection in the field **Country** and check the text object.
You have now displayed a picture in a text object that is permanently visible and that is updated automatically according to the selections you have made.

Saving, closing and exiting

If you don't want to turn to the next lesson right away, you can close the document. You should also save the document, since the following lessons are based on the work you have done so far.

What is next?

You have now finished this part of the tutorial. In addition to the basic knowledge about selections, sheets and sheet objects acquired in the first part (*Working with QlikView (page 11)*), you have learned how different kinds of files are loaded into the associative QlikView database and how the logical structure is created.

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The final part of this tutorial, *Advanced features (page 117)*, lets you further explore the possibilities of QlikView. The lessons in the final part are especially suitable for application developers, because they deepen the knowledge about loading data and building the data structure. It differs from the first two parts in that it contains independent lessons (that is the procedures performed are not based on the work done in previous lessons), thereby allowing you to immediately go to the lesson that interests you the most.

4 Advanced features

- More about associations
- Load inline
- Field groups and cyclic display in charts
- Cross tables
- And-mode
- Number formats
- Security

4.1 Introduction

This final part of the Tutorial deepens the knowledge you have already acquired and lets you further explore the possibilities of QlikView. Among other things, you will learn how to modify the script to load different types of table formats in an optimal way and how to use access restriction. Moreover, Advanced Features provides a lesson on the interpretation and formatting of numbers.

Although most of the functions presented are related to the script, we have also devoted a chapter to advanced layout features: you will learn to create hierarchic and cyclic field groups and to use cyclic expressions in charts.

The lessons in this third part of the Tutorial, Advanced Features, are independent (the procedures performed are not based on the work done in previous lessons), which allows you to immediately go to the lesson that interests you the most.

The files used in this part are found here `..\Tutorials source\Advanced`.

4.2 More about associations

The **Fields** dialog appears after every script execution contains a check box named **Show System Fields**. If this check box is selected, the column listing available fields includes six fields preceded by a dollar sign (\$). These fields, called **system fields**, are very useful for obtaining an overview of the logical structure of a QlikView document.

The first section of this lesson describes the system fields and shows how they can be used on a system sheet. The second part shows an example of how you can solve a common problem using the system fields: display of frequency information for key fields.

Creating a system sheet

Do the following:



1. Start QlikView.
2. Open the file *Advanced.qvw* found in the **Advanced** folder.
3. Choose **Add Sheet** from the **Layout** menu.

4. Go to the **Sheet Properties** dialog. Name the sheet *System*.
5. Go to the **Fields** tab.
6. Make sure the option **Show System Fields** is selected.
7. Move the system fields (the ones preceded by a dollar sign, \$) to the column **Fields Displayed in List boxes**
8. Click **OK**.
9. Size the list boxes until you see all field names and all field values, then rearrange the boxes.
10. Save the file as *System.qvw*.

The system fields show:

- the names of the fields retrieved (**\$Field**),
- the names of the tables loaded (**\$Table**),
- the number of rows and columns in a table (**\$Rows** and **\$Fields**),
- the column number for a specific field (**\$FieldNo**),
- the names of the info tables loaded (**\$Info**).

Using the system sheet


Your system sheet is now ready, but to further improve it, choose frequency display for the list box **\$Field**.

\$Field	\$Table	\$Rows	\$Fields	\$FieldNo	\$Info
Address	Country	37		1	
Area(km.sq)	Customer	181		2	FlagsOECD
Capital	Market	191		3	
City	Sales	197		4	
Country	Salesperson	713		5	
Currency				6	
Customer				7	
Customer ID				8	
Day				9	
Distributor ID				10	
Gross Margin				11	
ID Customer					
Inflation					
List Price					
Market					
Month					
Official name of Country					
Pop. Growth					

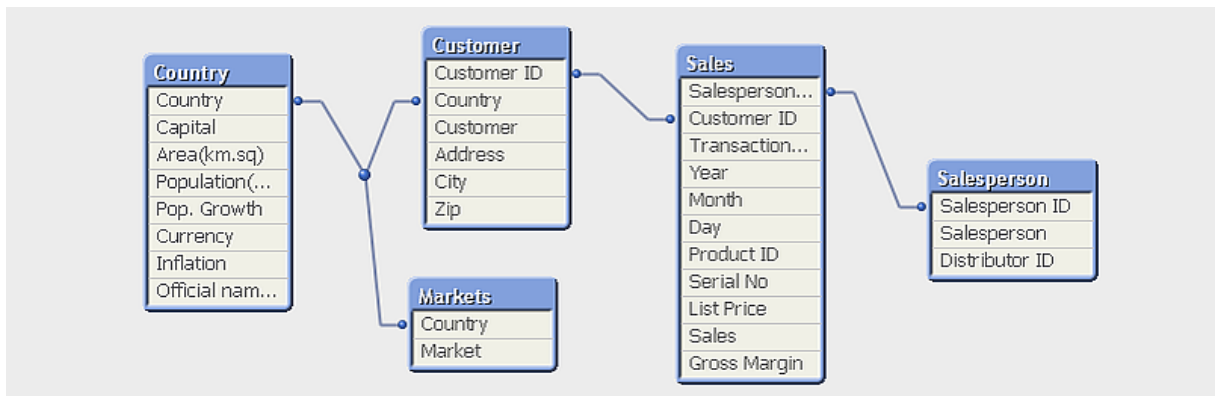
Do the following:

1. Open the **Properties** dialog for the list box **\$Field**.
2. On the **General** tab, select the check box **Show Frequency**.
3. Go to the **Sort** tab and select **Frequency, Descending**.
4. Click **OK**.

The values in the field **\$Field** are now followed by numbers indicating their number of occurrences in the tables. The list box is being sorted by frequency and the field with the greatest number of occurrences is placed at the top. You see that the field **Country** occurs in three tables **Customer ID** and **Salesperson ID** in two tables, and all the other fields are in only one table.

5. Open the **Table Viewer** to have a closer look at the structure. 

The three fields appearing more than once are the fields used to associate the tables of the document.



6. Click **OK** to go back to your document. Close the **Table Viewer**.
7. Click **Country** in the **\$Field** box.

The program now shows that the field **Country** occurs in the tables **Country** (a logical table consisting of three concatenated country tables), **Customer** and **Market**. The other list boxes provide additional information on the number of rows and fields of the concerned tables, and on the column numbers of the field in the respective tables. Moreover, the list box **\$Info** on the system sheet shows the info table associated with the field **Country**.

As soon as only one table or info table is possible (selected or optional) in a list box, a small info symbol **i** is displayed in the top right-hand corner of the list box. Clicking this will allow you to edit the table directly.

Edit table

Do the following:

1. Click **Customer** in the list box **\$Table**.
2. The info symbol appears in the top right-hand corner. Click it.
3. The original table is now opened by the associated program. Study it, then close the program to get back to QlikView.
4. Clear your selections.



*If the file type of the table is not associated with an appropriate editor, the table will not be opened. To associate a file type with a program, open Windows Explorer (Windows 7) or File Explorer (Windows 8.1 and 10). Select a file of the relevant type in the structure and double-click it. This opens a list of available programs. Pick an appropriate program, preferably Notepad or Excel, then click **OK**. (Another option is to choose **View, Folder Options** from the Explorer menu and go to the **File Types** tab.)*

When working with large sets of data with complicated structures, it is impossible to keep the entire data structure in mind. This is when the system sheet is of crucial importance.

Creating a system table

Besides displaying the system fields in list boxes, you can also illustrate the relations by creating a system table. Do the following:

1. From the **System** sheet, open the **New Sheet Object** menu.
2. Select **System Table**.

The system table now appears on your system sheet, size and study it. You will find that the first column, listing all the fields found in the document, is followed by one column for each loaded table. If a table contains the field listed in the leftmost column, the field also occurs in the table column; if not, a - (indicating a NULL value) is displayed. You can easily see which of the fields are keys, common to more than one table. The system table thus clearly shows how the tables of the document are associated. It can be a useful complement to the **Table Viewer** described in *The table structure (page 104)*.

Below you find one of many examples of situations where the use of system fields is indispensable.

\$Field	\$Table	Country	Customer	Sales	Markets	Salesperson
Country	-	Country	Country	-	Country	-
Customer ID	-	-	Customer ID	Customer ID	-	-
Salesperson ID	-	-	-	Salesperson ID	-	Salesperson ID
Capital	-	Capital	-	-	-	-
Area(km.sq)	-	Area(km.sq)	-	-	-	-
Population(mio)	-	Population(mio)	-	-	-	-
Pop. Growth	-	Pop. Growth	-	-	-	-
Currency	-	Currency	-	-	-	-
Inflation	-	Inflation	-	-	-	-
Official name of...	-	Official name of...	-	-	-	-
Customer	-	-	Customer	-	-	-
Address	-	-	Address	-	-	-
City	-	-	City	-	-	-
Zip	-	-	Zip	-	-	-
Transaction ID	-	-	-	Transaction ID	-	-
Year	-	-	-	Year	-	-
Month	-	-	-	Month	-	-

Showing frequency in key fields

Suppose you work with the **Customers** sheet and want to see how many customers you have in different countries, that is how many times the countries occur in the data.

Do the following:

1. Go to the **Customers** sheet of your document.
2. Right-click on the list box **Country**, then click **Properties**.
3. Go to the **General** tab.

The check box **Show Frequency** is disabled, it is not possible to show frequency for this field.

Show Frequency
 In Percent

By studying the **System** sheet, you clearly see that the field **Country** occurs in more than one table. As a matter of fact, three of the loaded tables contain a field named **Country**. As the three **Country** fields are treated as one due to the associations, it is impossible for the program to know which of the tables it should use for calculating data frequencies. Since making guesses could lead to erroneous results, QlikView has been designed not to allow certain operations when the data interpretation is ambiguous for key fields. **Country** and **Market**, containing geographical information and a list of the markets to which different countries belong, list each country only once. The **Customer** table, however, contains more than one occurrence of countries in which several customers reside. This is what we are interested in. To obtain the information you need, load the field **Country** a second time under a new name from the table *Customer.xlsx*:

4. Close the **List Box Properties** dialog.
5. Open the **Edit Script** dialog.
6. Find the statement loading *Customer.xlsx* and position the cursor after the last field (**Country**), then type *Country as CustomerCountry*. The **LOAD** statement now looks like this:

```
Directory; Customer: LOAD [Customer ID], Customer, Address, City, Zip, Country, Country as CustomerCountry FROM [..\Creating a Document\Data Sources\Customer.xlsx] ooxml, embedded labels, table is CUSTOMER$);
```

You need to keep the field **Country**. If you do not, there will be no key field and no association with previously loaded tables.

7. Click **Reload**.
8. Move the new field **CustomerCountry** to the list of displayed fields, then click **OK**.
The list box **CustomerCountry** contains only countries in which there are customers. It holds less values than the **Country** list box. This can easily be seen in the status bar, which you find in the right lower corner.
9. Select all countries beginning with B in the list box **CustomerCountry**.



See the information about the list box **CustomerCountry** in the QlikView status bar at the bottom of the window.

Besides a time stamp of the last reload of the document, the status bar holds information about the active list box field. Behind the **D**, the number of selected values in relation to the number of distinct values in the list box. This means there is a selection of 9 out of 94 distinct values in the field **CustomerCountry**. Behind the **F**, the number of selected records in relation to the total number of values. The selected countries occur in 13 out of 181 records, that is there are 13 customers in the selected countries and there are 181 records in total in the **Customer** table. This can be verified on the system sheet.

10. Click the header of the list box **Country** to activate this object.
Again look at the information in the QlikView status bar. There are 9 values selected out of 197. This means the **Country** field holds 197 distinct values in total. There is no information about the number of records as **Country** is a key field and frequency is not available. For **CustomerCountry** it is possible to show frequency information.

11. Clear the selection.
12. Click on the **CustomerCountry** list box with the right mouse button, then choose **Properties**.
13. On the **General** tab, select the check box **Show Frequency**.
14. Go to the **Sort** tab and select **Frequency**.
15. Click **OK**.
The countries are now displayed in frequency order.

You may have to size the list box to see the numbers. Since it actually makes more sense to have the **CustomerCountry** field on this sheet than the **Country** field, Do the following:

1. Remove the **Country** list box.
When selecting countries on the **Customers** sheet, there will now always be at least one customer optional.
2. Adjust the layout.
3. Save the file.

Key fields have yet two limitations besides the inability to show frequency:

- Statistics boxes based on a key field show *n/a* for most statistical entities.
- In charts it is not possible to create expressions containing functions that depend on frequency information for key fields (for example sum, count functions, average) unless the distinct modifier is turned on.

If you wish, compare it with the file *SystemFinal.qvw* found in the **Advanced** folder. For more information, see the QlikView online help.

4.3 Load inline

In some cases, you may want to add data by entering it directly in QlikView rather than loading it from a file or a database. In this lesson you will learn how to do this with **load inline**. **Load inline** can be used for adding data in existing tables or for reading new tables into the document.

Adding a record with load inline

Do the following:

1. Start QlikView and open the file *Inline.qvw* found in the `..\Tutorials source\Advanced` directory.
The document holds two tables, **Customers** and **Sales**. Suppose you want to add a customer to the document, but without changing the original files.
2. Open the **Edit Script** dialog.
3. Position the cursor behind the load statement that loads the *Customer.xlsx* file.
4. Type the following lines:
Load * Inline [Customer ID, Customer, Address, City, Zip, Country 1181, Alexander's Catering Service, Fisherman's Drive 4, Portsmouth, BH 354 RW, Great Britain];

- The first line (*Customer ID, Customer, Address, City, Zip, Country*) lists the field names of *Customer.xlsx* (the table to which you want to add the record).
- The second line (*1181, Alexander's Catering Service, Fisherman's Drive 4, Portsmouth, BH 354 RW, Great Britain*) contains the record that is to be added.
- The star symbol * is equivalent to "all fields", which means that the statement should load all of the fields of the new record.



Due to limited space, the record in the above example does not fit in one line. When reproducing this inline clause in the script, it is important that you put the entire record in one single line: **Portsmouth** etc. should thus follow directly after **Fisherman's Drive 4**.

5. Click **Reload**.
6. Click **OK** to close the dialog.
7. No new fields has been added, but there are new field values in some of the list boxes. Click **Alexander's Catering Service** in the **Customer** list and check that the record has been read properly. The data enclosed by the parenthesis after **inline** is treated like an ordinary table. Having the same set of fields as the customer table, the inline table has been concatenated with the customer table. You can easily check this by studying the **System** sheet: only two tables are displayed in the **\$Table** list box (the concatenated table is always given the name of the first table read, which, in this case, is **Customer**).
8. Save the document as *MyInline.qvw*, or something similar.
Naturally, inline tables can be used for other purposes than for adding records to existing tables. If, for instance, you wish to load very small tables, it may be easier to create these directly in the script than to create and load an external file.

Adding a table with load inline

The document *MyInline.qvw* contains a field with the months of the year written as numbers. Suppose you want to create a chart with the names of the months spelled out, and another chart showing sales per quarter. This is easily solved with a new table containing this information. Adding a new table means associating new information to already existing information using a field name. Typical examples could be connecting an account number to an account name or splitting a date into three fields for year, month and day, respectively.

In this example, you will use **load inline** to add month numbers and quarters. As there is a little more data to add this time we will use the built-in inline wizard to create the **load inline** statement, usually a much more convenient method than typing directly in the script.

Do the following:

1. Open the **Edit Script** dialog.
2. Position the cursor at the end of the script.
3. Open the **Inline Data Wizard** from the **Insert** menu, **Load Statement, Load Inline**.
The dialog that opens looks like a small spreadsheet and in fact works much like one.



There is no support for formulas in the data cells.

- The cursor will be positioned in the top left data cell. Enter the data into the **Inline Data Wizard**, as shown in the picture below. Use Enter or the arrow keys to move between cells and fill in the table as shown below.
- Finally double-click in the header row over *1* and enter the field name *Month*. Repeat for the remaining columns as shown below.

	Month	Month Name	Quarter				
1		1 January	1				
2		2 February	1				
3		3 March	1				
4		4 April	2				
5		5 May	2				
6		6 June	2				
7		7 July	3				
8		8 August	3				
9		9 September	3				
10		10 October	4				
11		11 November	4				
12		12 December	4				



If you already have the table stored in a program such as Excel it can of course be pasted into the QlikView inline wizard.

- Click **OK**. You now have a piece of script looking like this:

```
LOAD * INLINE [ Month, Month Name, Quarter 1, January, 1 2, February, 1 3, March, 1 4, April, 2 5, May, 2 6, June, 2 7, July, 3 8, August, 3 9, September, 3 10, October, 4 11, November, 4 12, December, 4];
```
- Click **Reload**.
 Two new fields have been added to the list of available fields, **Month Name** and **Quarter**. The inline table has been associated with the **Sales** table by the field **Month**.
- Click **OK**.

Create a bar chart

Do the following:

1. Create a bar chart showing sales per quarter (choose **Quarter** as dimension and add the expression *Sum of Sales*). In case you need help, see *Changing chart types using a fast type change* (page 42).

The screenshot shows the QlikView interface with a bar chart titled "Sales per Quarter" and several data tables. The bar chart displays sales for four quarters, with the y-axis ranging from 0 to 800,000. The bars represent sales for quarters 1, 2, 3, and 4, with values approximately 580,000, 500,000, 550,000, and 650,000 respectively.

The data tables shown are:

Customer	Address	City	Zip	Country
Adder Inc.	2 Atlanta Road	Abu Dhabi	3462-8345	Afghanistan
Al Akbar News Services	2 cl de la Paz	Al Wakrah	3582-2134	Albania
Alexander's Catering Service	2, rue de l'Université	Alma-Ata	3663-1239	Andorra
Alf Jequitaine	4 Hampshire Road	Amman	BH 354 RW	Armenia
Asian Pizza	4 Kennedy boulevard	Amsterdam	LD6-3FK	Australia
Atlantic Marketing	4 Queen's Road	Andorra La Vella	1433	Austria
Baltic Resort	4, rue du Général de Gaulle	Ankara	1437	Azerbaijan
Bank Burger	5 Washington Road	Arnhem	1463	Bahrain
Barley Foods		Athens		Bangladesh

Year
2004
2005
2006
2007
2008
2009
2010
2011

Month
1
2
3
4
5
6
7
8
9
10
11
12

Day
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31

Sales
690
859
959
1000
1039
1090
1130
1179
1230
1290
1350
1419
700
900
979
1010
1059
1100
1139
1200
1250
1299
1390
1430
759
910
990
1019
1070
1110
1159
1210
1270
1310
1400
1439
810
930
999
1030
1079
1119
1170
1219
1279
1319
1410
1450

The potential appearance of your inline document.

If you wish, compare your file with the file *InlineFinal.qvw*.

2. Save the document, then close it.

4.4 Field groups and cyclic display

Instead of displaying single fields as dimensions in charts, it is possible to define groups of fields to be used for this purpose. Working with field groups allows you to display data in a very efficient way, since the resulting charts will show the selected fields in a hierarchical (drill-down) or cyclic sequence. In this lesson, these important features will be explained: you will define both hierarchic and cyclic field groups and create corresponding charts.

The use of field groups should not be confused with cyclic display in charts. Cyclic display, constituting the last part of this lesson, can be applied to any chart having more than one expression, and results in the expressions being displayed sequentially. Just like the use of field groups, however, it saves space and allows you to make quick changes in the data displayed in the chart.

Field groups

One main difference between QlikView and many other database viewers, OLAP tools, is that in QlikView there is no need to predefine any hierarchies in the data. The unique associative logic of QlikView gives you the complete freedom to access any field as a full dimension in any order you like.

For most purposes this freedom is extremely powerful. There are occasions when a hierarchy could actually help you to display data more efficiently. QlikView therefore offers the possibility to define groups of fields. The groups can be hierarchic (drill-down) or non-hierarchic (cyclic).

Creating a drill-down group

When several fields form a natural hierarchy, it makes sense to create a drilldown group. Do the following:

1. Start QlikView, then open the file *Groups.qvw* found in the `..\Tutorials source\Advanced` directory.
2. In the **Settings** menu choose **Document Properties** and go to the **Groups** tab.
3. Click the **New**. The **Group Settings** dialog opens.
4. In the **Group Name** box change the default name to **Time**.
5. Select **Year**, **Quarter** and **Month** in the list of available fields by Ctrl-clicking them, then click **Add** to move them to the column of used fields. You can also double-click them to move them.
6. Use the **Promote** and **Demote** buttons to get the correct hierarchy: **Year**, **Quarter** and **Month**. This is of great importance, since the order of the fields in the group corresponds to the display order in charts.
7. Click **OK** twice to close all dialogs.

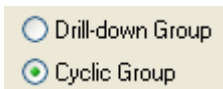
You have now created a drill-down group, which you can use as a dimension in a chart.

Creating a cyclic group

Sometimes it may be useful to group fields which do not form a natural hierarchy or do not have anything in common at all. The reason would be to make quick changes of the data displayed in a chart and to save space.

Any fields can be grouped together in a cyclic group. Do the following:

1. In the **Settings** menu choose **Document Properties** and go to the **Groups** tab.
2. Click the **New** button. The **Group Settings** dialog opens.
3. In the **Group Name** box change the default name to **Cyclic**.
4. Select the **Cyclic Group** option.





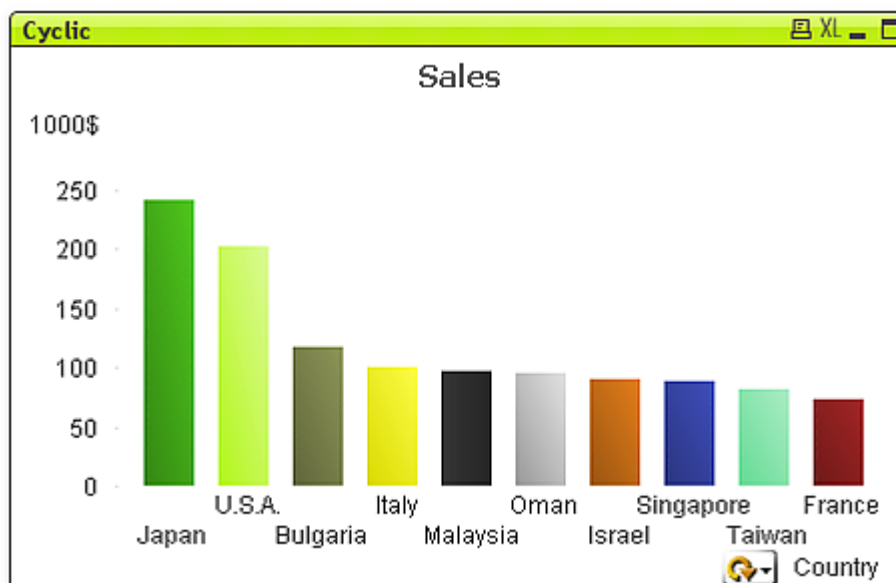
5. Double-click **Country**, **Salesperson** and **Year** in the list of available fields to move them to the column of used fields. The order of the fields in the list is of no importance when defining cyclic groups.
6. Click **OK** twice.

You have now created a cyclic group. When used as a dimension in a chart, it will allow you to switch between the fields of the group (x-axis) while keeping the same expression (y-axis).

Creating and using a cyclic bar chart

To create a cyclic chart, Do the following:

1. Click the **Create chart** button on the toolbar. 
2. Type *Cyclic* as window title, then click **Next >** to go to the **Dimensions** tab.
The **Cyclic** group is listed among the ordinary field names. Just like the drill-down group, it is preceded by a symbol. For cyclic groups, this symbol is a circular arrow. 
3. Double-click the **Cyclic** group to move it to the column of **Used Dimensions**.
4. Click **Next >**.
5. The **Edit Expression** dialog automatically opens. Compose the expression *Sum of Sales*, then click **Paste**. Alternatively, you can type the expression directly in the edit field. Click **OK**.
6. Type *Sales* in the **Label** box.
7. Click **Next >**. On the **Sort** tab, select the values by **Y-value**, **Descending**, and click **Finish**.
8. Right-click the chart and select **Properties**.
9. On the **Colors** tab, mark the check box **Multicolored**.
10. Click on the **Number** tab, highlight the expression and select **Integer** and type *1000\$* in the **Thousand Symbol** box, then click **OK**.

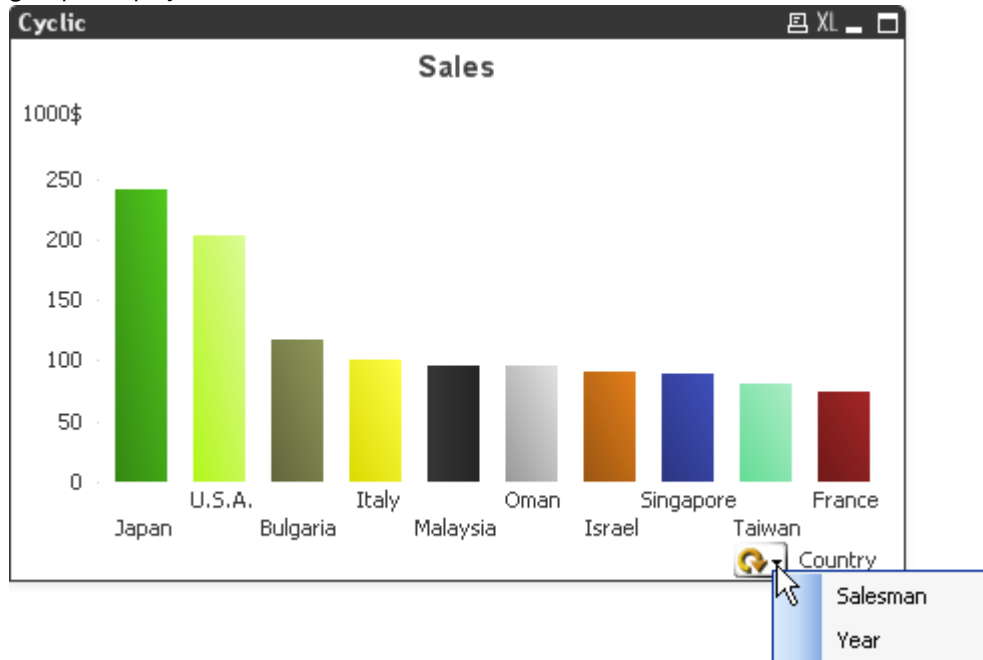


Initially, your chart shows the sum of sales per **Country**, which is the first field in the field list.

11. Right-click the cyclic chart and choose **Properties**.
12. On the **Dimension Limits** tab, mark the check box **Restrict which values are displayed** using the first expression and select the radio button **Show only>**.
13. Select **Largest** from the drop-down list and enter the number *10>*.
14. Switch to the next field by clicking the cycle icon in the bottom right-hand corner of the chart.
Now **Salesperson**, the second field, is displayed.
15. If you click the icon a second time, the sum of sales per year will be shown. **Year** is the third and last field

of the field group.

When the last field in the list has been used, the turn goes back to the first field. The chart can be cycled indefinitely. It is also possible to right-click on the cycle icon, in which case a list of the fields in the cyclic group is displayed for direct selection.



16. Minimize the chart.

Showing three charts in one frame in this way is a very efficient way of displaying data. It also allows you to make quick changes of graphically displayed data.

Cyclic display of expressions

The **Expressions** tab in the **Chart Properties** dialog provides a possibility to group several expressions together. Grouped expressions are displayed sequentially instead of simultaneously. The switching between expressions is done using a button similar to the one used in cyclic charts.

To create a bar chart with cyclic display of expressions, Do the following:

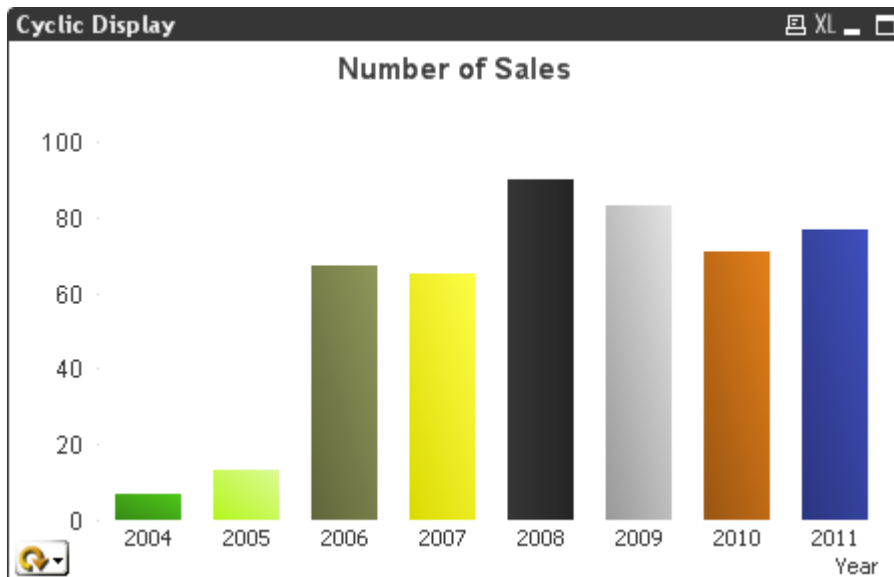
1. Click the **Create chart** button on the toolbar.
2. Choose **Cyclic Display** as window title, then click **Next >** to go to the **Dimensions** tab.
3. Move the field **Year** to the column of **Used dimensions**, then click **Next >**.
The **Edit Expression** dialog automatically opens.
4. Compose the expression *Sum (Sales)*, then click **Paste** and the **OK** to close the dialog.
5. Type *Sum of Sales* in the **Label** box.



The **Group** button is disabled: you need two expressions in the chart to be able to use it.

6. Click **Add** to add a second expression.

7. This time, create the expression *Count (DISTINCT [Transaction ID])*. To do so choose the aggregation **Total count, Field** and **Transaction ID**. Check the **Distinct** option to make sure that several occurrences of the same transaction are only counted once. Click **Paste**.
8. Then click **OK** to close the dialog.
9. Type *Count of Sales* in the **Label** box.
10. The **Group** button is now enabled: click it.
11. Click **Next >** until you reach the **Colors** tab. Mark the check box **Multicolored**. Click **Next >**.
12. On the **Number** tab, highlight the expression *Sum of Sales* and select **Integer** and set *1000\$* as **Thousand Symbol** (for the first expression), then click **Finish**.
The chart looks like an ordinary bar chart showing the sum of sales per year. The cycle icon in the bottom left-hand corner indicates that the chart has further potential.
13. Click the **cycle** icon.
The chart now turns to showing the number (total count) of sales performed during different years:



Naturally, you can choose to display more than two expressions this way. It is also possible to combine groups and cyclic display into powerful multi-dimensional charts.

14. Save the document using a name of your choice. If you wish, compare it with the file *GroupsFinal.qvw*.
15. Close the file.

4.5 Loading cross tables

A cross table is a common type of table featuring a matrix of values between two orthogonal lists of header data. By using the QlikView **cross table** statement, you can load this type of table in a very elegant way. The procedure is described in this lesson.

Loading a cross table

You will start by looking at a crosstable in Excel (or a similar program). Do the following:

1. Open the Explorer, then find the file *Crosstable1.csv* in the ..\Tutorials source\Advanced\Data Sources directory and double-click it.

Excel opens the file. This table holds the number of orders per month, the content appears as follows.

Year	Jan	Feb	Mar	Apr	May	Jun
2007	45	65	78	12	78	22
2008	11	23	22	22	45	85
2009	65	56	22	79	12	56
2010	45	24	32	78	55	15
2011	45	56	35	78	68	82

2. Close the file.

Loading the table into QlikView

1. Start QlikView and choose **New** from the **File** menu. Name the document *Crosstable1.qvw* and save it in the **Advanced** folder.
2. Open the **Edit Script** dialog.
3. Click **Table Files** and browse for the file *Crosstable1.csv* in **Advanced** . Click **Open**.
4. If the file wizard has made a correct interpretation, click **Finish**.

The following statement has been generated in your script:

```
Load Year, Jan, Feb, Mar, Apr, May, Jun FROM [Data Sources\Crosstable1.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq);
```

5. Load the script by clicking **Reload**.
6. In the dialog **Sheet Properties** that now opens, add all the fields except the system fields to the **Fields Displayed in List boxes**.
7. Click **OK**.

The following list boxes appear on your screen:

Year	Jan	Feb	Mar	Apr	May	Jun
2007	11	23	22	12	78	22
2008	45	24	32	22	45	22
2009	65	56	35	79	55	56
2010	45	24	32	78	68	15
2011	45	56	35	78	78	82

The result of this load process is one field for **Year** and one field for each of the months. This is not what you want: you would prefer to have three fields generated, one for each header category (Year and Month) and one for the data values inside the matrix.

2. Open the **Edit Script** dialog box again.
3. Now add the **crossstable** prefix, indicating that the table is to be loaded as a cross table, to your **LOAD** statement. The **crossstable** prefix should be followed by a parenthesis containing the names you wish to apply to the new fields, in our case **Month** and **Orders**:

```
Crosstable(Month,Orders) LOAD Year, Jan, Feb, Mar, Apr, May, Jun FROM [Data Sources\Crosstable1.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq);
```

4. Click **Reload**. The **Fields** dialog tab of the **Sheet Properties** dialog opens. Move the fields **Month** and **Orders** to the column of displayed fields (the field **Year** is already there), then click **OK**.

The following list boxes appear on your screen:

Year	Month	Orders
2007	Apr	11
2008	Feb	12
2009	Jan	15
2010	Jun	22
2011	Mar	23
	May	24

This distribution of values makes a lot more sense.

- Remove the obsolete (now empty) list boxes for the single months.
- Save the document, then close it.

Loading a cross table with more than one regular column

The cross table is often preceded by a number of regular columns that should be loaded in a straightforward way. This is the case in the following table *Crosstable2.csv*:

A	B	C	D	E	F	G	H	I	J	K	L
Salesperson	Year	Jan	Feb	Mar	Apr	May	Jun				
A	2007	45	65	78	12	78	22				
A	2008	11	23	22	22	45	85				
A	2009	65	56	22	79	12	56				
A	2010	45	24	32	78	55	15				
A	2011	45	56	35	78	68	82				
B	2007	57	77	90	24	90	34				
B	2008	23	35	34	34	57	97				
B	2009	77	68	34	91	24	68				
B	2010	57	36	44	90	67	27				
B	2011	57	68	47	90	80	94				

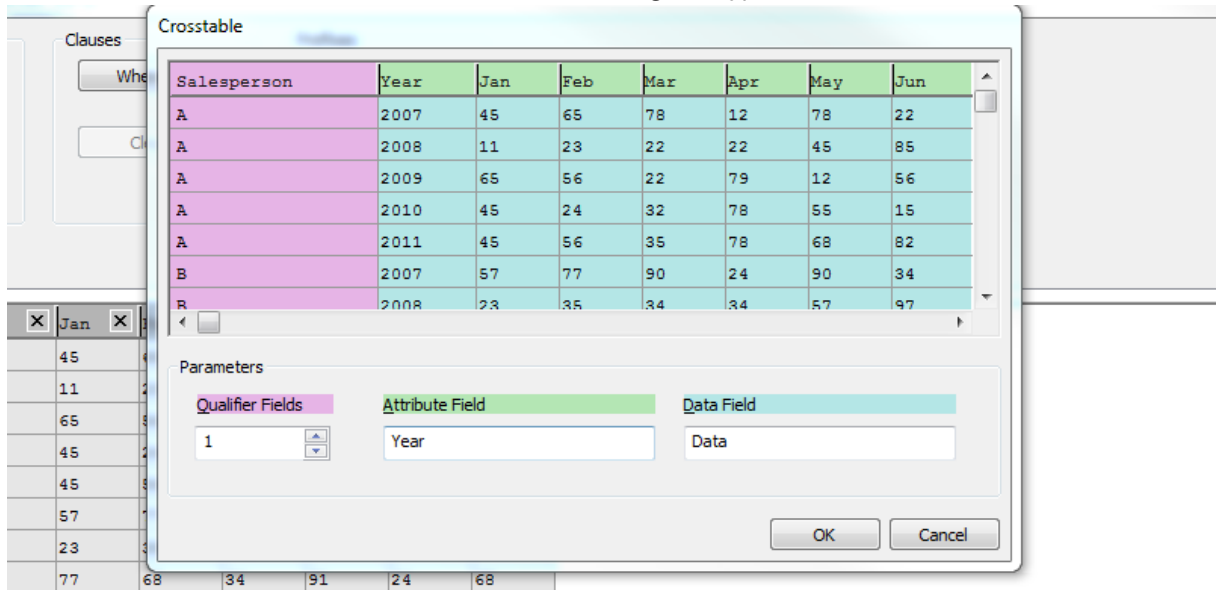
In this table the matrix columns are preceded by two regular columns: **Salesperson** and **Year**. You would probably like QlikView to show the contents of the table in four fields.

- **Salesperson**, containing the values of the first (regular) column
- **Year**, containing the values of the second (regular) column
- **Month**, containing the headers of the remaining columns
- **Sales**, containing the values of the remaining columns

To obtain this result, Do the following:

- Choose **New** from the **File** menu.
- Name the document *Crosstable2.qvw* and save it in the **Advanced** folder. Open the **Edit Script** dialog.
- Click **Table Files** and browse for the file *Crosstable2.csv* in the **Advanced/Data source** folder .
- Click **Open**. The **File Wizard** opens. We will use this wizard to create the **crosstable** statement.
- Click **Next** >until you get to the **File Wizard: Options** page.
- Click the **Crosstable** button.
The **Crosstable** wizard opens.
- Under **Qualifier Fields**, set the number of qualifier fields that precede the table to be transformed to 2.

- Under **Attribute Field**, enter the name of the new field that will contain the month names. Type *Month*.
- Under **Data Field**, that is the field that combines the sales figures, type *Sales*.



- Click **OK**. In the preview pane you can now see the transformed table.

Salesperson	Year	Data
A	Year	2007
A	Jan	45
A	Feb	65
A	Mar	78
A	Apr	12
A	May	78
A	Jun	22
A	Year	2008
A	Jan	11

- Click **Finish**. The generated script statement looks as follows:

```
CROSSTABLE(Month, Sales, 2) LOAD Salesperson, Year, Jan, Feb, Mar, Apr, May, Jun FROM Data Sources\Crosstable2.csv (txt, codepage is 1252, embedded labels, delimiter is ',', msq);
```



The **crosstable** prefix has the number 2 as a third parameter. This indicates the number of regular columns in the original table. If no parameter is stated, 1 is assumed.

- Load the script by clicking **Reload**.
- The **Fields** tab of the **Sheet Properties** dialog opens. Move all fields, except system fields, to the column of displayed fields, then click **OK**.
The list boxes **Salesperson**, **Year**, **Month** and **Orders** appears on your screen.
- Save the document, then close it.
For more information, see the QlikView online help.

4.6 And-mode in a list box

Two selections in different list boxes are always interpreted as logical **and**, for example QlikView will show all the field values associated with both the selections. A multiple selection within a list box is however usually interpreted as logical **or**, for example QlikView will show data entries associated with any of the selected values.

Under some circumstances, a multiple selection within a list box can be set to logical **and**, which means that QlikView will show only data entries associated with all of the selected values.

This lesson features a list box set to **and**-mode, which you will use for regular selections as well as for **not**-selections. You will also learn under which circumstances a list box can be set to **and**-mode.

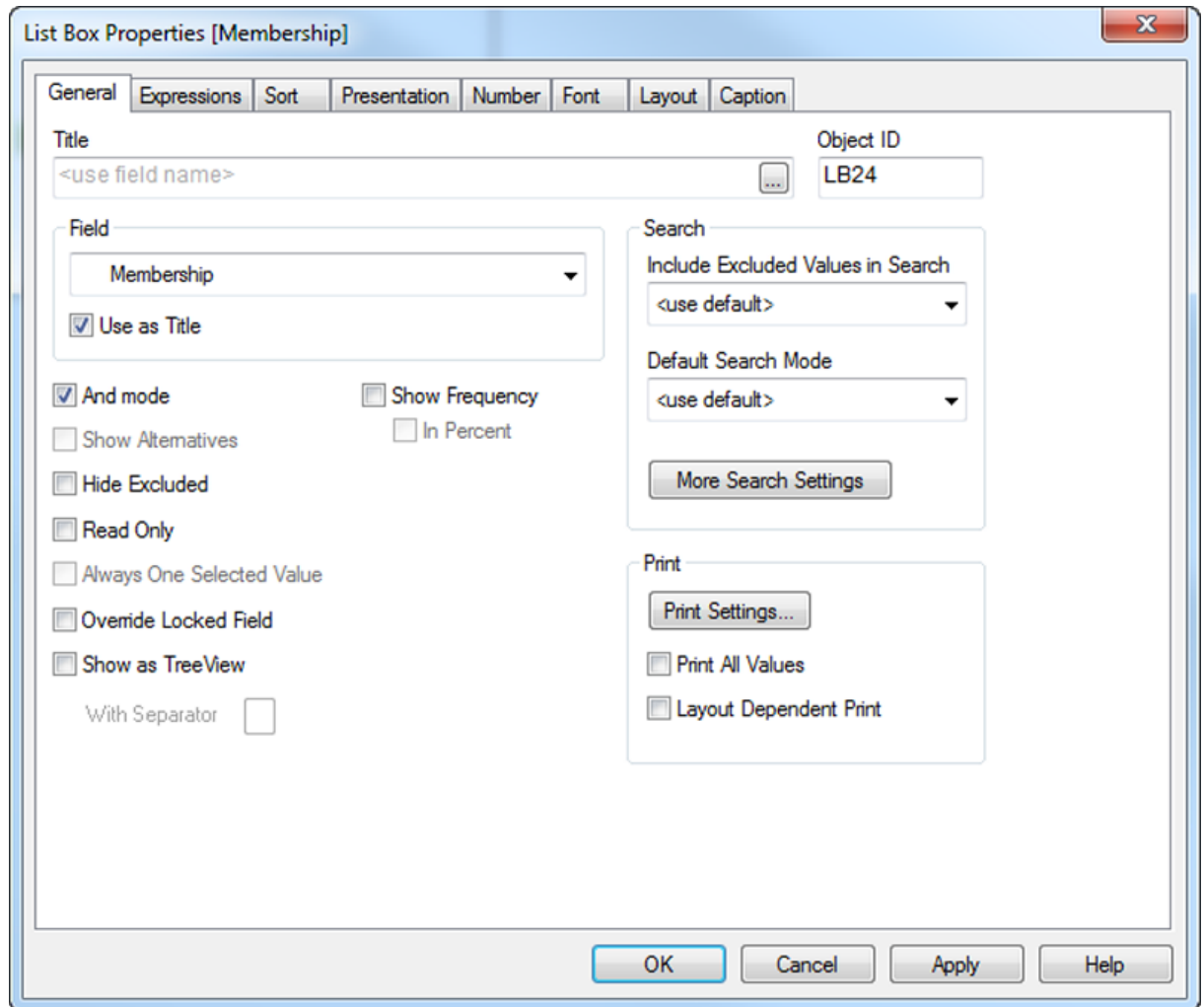
Making an and-selection

In the file *And.qvw* in the `..\Tutorials source\Advanced` folder, there is a list box for which the **and**-mode can be activated.

Do the following:



1. Start QlikView.
2. Open the file *And.qvw* in the `..\Tutorials source\Advanced` folder.
3. Choose the tab **Geography**, and find the list box **Membership**.
This is a list of organizations and geographical areas that the different countries belong to. A country can be a member of several organizations, and an organization can have many members. There is a many-to-many relationship between the field **Country** and the field **Membership**. Moreover, the field **Membership** does not link directly to any other field but **Country**. Under such circumstances, the field **Membership** can be set to **and** mode. A multiple selection in the **Membership** field will then be interpreted as "show only countries that are members of all the selected organizations".
4. Right-click on the list box **Membership**, then choose **Properties**.
5. On the **General** tab mark the check box **And mode**, then choose the **OK** button.

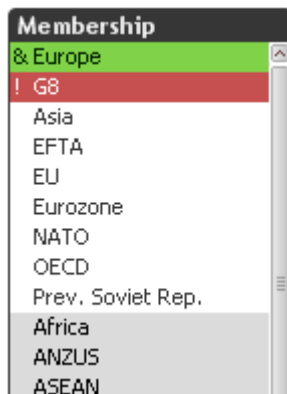


6. Select **Europe** by clicking it.
The Europe cell should now be green, and have an ampersand **&** to the left. The organizations shown as alternatives (white) are the ones that have one or several members of Europe. The organizations that are excluded are the ones with no members on the European continent.
7. Select **G8** by Ctrl-clicking.
You have now selected Europe and G8, that is countries that are members of both. Only five countries remain optional, and these are all European countries in the G8 group.

Making a not selection

It is also possible to exclude countries in a similar way. Do the following:

1. Deselect **G8** by Ctrl-clicking.
2. Select **G8** by Ctrl-clicking it, keeping the mouse button down. Release the button when the cell has turned red.
You have now selected Europe and not G8. Only European countries not in the G8 group are now optional. This type of selection is called forced exclusion, and is very useful in many-to-many relationships.



3. Close the file.

Characteristics of the and table

- Not every field can be set to logical **and** mode. The **and** mode is only possible if the field corresponds to the second column of a two-column table.
- The field must not be fetched from more than one table, the reason being that the **and** alternative is logically meaningful only if the concerned field is associated to only one other field.
- There must be no duplicate records in the table. Therefore this kind of table is always loaded using the **distinct** predicate. For more information, see the QlikView online help.

If the field is loaded this way, the **And mode** control in the **List Box Properties** dialog will no longer be dimmed and the logical mode of the list box can be changed.

Country	Membership			
Afghanistan	Asia			
Albania	Europe			
Albania	NATO			
Algeria	Africa			
Algeria	OPEC			
Andorra	Europe			
Angola	Africa			
Angola	OPEC			
Antigua	North America			
Argentina	South America			
Armenia	Europe			
Armenia	Prev. Soviet Rep.			
Australia	ANZUS			
Australia	Australia & Pacific			
Australia	OECD			
Austria	EU			
Austria	Europe			
Austria	Eurozone			
Austria	OECD			
Azerbaijan	Europe			
Azerbaijan	Prev. Soviet Rep.			
Bahamas	North America			
Bahrain	Asia			

4.7 Number formats

QlikView can handle text strings, numbers, dates, times, time stamps and currencies correctly. They can be sorted, displayed in a number of different formats and they can be used in calculations. This means that dates, times and time stamps can be added to or subtracted from each other.

This lesson deals with the basics of number interpretation and number formatting. The examples have been designed for computers with regional options set to English (United States). If you are using a computer with different regional options, number formats in the data sources, in the QlikView script and in the QlikView layout may look different.

Handling of numeric data

The issue of obtaining correct number formats is really a question of two different things:

- Interpretation of data when it is loaded.
- Display of different number-based data types.

Data storage inside QlikView

To understand data interpretation and number formatting in QlikView, it is necessary to know how data is stored internally by the program. All of the data loaded into QlikView is stored in two representations, as a string and as a number.

- The string representation is always available and is what is shown in the list boxes and the other sheet objects. Formatting of data in list boxes (number format) only affects the string representation.
- The number representation is only available when the data can be interpreted as a valid number. The number representation is used for all numeric calculations and for numeric sorting.

If several data items read into one field have the same number representation, they will all be treated as the same value and will all share the first string representation encountered. Example, the numbers 1.0, 1 and 1.000 read in that order will all have the number representation 1 and the initial string representation 1.0.

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Loading data with default formats

QlikView tries to interpret input data as a number, date, time etc. As long as the system default settings (found in the **Control Panel** under **Clock, Language, and Region** in Windows) are used in the data and the number interpretation variables in the script are correctly defined, the interpretation and the display formatting are handled automatically by QlikView, and the user does not need to alter the script or any setting in QlikView.

Do the following:

1. Open the Explorer and open the file *Date1.csv* in the *..\Tutorials source\Advanced\Data Sources* folder.
2. Excel opens the file. It consists of three fields, **Date**, **Customer** and **Sales**.



The dates in the **Date** field are formatted according to the American standard format M/D/YYYY (M=month, D=day, YYYY=the year), and that the numbers in the **Sales** field have comma as a thousands separator.

3. Close the file.
4. Create a **New** document in QlikView. Save the document in the **Advanced** folder and name it *Number.qvw*.
5. Open the **Edit Script** dialog.

A certain number of **set** statements, defining separators and number formats using the number interpretation variables, have been generated automatically:

```
SET ThousandSep=','; SET DecimalSep='.'; SET MoneyThousandSep=','; SET MoneyDecimalSep='.'; SET MoneyFormat='$#,##0.00;($#,##0.00)'; SET TimeFormat='h:mm:ss TT'; SET DateFormat='M/D/YYYY'; SET TimestampFormat='M/D/YYYY h:mm:ss[.fff] TT'; SET MonthNames='Jan;Feb;Mar;Apr;May;Jun;Jul;...'; SET DayNames='Mon;Tue;Wed;Thu;Fri;Sat;Sun';
```

These settings are taken from the regional settings in your computer on which the script is generated and could therefore look somewhat different on your computer. The number interpretation variables ensure a correct re execution of the QlikView script also on computers with other regional settings, provided that the data files remain the same.

6. Open the Control panel (**Start** menu, **Settings**) and go to **Regional Settings**.
7. Look through the tabs of the **Regional Settings** dialog, especially **Number** and **Date**, and note that the settings correspond to those defined by the variables above. To get the same results as this example, English (United States) must be chosen on the first tab.
8. Close the Control panel.

The number interpretation variables may be deleted, edited or duplicated freely. If changed, they substitute the operating system defaults.



The thousands separator and the date format defined by the number interpretation variables also correspond to the formats used in the file *Date1.csv*. QlikView will thus interpret everything correctly.

Do the following:

1. Go back to QlikView and click **Table Files** in the **Edit Script** dialog.
2. Find the file *Date1.csv* in the *..\Tutorials source\Advanced\Data Sources* folder then click **Open**.
3. Make sure that the file wizard has made a correct interpretation of the contents, click **Finish**.
4. **Reload** the script.
5. Move the fields **Date**, **Customer** and **Sales** to the column of displayed fields, then click **OK**.
6. The three list boxes appear on your sheet. Move and size them.

There is an easy way to find out if QlikView has interpreted the contents as valid numbers: valid numbers are always right-aligned in the list box, whereas values interpreted merely as text strings are left-aligned. The contents of both **Sales** and **Date** being right-aligned, you can conclude that they have been correctly interpreted.

Once QlikView has interpreted the data as valid numbers, you can apply other formats using the **Number** tab in the **List Box Properties** dialog. Formatting will be treated in the section *Formatting of data* (page 140).

7. Save the document and close it.

Loading data with different formats

Suppose that the values of the field **Date** have the British date format (DD/ MM/YYYY) instead of the American, that is a format that differs from the system settings and the formats set at the beginning of the script:

1. Create a new QlikView document. Save the document in the **Advanced** folder and name it *Number2.qvw*.
2. Open the **Edit Script** dialog, then click **Table Files**.
3. Find the file *Date2.csv* in the `..\Tutorials source\Advanced\Data Sources` folder then click **Open**.
4. If the file wizard has made a correct interpretation of the contents, click **Finish**.
5. Click **Reload**.
6. Move the fields **Customer**, **Date** and **Sales** to the column of displayed fields, click **OK**.
7. Move and size the three list boxes that appear on your sheet.

This time, the number interpretation has not worked properly. The first two digits in **Date** have been interpreted as month although they represent the day. Therefore, dates with a day number greater than 12 have not been recognized as valid dates (these are left-aligned) and in the other values, month and day have been inverted.

As long as a date is not recognized as numeric, you will not be able to change the number format of the field, nor make calculations based on the field.

The problem can be solved in one of the following ways:

- By changing the system settings in the Control panel.
- By changing the date format setting in the script.
- By using an interpretation function in the script.

Changing the system settings is usually not a good idea, unless most of the files you load have a type of regional settings that is different from yours.

Changing the date format in the script

Changing the date format setting in the script is a better solution (moreover, it is very useful if you want a person with different system settings to use the document). Do the following:

1. Open the **Edit Script** dialog of your file *Number2.qvw*. Change the date format setting to *DD/MM/YYYY*. The set statements are now the following:

```
SET ThousandSep=','; SET DecimalSep='.'; SET MoneyThousandSep=','; SET MoneyDecimalSep='.'; SET MoneyFormat='$#,##0.00;($#,##0.00)'; SET TimeFormat='h:mm:ss TT'; SET DateFormat='DD/MM/YYYY'; SET TimestampFormat='M/D/YYYY h:mm:ss[.fff] TT'; SET MonthNames='Jan;Feb;Mar;Apr;May;Jun;Jul;...'; SET DayNames='Mon;Tue;Wed;Thu;Fri;Sat;Sun';
```

Due to this change, dates in the format *DD/MM/YYYY* should be interpreted properly. Values in the format *M/D/YYYY* however are no longer recognized.

2. Re execute the script by clicking **Reload**.
3. Click **OK** to close the dialog, then study your document and note that the values in the list box **Date** are now right-aligned. They have thus all been interpreted as valid dates.
4. Save the document and close it.

Formatting of data

Once QlikView has interpreted data as valid numbers, they are assigned a default number format which you can see and modify in the **Document Properties** dialog on the **Number** tab.

It is however also possible to choose a different number format in the properties dialog for the sheet object. Do the following:

1. Click on the list box **Date** with the right mouse button, then choose **Properties**.
2. Go to the **Number** tab.
3. Select **Override Document Settings** to set a separate number format for the list box.
4. Change the format to **Date** by marking the check box.
5. In the **Format** box, the default date format of the operating system appears. It can be changed to any other format of your choice. For instance, you may prefer the standard ISO format YYYY-MM-DD. Erase the contents of the **Format Patter** box and enter the new format, or click the **ISO** button.
6. Click **OK**.
The specified format has been applied to the values of the list box **Date**. To choose another date format, simply open the **Number** tab of the properties dialog again and change the contents of the **Format** box. If the field originally contained differently formatted values, for example certain dates with the format *M/D/YY* and others with the format *DD/MM/YY*, you may want to return to the original formatting. For ordinary text files, however, this is only possible if the script is re-executed with the **Survive Reload** check box (**Document Properties** dialog, **Number** tab) deselected.



*The **Default from Input** button on the **Number** tab is only available for fields with a defined data type read from a database using ODBC.*

7. Save and close the document.

It is also possible to set the formatting by using formatting functions in the script. For more information, see the QlikView online help.

4.8 - Security

It is important that information is distributed only to those who have rights to see it. Since QlikView makes the previously cumbersome process of retrieving information a very simple task, it is obvious that security is an issue.

A security mechanism in QlikView can be set up in two different ways:

- Built into the QlikView document script.
- Set up through the use of QlikView Publisher.

If the QlikView Publisher is set up to handle security, then each QlikView file will be split up into several files, each containing the data pertaining to the relevant user or user group. These files will be stored in folders with the correct OS security settings, that is QlikView lets the operating system handle the access. There is, however, no security built into the file itself, so there is no protection on a downloaded file.

As we cannot assume that you are working with QlikView Server and Publisher, this lesson, which is the last lesson of the tutorial, refers to the second possibility: security settings that are built in the script of the document. In this case one single file can be made to hold the data for a number of users or user groups. QlikView will use the information in the script to grant or refuse access.

Sections in the script

Access control is managed by one or several security tables loaded in the same way as QlikView normally loads data. It is thus possible to store these tables in a normal database.

The script statements managing the security tables are given within the access section, which in the script is initiated by the statement section access. If an access section is defined in the script, the part of the script loading the “normal” data must be put in a different section, initiated by the statement section application. For more information, see the QlikView online help.

Access levels

Access to QlikView documents can be authorized to specified users or groups of users. In the security table, users are assigned the access levels Admin or User. If no access level is assigned, the user cannot open the QlikView document.

A person with Admin access can change everything in the document. Using the **Security** tab in the **Document Properties** and **Sheet Properties** dialogs, a person with Admin access can limit the users’ possibilities of modifying the document. A person with User privileges cannot access those tabs.

Example:

```
Section Access; LOAD * INLINE [ACCESS,USERID,PASSWORD ADMIN,A,X USER,U,Y ]; Section Application; LOAD ... FROM ...
```

Security fields

The access levels are assigned to users in one or several tables loaded within the section access. These tables can contain several special security fields, typically **USERID** and **PASSWORD** or **NTNAME**, and the field defining the access level, **ACCESS**. For more information, see the QlikView online help.

Other fields such as **GROUP** or **ORGANIZATION** may be added to facilitate the administration, but QlikView does not treat these fields in any special way.

None, all, or any combination of the security fields may be loaded in the access section. If the **ACCESS** field is not loaded, the section access will really not be meaningful.

- ACCESS** A field defining what access the corresponding user should have.
- USERID** A field containing an accepted **User ID**. QlikView will prompt for a **User ID** and compare it to the value in this field. This **User ID** is not the same as the Windows user ID.
- PASSWORD** A field containing an accepted password. QlikView will prompt for a **Password** and compare it to the value in this field. This password is not the same as the Windows password.
- SERIAL** A field containing a number corresponding to the QlikView license number (serial number).
Example: 4900 2394 7113 7304. QlikView will check the license number of the user and compare it to the value in this field.
- NTNAME** A field containing a string corresponding to a Windows NT Domain user name or group name. QlikView will fetch the logon information from the operating system and compare it to the value in this field.

QlikView will first compare the QlikView license number (serial number) with the field **SERIAL**. After this it will ask the operating system who is logged on. It will then, if necessary, prompt for **User ID** and **Password** and compare these with the fields **USERID** and **PASSWORD**.



*If the combination of Windows User ID, QlikView **User ID**, QlikView **Password** and license number is found in the **Security table**, the document is opened with the corresponding access level. If not, QlikView will deny the user access to the document. If the **User ID** and/or the password are not entered correctly within three attempts the entire log-on procedure must be repeated.*

Example 1: Only the license number is checked. One specific computer gets Admin access. Everyone else gets User access.



A star can be used to mark "any license number".

ACCESS	SERIAL
ADMIN	4900 2394 7113 7304
USER	*

Example 2: The administrator and the computer with license number “4900 2394 7113 7304” (the server on which QlikView runs as a batch job) gets Admin access. Everyone else gets User access when entering *USER* as **User ID** and **Password**.

ACCESS	SERIAL	USERID	PASSWORD
ADMIN	*	ADMIN	ADMIN
ADMIN	4900 2394 7113 7304	*	*
USER	*	USER	USER

If you have once opened a document with access restrictions by entering the correct user name and password, the document will open again using the same credentials without prompting for them as long as the QlikView session lasts.



Before you start this exercise, you should take a backup of the file you intend to use. The smallest mistake in the security table could make it impossible to open the file again.

Loading security tables

Suppose you have two tables containing security information. The first table named **AccessList.csv** contains the security fields **USERID**, **PASSWORD** and **ACCESS**. The second table named **AccessSerial.csv** the security field **SERIAL**. Since the same associative logic that is the hallmark of QlikView is used also in the access section, the tables will be associated using the optional field **COMPUTER NAME**.



*All fields listed in **load** or **select** statements in the section access must be written in upper case. Any field name containing lower case letters in the database will be converted to upper case when being read by the **load** or **select** statement. The user ID and the password entered by the end user opening the QlikView document are case insensitive.*

USERID	PASSWORD	ACCESS	GROUP	COMPUTER NAME
Sharon	7VF11R	ADMIN	IT	All
Sharon	FROMME2U	USER	IT	All
Bob	LOVE15	ADMIN	Marketing	Bob
Bob	15ALL	USER	Marketing	All
Pete	NUMBER1	USER	Personnel	All
Sarah	ABSOLUT	USER	Personnel	Sarah

COMPUTER NAME	SERIAL
Sharon	1234 5678 9012 3456

Bob	1234 5678 9012 3457
Pete	1234 5678 9012 3458
Sarah	1234 5678 9012 3459
All	*



The license number must be given in 4x4 number groups separated by a blank.

To load the table above. Do the following:

1. Open the document for which you want access control, for example, *Advanced.qvw*.
2. Save the file as *Advanced.qvw* in the same folder.
3. Open the **Edit Script** dialog and position the cursor at the beginning of the script, but after the **set** statements.
4. For the tables to be used for access control, the statements loading them need to be placed in a separate section. Type *section access;* and press Return to get to a new line.



Do not forget the semicolon, it indicates the end of a statement.

5. Click **Table Files**.
6. Select the files *AccessList.csv* and *AccessSerial.csv* (in the ..\Tutorials source\Advanced\Data Sources directory) and click **Open**.
7. The files are opened in the file wizard. Make sure the labels are recognized properly, then click **Finish** for both files.
8. To distinguish the access section from the application section, position the cursor after the statements loading the security tables, then type *section application;*. Again, do not forget the semicolon. The first part of your script has the following appearance:

```
Section access; Directory; LOAD USERID, PASSWORD, ACCESS, GROUP, [COMPUTER NAME] FROM [Data Sources\AccessList.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq); LOAD [COMPUTER NAME], SERIAL FROM [Data Sources\AccessSerial.csv] (txt, codepage is 1252, embedded labels, delimiter is ',', msq); Section application; Directory; Country: LOAD Country, Capital,...
```
9. Choose **Reload** to execute the script.
10. Click **OK** to close the dialog.

The following access rights will be granted

Sharon - will have access rights from all the computers (since all the license numbers are allowed). Depending on which password she uses she will be granted either Admin or User access rights.

Bob - will have Admin rights when he sits at his own computer (license number “1234 5678 9012 3457”) and enters his **UserID** (Bob) and **Password** (LOVE15). He will have User rights on all the computers (all license numbers allowed) when he gives his **UserID** (Bob) and **Password** (15ALL).

Pete - will have User access from all the computers provided he gives his **UserID** and correct **Password**.

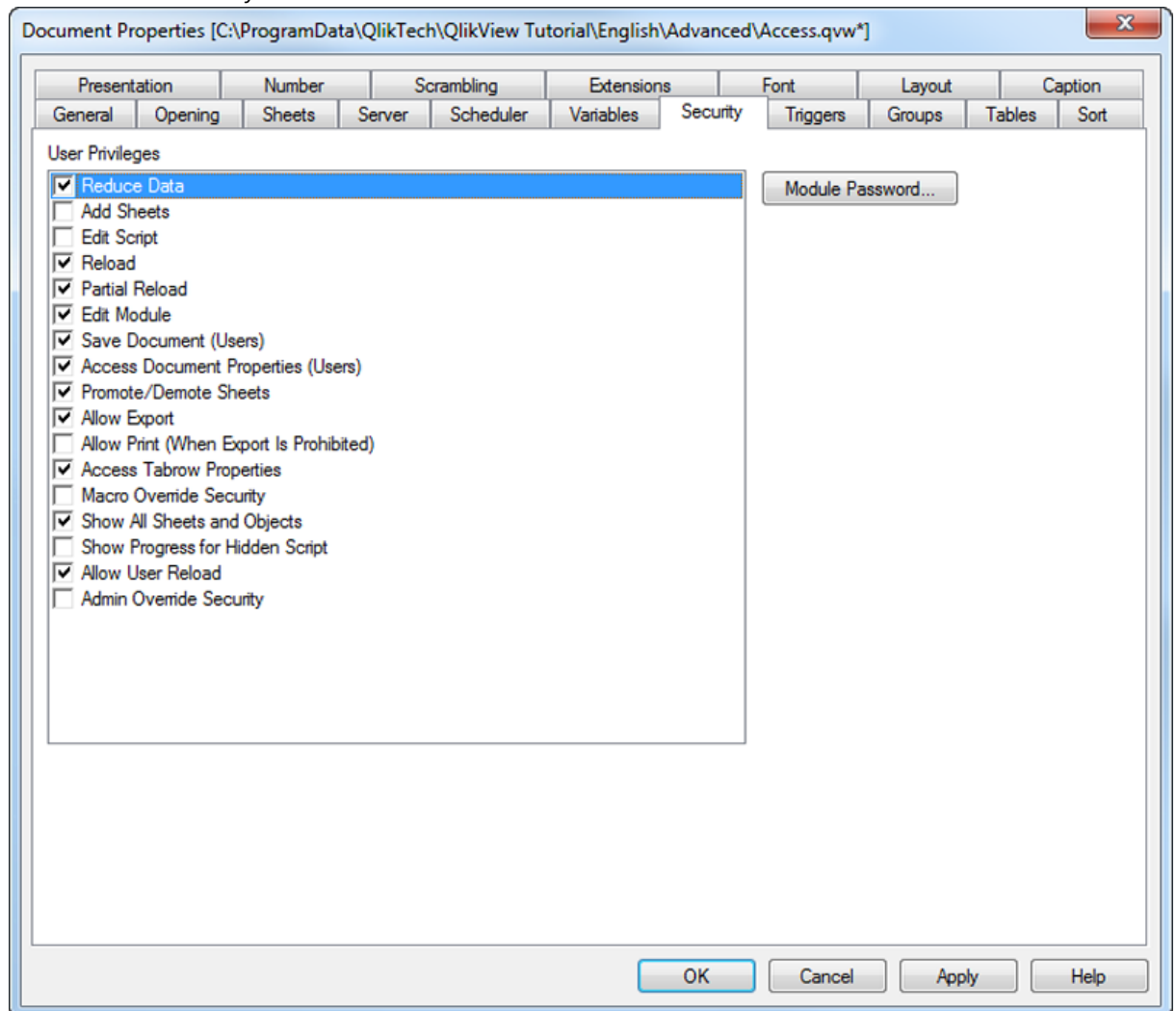
Sarah - will have to use her own computer (License number “1234 5678 9012 3459”) and give a correct **UserID** and **Password** to be able to open the QlikView document with User access rights.

Using the Security tabs

People with Admin privileges can prevent the execution of certain commands. Do the following:

1. Choose **Document Properties** from the **Settings** menu.
2. Go to the **Security** tab.

The **Security** tab contains a list of QlikView commands. By deselecting a check box, that command cannot be executed any more.



3. Deselect **Add Sheets** and **Edit Script**, then click **OK**.

Check that the commands you deselected are now dimmed, that is unavailable.

The deselected commands are unavailable even for users with Admin access, but these can - unlike users with User access - reactivate them any time. If the deselected commands should be available for Admin users any time, you can check the option **Admin Override Security**.

4. Save the file, then close it and exit QlikView.

There is also a **Security** tab in the **Sheet Properties** dialog, containing security settings on sheet level.

Opening a document with access restriction

Suppose you are Pete and wish to work with the document *Access.qvw*. Do the following:

1. Open QlikView, then choose **Open** from the **File** menu.
2. Find the file *Access.qvw* and click **Open**.
3. QlikView prompts for the correct **User ID**. Type *Pete*, then click **OK**.
4. QlikView now prompts for the correct password. As Pete, you have User rights from all the computers. Enter your password, that is *NUMBER1* (case insensitive). Click **OK**.

If you have done everything correctly, the document now opens and you can work with it.



*You cannot add sheets or view the script, since these commands have been inactivated, and you cannot access the **Security** tabs (these tabs are only available for Admin users). If you wish to be granted access to all the parts of the document, you need to type Sharon's UserID and Password (make sure to pick the password granting her Admin access rights).*

5. Close the file.

Apart from the security settings mentioned above, QlikView supports a feature by which some of the data in a document can be hidden from the user based on the section access log in. For more information, see the QlikView online help.

4.9 What's next?

You have now finished the second part of the tutorial. In addition to the basic knowledge about selections, sheets and sheet objects acquired in the first part (*Working with QlikView*), you have learned how different kinds of files are loaded into the associative QlikView database and how the logical structure is created.

Furthermore we recommend the training course QlikView Developer I. There you can learn more about the load script, data modeling, database connectivity and typical pitfalls to avoid. The course QlikView Developer II - for advanced developers - covers complex scripting functionality as well as data cleaning, data model optimization and performance tuning.

The final part of this tutorial, *Advanced Features*, lets you further explore the possibilities of QlikView. The lessons in the final part are especially suitable for application developers, because they deepen the knowledge about loading data and building the data structure. It differs from the first two parts in that it contains independent lessons (the procedures performed are not based on the work done in previous lessons), thereby allowing you to immediately go to the lesson that interests you the most.