



# ADVANCED REPORTING

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# 1 Introduction

## Objectives

- Review the course objectives.
- Understand course methods and logistics.
- Identify the basic components of QuickBook's Advanced Reporting Graphical Interface.
- Explain how to define user preferences.

## 1.1 Welcome!

Welcome to the Intuit QuickBooks Advanced Reporting course. Thank you for taking the time to start your journey with report building through guided analytics and data discovery with our Advanced Reporting tool. This journey will ultimately empower you and your company to make better business decisions faster and will demonstrate those results into reports which will visually clarify any business analysis that are required.

Intuit's courses are a uniquely designed learning experience, based on interactivity and student engagement. This is accomplished through the use of role-based, process-driven, and hands-on learning approaches. By using this methodology, students not only leave with an overview of features and functions, but they leave with the knowledge of how they can apply the software to their business needs.

While you are taking the necessary steps to start your journey with Intuit's QuickBooks Advanced Reporting tool, keep in mind this formal education is only part of what will make you successful. Please have a look at our website and learn more about the many features incorporated into this reporting tool which is part of **QuickBooks**. There will be further links and resources to aid you in your development throughout the course work and at the end in the Appendix.

Enjoy your journey with Advanced Reporting powered by **QlikView®**!

## 1.2 What is QuickBooks Reporting?

**QuickBooks Advanced Reporting** allows you to create interactive reports which will give you further insight into your business. It will run the reports in an efficient manner without sacrificing on performance. A report can be built from scratch or built from a pre-existing report template to *customize* a report.

Understanding how to maximize the use of the *Advanced Reporting* design components is essential to building effective and powerful reports. **QuickBooks Advanced Reporting** is a course that uses a business case scenario to guide you through the steps needed to build an Advanced Reporting report and allow you to use pre-existing report templates that can be modified to your advantage as your business needs change. The course is a combination of lectures and demonstrations followed by hands-on activities.

## 1.3 What is QlikView®?

**QlikView®** is a business intelligence tool developed by *Qlik* and partnered with *Intuit*. **QlikView®** powers the technology that is a part of **QuickBooks Advanced Reporting** tool. Advanced Reporting uses many of **QlikView®'s** functions and features which works behind the scenes to drive the power of Advanced Reporting with its back-end technology, while Advanced Reporting uses many of QuickBooks' data to create reports with a visual representation that is robust, flexible and easy to analyze. It is not necessary to install **QlikView®** as it is part of the *Advanced Reporting* environment and loaded with the data as part of **QuickBooks**.

## 1.4 System Requirements

Platforms	Windows 7 x64 Windows 8.1 x64 Windows 10 x64
Processors	Intel Core 2 Duo or higher
RAM	4 GB minimum, 8 GB recommended (depending on data volumes)
System Software	QuickBooks

## 1.5 Optimum Performance Criteria for Reporting

When building reports it is important to understand what will help to keep the report running at optimum performance levels. Here are a few key hints:

1. You will learn that in your reports you have the *flexibility* to create **multiple sheets** to organize your data and visualizations better. Unfortunately, as data sizes increase, the more sheets you place with increasing number of sheet objects, the more performance degradation you will experience. As a rule of thumb we advise keeping the reports down to **maximum 3 sheets**.
2. Eliminate **variables** and **expressions** that are not being used in your reports.
3. **Reduce** the number of **sheet objects** that are placed in the reports. You will learn in a later chapter that sheet objects are generally anything placed on sheets. They can be list boxes, a pie chart, tables, buttons, search bar, etc.
4. Use **containers** to use space efficiently.
5. **Reduce** number of **list boxes**, so you are using only the ones necessary for analysis and reporting.
6. Keep your **expressions** concise. Try not to use too many *if conditionals*. Instead use filters and set expressions.
7. Reduce the **sizes** of *images* used on the sheets.

## 1.6 Course objectives

The goals outlined below will enable students to master the *Advanced Reporting* in stages. Modules have been designed to fit the needs of trainees at any level or reporting experience from **Basic**, **Intermediate** to **Advanced** levels of learning. Here is a description of what each training module covers in the course objectives.

### Training Module 1: Basic (Chapters 1-5):

- Demonstrate basic knowledge of an *Advanced Reporting* structure and how to access *Advanced Reporting* through **QuickBooks**.
- Understand **navigation** and **sheet objects** in *Advanced Reporting*.
- Understand the benefits of *creating users* and setting correct **permissions**.
- Create a basic sheet and understanding sheet object properties.
- Work with the **data model**, understand the difference between creating a *Start From Scratch* report versus using a pre-existing **report template**.
- Understand the different **file formats** in the reporting structure.
- Develop a report based on *foundations of a powerful user interface design*.

**Training Module 2: Intermediate (Chapters 6-8):**

- Create a consistent navigation using list boxes for filtering, a search object, a navigation box and calendar objects.
- Create a basic report with **multiple sheet objects** and understand how to modify object properties.
- Differentiate between **dimensions** and **expressions** and understand how they are used for charting.
- Create **visualizations** that will enhance reports.
- Gain understanding of when to use the right **charts** for the appropriate business analysis and reporting model (bar chart, line chart, scatter plot, etc.).
- Create **tables** using appropriate table design choices.
- Use design *best practices*.

**Training Module 3: Advanced (Chapters 9-12):**

- Create *advanced* reports and make your reports more dynamic.
- Use **color** effectively to brand your product and give it a cohesive look.
- Use **set analysis** to streamline currently used expressions.
- Learn to use **Alternate States** and create examples using **Alternate States**.
- Use **variables** to extend dynamic capabilities in reporting.
- Create **conditional** expressions.
- Create **bookmarks**.

## 1.7 Activities

Activities in the following chapters are structured like this (NOTE: not all activities will have Hints):

### Challenge

This is a description of an explicit problem you need to solve. It outlines the objective and puts the activity into context.

### Hints

This section provides you with additional information and helps you get started with your report. Some activities may not include the Hints section. Not all activities will have a Hints section.

### Step-by-step

You can easily follow the step-by-step instructions.

This is a **sample of instructions** you use to complete an activity containing a sequence of steps.

- 1 Click the **Start** button.
- 2 Locate the **QuickBooks** icon.
- 3 Click the **QuickBooks** icon to launch the program.

All commands, as well as all names of menus, dialogs, and buttons, are in bold font style:

#### **File**

All names of specific data in list boxes, variables, table and field names are in italic font style: *Country*

User input is in italic font style:

For Label, type *Order Trends*

All file names are in the following font style: **Test File.qbw**

Tips and Notes are outlined in a highlighted box, as follows:

**Note:** This sample sentence is used to illustrate important parts in the text, tips, and notes to consider as you complete the course material.

## 1.8 Data Files

For the exercises that you will be completing in the **Basic**, **Intermediate** and **Advanced** modules please follow the steps listed below in order to download the data files for the projects.

1. Visit [qbar.intuit.com](http://qbar.intuit.com)
2. Go to the **Learning Center** and find '**Training Module 1: Basic**', '**Training Module 2: Intermediate**', '**Training Module 3: Advanced**'. The training modules are built chapter by chapter within each of the structure learning components (Basic, Intermediate and Advanced) in order to give the trainee a flexible pace for learning.
3. From the Learning Center at [qbar.intuit.com](http://qbar.intuit.com), you will find a *link* to download a file called **Advanced Reporting Training Files.zip**
4. Download and unzip this **.zip file** to a folder of your choice
5. The data files should contain the **company file**, the **images** that will be used for the project, **recordings**, the **documentation** with step-by-step instructions to create your project(s) and any other supplementary files needed to complete the final projects under the *Basic*, *Intermediate* and *Advanced* modules.

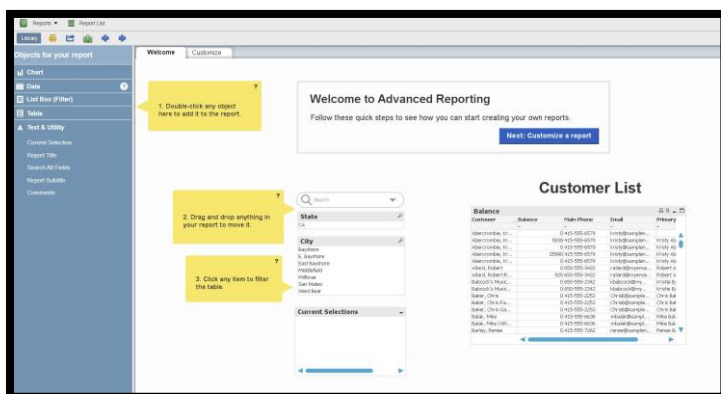
## 1.9 Advanced Reporting's Start Page

In this section of the course, you learn how to navigate the Advanced Reporting's Graphical User Interface (GUI).

**Tips:** Click on the *Help* icon under the *Advanced Reporting Tool* to find more information and links to video recordings that are provided outside of these training modules.

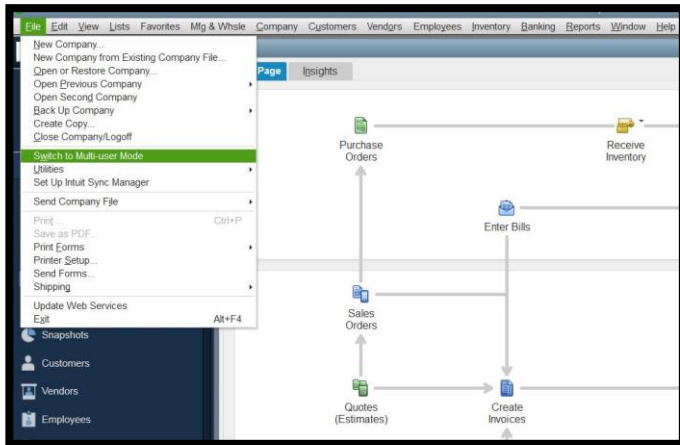
### 1.9.1 Advanced Reporting Start page

**QuickBook's Advanced Reporting Start Page** can be accessed by going through **QuickBooks Menu** tab at the top and selecting **Report>Advanced Reporting**. Before you proceed to selecting the **Advanced Reporting** selection under **Reports**, you may need to set up users and assign several permissions for those specific users from the top menu bar.



### 1.9.2 Multi-User Mode

The first time you login to **QuickBooks**, you need to log in to the software as *Admin* or have the *Admin* grant you full access to the *Advanced Reporting* tool. In order to use *Advanced Reporting* with **QuickBooks**, you need to go to the **File** tab and select **Switch to Multi-User Mode**. This will switch to *multi-user mode* as a first step towards gaining access to *Advanced Reporting*.



### 1.9.3 Give a User Access to Advanced Reporting

In order to give a User access to Advanced Reporting, it is required that an Admin set up the appropriate **permissions** for the user. Generally, the **permissions** may be set up under the *Company* menu tab by selecting from the drop-down option, **Users>Set Up Users and Roles**. There will be an activity at the end of this chapter that takes you through the whole step-by-step process of creating a new user, assigning it a role that will have access to *Advanced Reporting permissions*.

**CAUTION:** It is important to understand that by giving a user access to *Advanced Reporting*, it gives them access to all **QuickBooks** data for that *company file*.

### 1.10 Report – Advanced Reporting

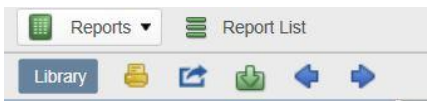
When you click on the **Reports>Advanced Reporting** option, it takes you to a screen which asks if you want to *update* the data. It is wise to always choose to update the data. Skipping this step may cause data to be missing for your report generation. This step extracts all the data within a *company file*. While updating you see progress from 1



to **146 steps**. This may take a few seconds or up to a few hours depending on how much data you have in the company file.



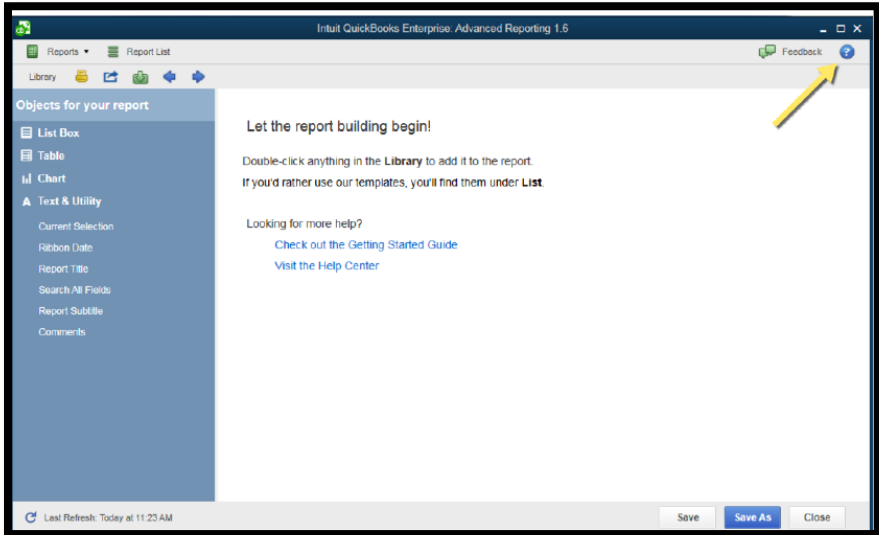
## 1.11 Advanced Reporting Toolbar



- 1.11.1 **Reports Tab** – allows you several options one of which lets you create a report from scratch. It allows you to open existing reports from the *Report List*, *Import*, *Share*, *Save/Save As* and *Exit* the *Advanced Reporting* tool.
- 1.11.2 **Report List** – gives you access to *pre-existing report templates* within a particular company file that you can edit or the option to create a *Start from Scratch* report. You can filter the reports by industry and select to show *All Report Types*, *Starter Reports*, or *My Custom Reports* from the **SHOW** option.
- 1.11.3 The **Library** contains predefined *chart objects*, *date parameters*, *list boxes*, *table choices* and *text and utility objects* which may be added to your report by simply double clicking to add without creating your own. These will be discussed in detail in the Intermediate modules.
- 1.11.4 **Print** – this icon allows you to print your report with formatting that the user sets up.
- 1.11.5 The **Export** button allows the user to *share the report* generated with others by placing the **Report** file in a folder path made available to others.
- 1.11.6 The **Import** button allows the user to bring in a Report that exists in a folder structure in order to edit it and incorporate into an existing company file.
- 1.11.7 **Back Button** – moves one action back
- 1.11.8 **Forward Button** – moves forward one action

## 1.12 The Help Center

Clicking on the *question mark* icon on the far right takes you to the **Help Center** shown below.



## 1.13 File Types

In **QuickBooks Advanced Reporting** there are a few file types which you may encounter in your path structure. It is of value to understand the differences when using **Advanced Reporting**. The report files are located in the same location where your *Sample Company Files* are located.

For example:

- A. **C:\Users\Public\Public Documents\Intuit\QuickBooks\Company Files\QuickBooks Enterprise Solutions 16.0\sample product based business Advanced Reporting\Backup Reports**

will contain the **.qvr** import and export files

Under the folder structure:

**C:\Users\Public\Public Documents\Intuit\QuickBooks\Company Files\QuickBooks Enterprise Solutions 16.0\sample product based business Advanced Reporting**

will contain the **.qvt** template files and the **.qvd** data files

Under the folder structure:

**C:\Users\Public\Public Documents\Intuit\QuickBooks\Sample Company Files\ QuickBooks Enterprise Solutions 16.0**

will contain the files that have the **.qbw** extension referring to the **QuickBooks** working file.

**.qbw** – this is your QuickBooks working file

**.qvr** – this is the file extension to your Advanced Reporting report

**.qvt** – this is the file extension for a report template

**.qvd** – this is the file extension given to data files which contain table data used in generating reports

## 1.14 QVD File Type

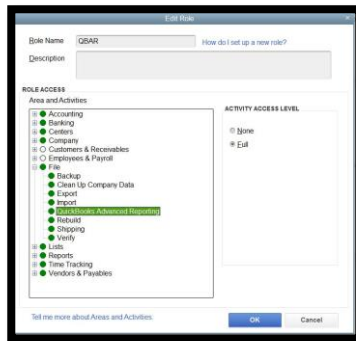
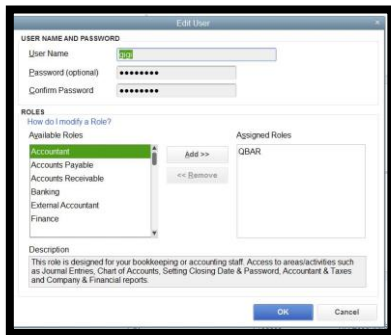
A **.qvd** file is created by the **QlikView®** software. It is not necessary to ever modify this as it is created in the back end structure of the reporting tool. The **.qvd** file contains basically compressed versions of data tables that are used by company files and allow access to the data tables when performing *Advanced Reporting* analysis and allow data access for report generation.

The process by which a **.qvd** file is created and modified is handled by the System Administrator or the Data Architect/Developer and the user never needs to know how to open or modify the **.qvd** file.

## Activity 1.1: Define user preferences

### Challenge

Prior to going into the *Advanced Reporting* tool, the user needs to set some **preferences** within **QuickBooks** to ensure that access to all features of the reporting tool are permitted. The goal in this activity is to make sure that users are given the correct *user preferences* in order to access *Advanced Reporting*. We need to return to the **QuickBooks** Home Page in order to access the menu items required to set up these preferences. You need to be logged in as an *Admin* in order to assign relevant *user preferences*.



### Step-by-step

1. To set up users that will be able to access Advanced Reporting an *Admin* must go into the **Company** tab and select **Users>Set up Users and Roles**.
2. From the **Users and Roles** dialog box, select the **User List** tab and select the **New** button to create a new User or edit an existing user with access to *Advanced Reporting*.
3. Assign a *User Name*, a *password* for the User and assign *roles* from the left hand side to the user and add the *roles* for this user.  
**NOTE:** the roles that are assigned must have access to *Advanced Reporting*; otherwise the user will not be able to get into *Advanced Reporting*.
4. Click **OK** to create the new user.
5. Now let's create a new role. You go to the *Role List* tab in the **Users and Roles** dialog box and select **New**. That will take you to the dialog box shown below.
6. There you will select the name of the *Role*. Create a *Role* called "QBAR".
7. You select to give minimally full access to the **QuickBooks Advanced Reporting** under **File** button.
8. All other permissions to be granted may be decided by the *Admin* for the role created.
9. Without giving the role the permission under **File** for **QuickBooks Advanced Reporting**, the user with this role will not be allowed entry into the reporting tool.
10. Now any user assigned the role of *QBAR* will have access to *Advanced Reporting*.

## 2 Analysis and Search with Advanced Reporting

### Objectives

- Explain how to perform associative searches in *Advanced Reporting*.
- Explain the **Library** Components in *Advanced Reporting*

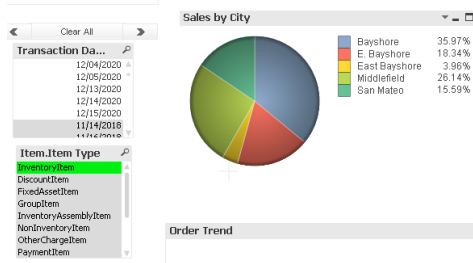
### 2.1 The Associative Experience with Advanced Reporting

*Advanced Reporting* uses an intuitive and easy to learn color-coded, point-and-click user interface. When a business user selects a data point, fields are immediately filtered and aggregated based on the business user's selection.

- (1) Selections are highlighted in **green**.
- (2) Data related to the selection is displayed in **white**.
- (3) Unrelated data to your selection is displayed in **gray**.

With *Advanced Reporting*, a business user can look at two different data points and understand precisely how the points relate to each other. The business user has the freedom to analyze relationships between different data in a flexible, powerfully interconnected manner.

In addition, *Advanced Reporting* gives the business user the ability to funnel data into specific points such as a product, country, or year, and look at how these individual factors relate to the total dataset. The user is not limited to analyzing data only with preset queries. With *Advanced Reporting*, all data aggregates are recalculated in real time, regardless of the source fields. Associations are stored generically as they occur in relation to the entire dataset. This makes it easy for a business user to find the answer to any business question and report on it in a customized fashion for the end user. The data from all tables is always at hand, ready to answer the next business question, whatever that may be.



### 2.2 List Boxes

List boxes bring in the field values from a specific field of the table. These list boxes act as filters.

When you make a selection in a List box, press ENTER to confirm your selection. If you want to leave the search in the List box, press the ESC button.

## 2.3 Library

The library contains many pre-defined objects that you can use to build your reports. There are charts, date ribbons and Current Selection boxes amongst other features.

In the **Library**, double-click on the object to add it to the report.

- **List Boxes** – helps you filter within the sheet objects
- **Tables/Charts** – display your data in tables and charts
- **Date** – includes multiple date formats and List Boxes to filter your data.
- To add an object from the library, **drag and drop** them to the sheet in order to move the object around the report.

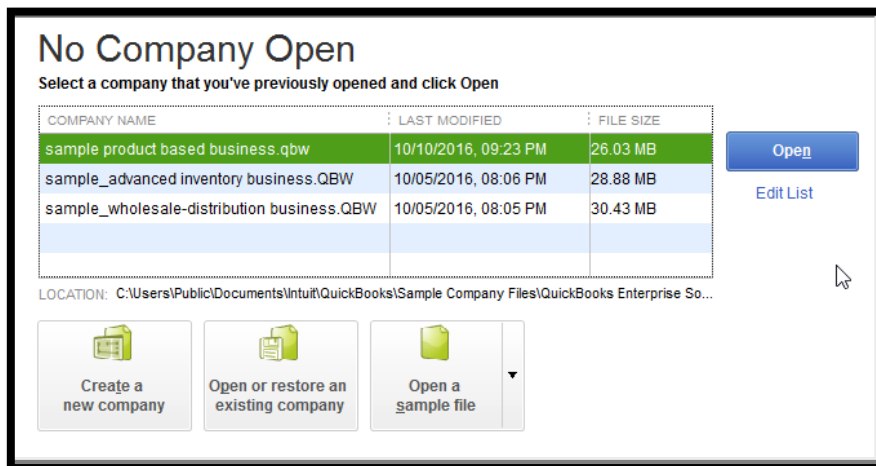
## Activity 2.1: Explore Advanced Reporting's associative power

You will learn about the associative power of *Advanced Reporting* and how *Advanced Reporting* differs from traditional reporting structures where it brings more interactivity and insight from selections made based on natural analytics. Now take a look at *Advanced Reporting* in action. In this activity, you open a report from *Advanced Reporting* and explore its associative power. *Advanced Reporting* reports have the .qvr file extension associated with them.

### Step-by-step

Open the **QuickBooks** application:

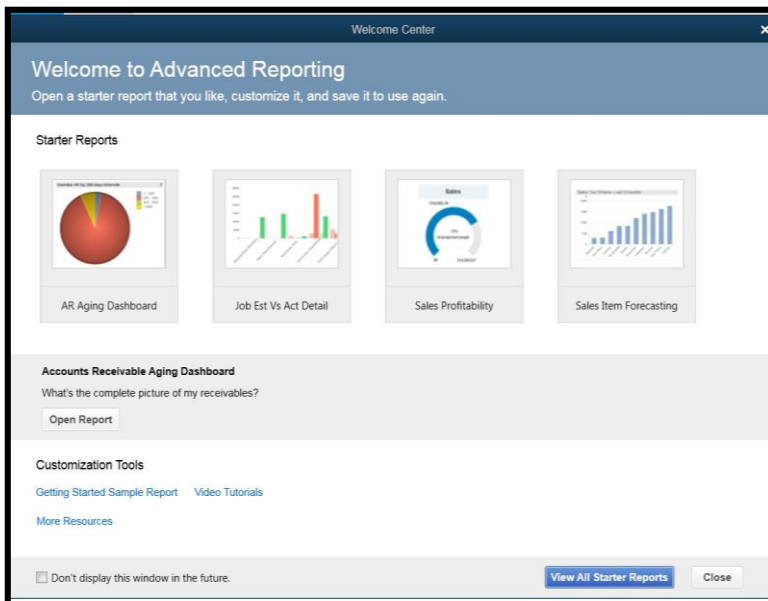
1. Click **QuickBooks**. Open a company file by highlighting it and selecting **Open**.



2. After opening up the company file in QuickBooks, you will be provided with several menu options at the top.
3. From the **Reports** menu, select **Advanced Reporting**.
4. At this point, it asks if the user would like to update the data from QuickBooks. Click on the **Update Now** button. Each time the user opens the *Advanced Reporting* option, it asks to update the data. This ensures that your report uses the most updated information from the company file. Updating can go from a few seconds to a few hours depending on the size of the company file and the speed of your computer.

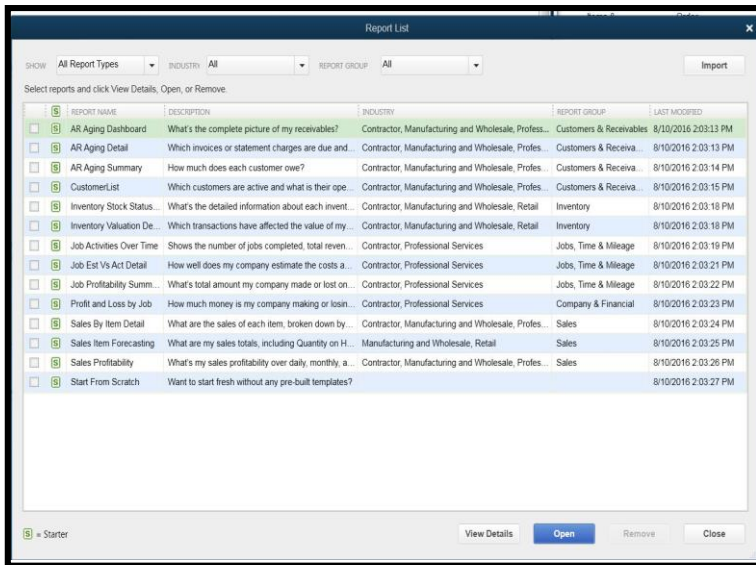


- Once completed it gives you a "Welcome to Advanced Reporting" dialog box. At this point click on the **View All Starter Reports** button at the bottom.



- You get a report list from which you may select a pre-existing report to work with or choose the last selection which starts a new report from scratch.





7. Reports with an **S** are templates that load with your data.
8. *Start from Scratch* opens a blank report.
9. From the report list, select the **Sales Profitability** pre-existing report for the following exercises. Select **Open**.
10. This takes you to a report template complete with designed visualizations and sheet objects in place for further analysis and reporting.

In the following, you are to perform searches in the application. List boxes are searchable. To enter a *search string*, click the search icon on the list box caption and then simply start typing the search string. A pop-up search box appears in which you can finish typing the search string. *Advanced Reporting* displays all the values of the selected field that match the criteria of the search string.

- When you press **Enter**, or click one of the cells in the result, the values are selected.
- The search box closes when you press **Enter**, **Esc**, or click in the layout.
- If you pick the *Cost of Products and Services* sheet on the *Sales Profitability* report, you can click on the search icon in the caption area of the list box titled “*Item*” and start typing: Hardware.
- Pressing **Enter** will highlight in green the selections that start with the word “Hardware”, e.g. *Hardware Brass hinges*, *Hardware Doorknobs Std*, *Hardware Lk Doorknobs*.
- Anything related to **Hardware** items will be highlighted in list boxes in white, for instance in the list box, **Item Type**, all Hardware related items are classified as **InventoryItem**. All charts and sheet objects will also reflect the choice based on **Hardware** items.
- After performing the search, hit the Clear All button from the Current Selections box to clear your search.

**Complete the following to explore Advanced Reporting’s associative power:**

### More about text searches

The simplest way of searching is **text search**. From the list box, you may search for field values matching a text string that you type. You can use a wildcard character such as an asterisk \*, to reflect any number of characters that precede or follow your search string.

### Activity 2.2 – Wildcard Search

1. Clear any selections you may have made on sheet.
2. Go to the **caption** area for the Item list box click on the search icon.
3. Type **Cabinet\*** (Cabinet is not case sensitive). Press Enter.
4. Notice there are three values in the item list green which fit the above criteria.



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### Numeric searches

You can also use numeric values in search criteria.

For instance, if you click on the search icon in the caption and type in a numerical value, it will bring up the number and all its associated values in other list boxes and make appropriate selections in the sheet objects based on that numeric value.

For

## Fuzzy searches

Fuzzy search compares and sorts all field values according to their degree of resemblance to the search string. A tilde (~) character is displayed in front of the search string. Fuzzy search is especially useful where misspelling is an issue. It can also help you find values that are near-identical to each other.

### Activity 2.3 – Fuzzy Search

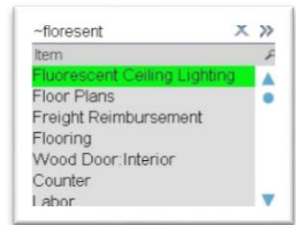
1. From the **caption** area of the list box Item, click on the search icon.
2. Type **~florescent** (if you cannot type in the correct spelling of fluorescent). Press **Enter**.
3. It displays the value **Fluorescent Ceiling Lighting**.

## Using expressions and complex searches

You can perform searches based on **expressions** by starting the search string with an equal sign (=), greater-than sign (>), less-than sign (<), and so on. These are especially good for limiting down date ranges.

### Activity 2.4 – Using Expression Search

1. Go to the **Txn Date** field in your *Sales Profitability* report and the *Cost of Products and Services* sheet.
2. From the caption area, click on your search icon. In the box that displays type in **>=1/1/2016**. Press **Enter**.
3. The dates that are filtered are all representative of those after January 1, 2016. All selections in other sheet objects reflect on values based on these dates that have been filtered through this search criteria unless using alternate states (to be discussed in the Advanced Module).

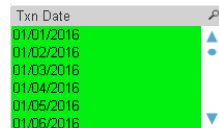


## Select excluded

This is an important and powerful feature of *Advanced Reporting*. **Select Excluded** allows you to, for example, search for products that have not been sold in certain regions or customers that haven't placed an order on a certain date.

### Activity 2.5 – Select Excluded

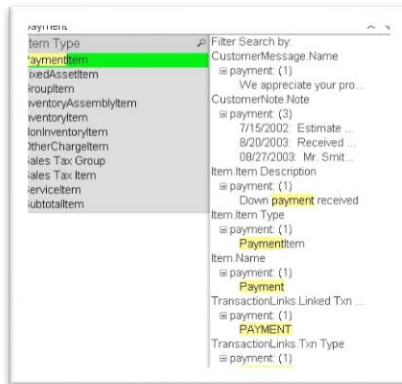
1. In our case, we will look in the *Cost of Products and Services* sheet and look for items that do not start with **Sub** in the name in the Item list box.
2. In the caption of the Item list box, click on the search icon.
3. In the box type in **sub\*** to first select all items with the word **Sub** as item name.



4. Notice there are **10** items this criteria.
5. To find all items that are **NOT** starting with **Sub**, right click caption area for the list box and pick “**Select Excluded**” the drop-down list.

### Select possible

This option transfers your **selection** from **white** to **green**. You can perform advanced searches by defining subsets in the data and then performing searches within the subsets.



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### Associative searches

When you activate associative search in the objects, you can perform searches in fields other than the field that is represented in a list box. This is a powerful feature that allows the user to explore information and relationships in fields that aren't displayed on the sheet.

Click >> in the search control to enter associative search logic to search in other fields. You will get the result set in the field to which the search control belongs. This is the same as simultaneously searching in several fields.

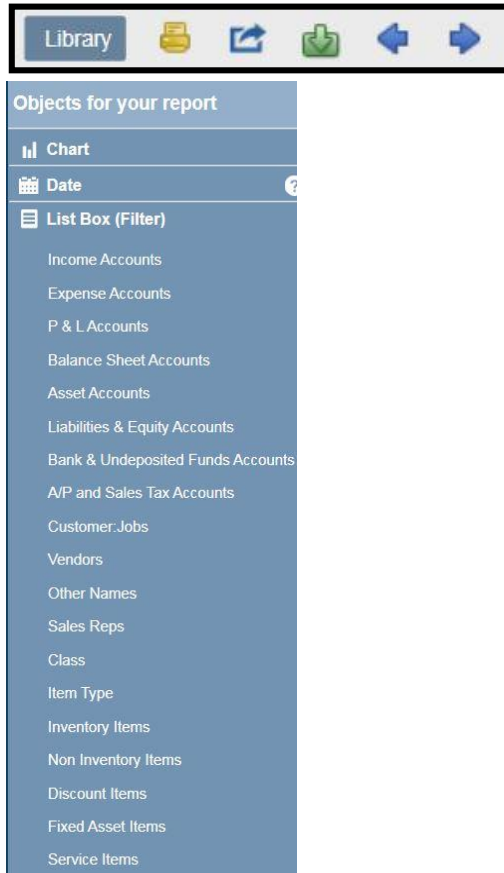
### Activity 2.6

1. Go to the list box titled *Item Type* and in the caption area, click the search icon.
2. Start typing **Payment**. Then on the right of the box, select >>.
3. It displays a drop-down with further values that may fit the search criteria of **Payment**.
4. Left click on **PaymentItem**.
5. **PaymentItem** is highlighted in green. Press **Enter** to make the final selection. All other sheet objects will update for this selection.

All selections made in list boxes (filters) will change the values to reflect on that selection for all sheet objects in the above exercises. For example, selecting a particular transaction date will generate values based on that particular date for all sheet objects in the report. The concept of *Alternate States* will be further discussed in the **Advanced** modules. *Alter-*

*nate States* will demonstrate how to perform **comparative analysis** based on making selections in one set of sheet objects that will not affect selections in another set of sheet objects. When *Alternate States* are created we can make comparisons showing two sets of values using the same set of sheet objects in a parallel view.

## 2.4 Navigate through your selections



### 2.4.1 Library

The library contains several predefined objects that you can use to build your reports. Some of the options are predefined charts, date parameters, list boxes (filters), tables, current selection box, and text and utility functions. You can double click on these objects to add it to the sheet of the report.

If you do not see the menu items on the left hand side click on the **Library** button at the top of the navigation bar.

- **List Boxes-** are filters used to reduce data from the charts and tables on the sheet

- **Tables/Charts** – visualizations to enhance reporting with data to support your business case
- **Current Selections** – box that displays selections that are made
- **Date** – includes multiple date parameters based on certain rules and conditions. This parameter is a bit more complicated than just having simple date fields. Some parameters are defined based on rules created in the *Advanced Reporting's Master Calendar*. We will discuss how to generate the **Master Calendar** in Chapter 4.
- **Text and Utility** – allows you to filter even further, search for specific items and add comments/titles to your report.

#### 2.4.2 Print

Allows you to print your report formatted in a specific way

#### 2.4.3 Export

Export your file to a certain path structure

#### 2.4.4 Import

Import your file from a certain path structure

#### 2.4.5 Back Button

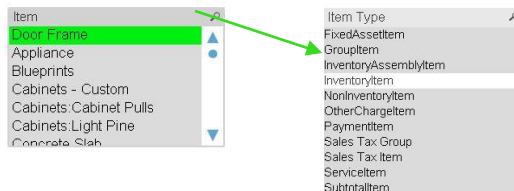
#### 2.4.6 Forward Button

## 2.5 Relationship in and in between fields

By now, you have learned the basics of how to select values and how Advanced Reporting enables you to perform associative searches. In this section, you take a more detailed look at how fields are related.

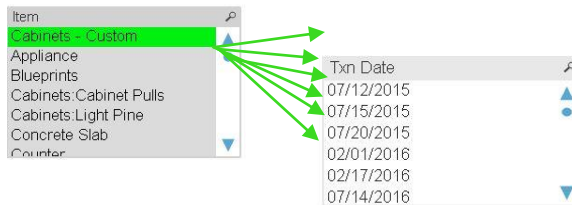
### 2.5.1 One-to-one relationship

When capturing data from tables, the relationships either show a *one-to-one* relation or *one-to-many*. For instance, if you are examining the item list box and observe the relationship with item type, it falls into a *one-to-one* relationship. An item can either be an inventory item or non-inventory item. It can't be both.



### 2.4.2 One-to-many relationship

When looking at the transaction dates, you might see that installing flooring or cabinets-custom may have multiple transaction dates depending on the customer/client.





## Activity 2.7: “Or” search

### Challenge

You want to be able to make multiple selections without one selection cancelling out the other. Determine all the Transaction dates for Cabinets-Custom **OR** Flooring. Using an “Or” search helps to accomplish this goal.

### Step by Step

1. Go to the **Item** list box and select first *Appliance*. This will be highlighted in green.
2. If you go to highlight *Counter* next by clicking on it, then *Appliance* will be deselected and you will only see Transaction dates for *Counter*.
3. First select *Appliance*. Then hold the **Ctrl** button down and select *Counter* and any other selections from the Item list box. This is your “**OR**” search where you see Transaction dates for *Appliance* **OR** *Counter* work that has been done.

## 3 Create a Basic Report from Scratch

### Objectives

- Understand the terminology of **Dimensions** and **Measures**
- Create **List Boxes** and understand their benefits
- Understand the different **file types**
- Examine the **Library** and its components
- Create and understand the use of a **Master Calendar**

Now that we have covered the basics, it is time to identify the benefits of utilizing the Advanced Reporting tool to *Create a Basic Report from Scratch*. In this chapter, our goal is to demonstrate how to create a Basic Report using list boxes, the Library components and bring in a Master Calendar. We will also highlight the importance of understanding the differences between **dimensions** and **measures**.

### 3.1 Dimensions and Measures

When building any report, utilizing optimum expressions based on data provided from previously loaded tables becomes of great importance in creating great reports. The user is able to utilize either pre-defined dimensions and expressions already present in the library or create custom ones defined to handle specific customer requirements and needs.

#### 3.1.1 Dimensions

When you are designing visualizations and charts, dimensions need to be defined. The user needs to ask a few questions to create the chart or visualizations. The field values that come from tables and attributes that you will chart over will be called a **dimension**. It can be discrete numerical values (for example Transaction Date) or it can be in the form of an attribute that is not calculated (for example Month, Customer, Product Category, etc.). As a general rule there is one data point for each **dimension** value in a chart.

Some of the commonly used **Dimensions** in the Advanced Reporting tool are listed below. These are a small subset of all that may be found in the dimensions list. When we create our application in the Intermediate and Advanced courses we will add the dimensions used for that company file and report to the Appendix.

Dimension	Description
Transactions.Item Full Name	Name of the item
Transactions.Customer Full Name	Name of Customer
Month, Year, Quarter	Time Dimensions (discrete values)

Month Year	Value derived from Master Calendar
------------	------------------------------------

### 3.1.2 Expressions (Measures)

Providing measurement visibility indicates compliance with business goals through the various ways they are presented in the reporting tool. The user needs to ask “What is the Sales per month?” The Sales value becomes a calculated **measure**. Any expression used to calculate a figure is named as **measure**. **Measures** may be simple or complex depending on your expressions. Most of the common ones use aggregation functions to create simple expressions. Some of the common aggregation functions used will generate one single value as a result.

**Sum()** – Returns the sum of expression over a number of records.

**Count()** – Returns the count of expression over a number of records. The optional DISTINCT qualifier used within this function ignores duplicate values.

**Avg()** – Returns the aggregated average of expression or field over the chart dimensions.

**Max()** – Returns the maximum numeric value of expression over a number of records.

**Min()** – Returns the minimum numeric value of expression over a number of records.

Measure	Description	Expression
<b>Sales</b>	Sales values for transactions	Sum({<\$(vExprSales)>}[Transactions.Amount With Sign])
<b>#Transactions</b>	Total # Distinct Transactions	Count(Distinct [Transactions.Ref Number])

## 3.2 Advanced Reporting File Types

There are a few types of files you need to be concerned with in the QuickBooks Reporting tool. They have the extensions .qvr, .qvt and .qvd.

- A **.qvr** file extension is used to *import* and *export* a report file into *Advanced Reporting*
- A **.qvt** file is a report template file that contains sheet objects that may be modified and customized and belongs to a certain company file

### 3.2.1 QVD Files

A .qvd file is a data file created by **QlikView®** and is proprietary to **QlikView®** except that Advanced Reporting makes use of its backend structure. A .qvd file contains only one table of data. Here are some other special features of QVD files:

- Is optimized for speed (10-100) times faster
- Reduces workload on external database
- Combines data from any number of tables in compressed format

### 3.3 List Boxes

- List boxes are useful for filtering the data in your report.
- List boxes are the most basic **sheet objects**
- **List boxes** contain the field values that are captured from data tables
- A **scroll bar** is displayed when not all values can be displayed within the list box
- **Green-white-gray** play an important part in list box selections and analysis of data

### 3.4 Library

- Contains pre-defined objects for your reports
- May contain predefined **Chart objects**, **Date parameters**, **List Box objects** for filtering, **Table objects** and **Text/Utility object**
- Contains **Current Selections** box
- Double click on the objects to place them onto the sheet from the **Library**
- If you do not see **Library** objects on the left hand side and a listing of the above options, click on the **Library** button and a panel opens up to show the different objects

### 3.5 Master Calendar

- A table of data that keeps all the pertinent date elements organized into one table
- A **dimensional table** that links to dates in your **company file**
- Extract certain **date parameters** for reporting purposes

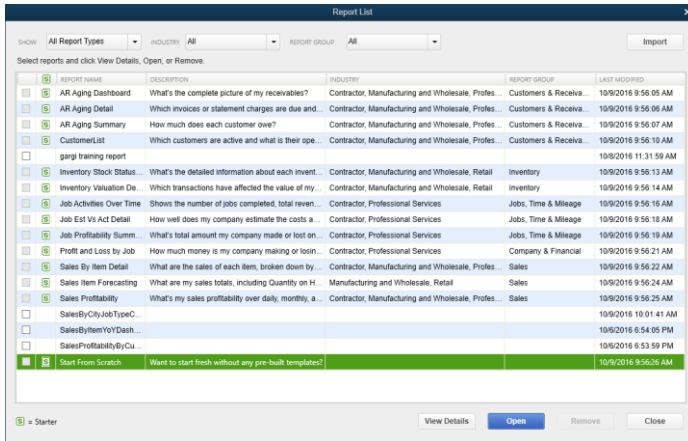
## Activity 3.1: Create a Report Using Start from Scratch

### Challenge

Create an interactive dashboard that allows you to explore how different cities, job types, and customers are performing together.

### Step by Step

1. From the *Advanced Reporting* page, click on the **Report List**.
2. Select **Start From Scratch** template to begin a report from scratch.



3. Click Open.

## Creating List Boxes

- First thing we need to do is to populate the blank sheet with some List boxes.
- Expand the List box area of the Library on the left hand side. Use some of the pre-defined list boxes so expand the List box area of the Library.
- Double click on *Customer Jobs* and *Class* list boxes for now. Notice the list boxes all pile up on top of another and you need to separate them on the sheet.
- Add a couple more List boxes in the same manner as Step 6 and these are *Item Type* and *Items List*.
- Also from the Library, expand the Text & Utility area and double-click on the *Current Selection* to add this to your sheet.
- If you want to position your objects and have a hard time moving it around, hold the Alt key down until a clear cross appears and then drag the object around the sheet to the desired location.
- If you do not see the List box choice you want on the left hand side in the Library, the other option is to right click on the sheet and pick **Select Fields**.
- The *Sheet Properties* dialog box comes up and under the **Available Fields** box you will see all the fields displayed from all tables. You can filter on the fields by table, by selecting a specific table in the **Show Fields from Table** box.
- You can pick and choose the field you want and add it to the **Fields Displayed in Listboxes** box on the right hand side.
- For example choose the ShippingMethod table from the **Show Fields from Table** box. There are only 5 fields in that table so it makes picking and choosing fields to display in list boxes much easier.

14. Pick *ShippingMethod.Name* and *ShippingMethod.Time Created* from the left hand side and add it to the **Fields Displayed in Listboxes** box on the right hand side. Do not delete any fields already displayed on the right hand side because it'll delete already those list boxes from the sheet.
15. Adjust the locations of the newly created list boxes *ShippingMethod.Name* and *ShippingMethod.Time Created*.
16. Now we'll create a **Master Calendar**.
17. Right click on the sheet, select **New Sheet Object->Table Box**. A table box combines a set of list boxes together in columnar format to show the relationships of fields to each other.
18. Select from the left hand side under **Available Fields**, the following fields, *Month*, *Month Year*, *Quarter*, *Quarter Year*, *Year*, *Week*, *Day* and *Transactions.Txn Date*.
19. There are a few tips on choosing these fields. You can type the first few letters and it takes you to the general area of the field and you can select and then click Add. Or when you see the field you can double-click on it to add it to the **Fields Displayed in Listboxes** side. You can also filter on the table at the bottom where it has the **Show Fields from Table** box and select for instance the Transactions table. This will filter down the number of fields to less than all the ones found for all the tables. Now you can pick *Transactions.Txn Date*.
20. You have a **table box** with all date parameters for the columns and can see the interrelationships between the dates. This is your **Master Calendar**.

## 4 Foundations of a Powerful User Interface

### Objectives

- Explain basic design concepts.
- Identify how to create a consistent user interface.
- Explain the best practices for the use of layout, fonts, and colors.

During the class, you continue adding more objects to your application. As the application gets more complex and richer, it is important to understand and follow basic design concepts. In the following section, you are introduced to the most important basic layout and design concepts.

#### 4.1 Visual perception

Visual perception is the process that enables the brain to interpret visual stimuli. A basic knowledge of how the human mind perceives visual information is important when creating Advanced Reporting documents, because our eyes do not register everything that is visible. Our mind only registers what we perceive, which means we only focus on a small part of what we see.

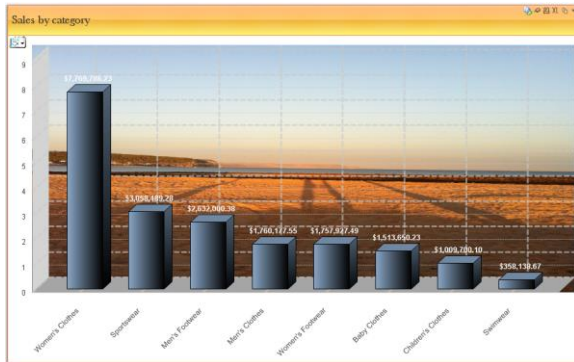
Only a small amount of the visual stimuli perceived by the eyes is processed by the human mind. Good design leads and helps the user identify and interpret important data with as little effort as possible. Obviously, bad data, no matter how well presented, leads to error. Without good design, though, even the best data can be difficult to interpret or, perhaps even worse, lead to wrong decisions.

#### 4.2 Less is more

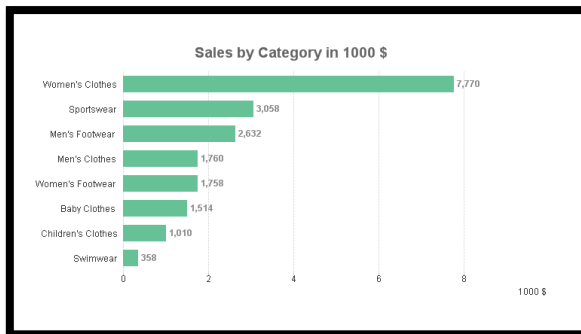
One of the common mistakes application designers tend to make is to overload visualizations in the reports. Although Advanced Reporting is capable of drilling down to micro granular data, not every sheet requires that high level of detail. Too many objects, heavy chart decorations, 3D, and other effects can distract the user, and lead to a negative user experience.

A design with unnecessary graphical effects is taxing to work with on a daily basis. One of the main tasks as an application designer is to simplify how the data is presented. Ludwig Mies van der Rohe, a famous German designer and Director of Architecture at the Bauhaus design school, became famous for spreading the idea that “less is more.” Fewer effects or less decoration makes the design more impactful.

## 4.2.1 Before



## 4.2.2 After

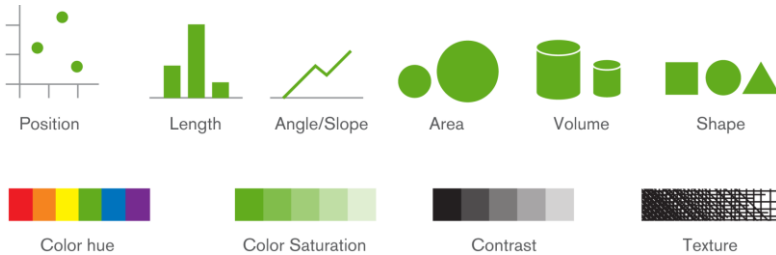


Take airport and road signs as an example for a simple and straightforward design. These signs need to be perceived rapidly and are some of the best examples of great, quiet design. They get you where you need to be without most people even noticing. Only when they are broken do people notice. If this sort of design were to be illustrated in a chart, it would be more of the “slow and steady wins the race” approach.

Purposeful design is more conservative than flashy design. It gives your application a longer shelf life, which means you don't have to change it as frequently. You ultimately do less work for greater reward.



### 4.3 Encoding Data



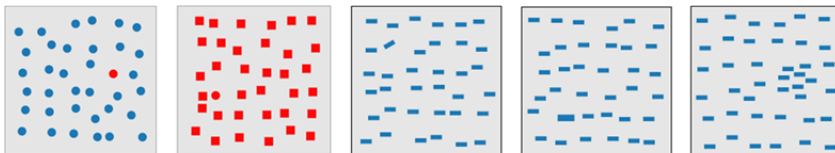
At the most fundamental level visualization is about encoding data. How should one map the data onto graphical elements? For instance, the picture above shows the relative difficulty humans have in assessing quantitative values when they are mapped to a number of different graphical encodings. Evaluating the types of encodings reveals the most efficient of these encodings is position (in relation to a scale), followed by length, angle/slope, area and volume. Color is the least reliable encoding.

### 4.4 Pre-attentive Processing

One of the most important roles of visualization is to highlight features of interest in a data set. The figure below illustrates this. The brain does not have to consciously determine what is important. The important symbols are made prominent in the mind without conscious engagement. This is **preattentive processing**.

**756490985763209788401189864128571742**

Other graphical features which are processed **pre-attentively** include *orientation, shape, size, groupings, length/width, curvature, color, intensity, intersection, flicker* and *direction of motion*.



## 4.5 Lack of Clarity

Road signs are pretty clear so that we make our way effortlessly. When they aren't clear, it makes for confusion. There are other ways to exhibit lack of clarity. Familiar icons may not be familiar to all; there may be cultural differences. If you place an image which may be misconstrued, place a text box highlighting the meaning behind the image or icon. A computer screen can mean many things, or a head and shoulders icon can have many different connotations. Place a text box to describe what the icon relates to in the context of the sheet.



## 4.6 Tell the Truth

There are many ways that charts may intentionally or unintentionally misrepresent data. There are several ways that charts may be a bit elusive or erroneous in its depiction of data. Here are some things to avoid when presenting visualizations:

- **Effects without causes** – this approach tends to present facts and data without providing information that allow the viewer to connect them in a cause-effect relationship chain.
- **Cherry-picking** - picking and choosing data that point only to certain facts that will support a specific conclusion.
- Incorrectly inferring **causality** from **correlation** – creating a chart that shows incorrect correlation
- Inappropriate **comparisons** and **contexts** – this includes comparing incompatible data sets. For example, creating monetary charts without accounting for inflation.
- **Dequantification** – removal of legends, axis labels or graphical entities that put the data into some context.
- **Exaggeration** – to give the impression that differences or ratios in the data are larger or smaller than they actually are.

## 4.7 Fonts

Choosing the correct font allows the user to review data with little need for interpretation. Fonts can be categorized in many ways, but we focus on two main font types: serif and sans-serif. A serif is a small decorative embellishment.

# sans-serif      serif

Examples of serif fonts are Palatino, Book Antiqua, and Times New Roman. A sans-serif font does not have decorative embellishment. Examples of sans-serif fonts are Arial, Helvetica, and Lucida. When you create a report, we recommend that you use sans-serif fonts. Make the distinction between navigation, data, and reference font size. Navigation font size must be big enough so users can interact with it easily.

## 4.8 Layout and hierarchy

The objects' size, position, and their mutual relation are of great importance for the design of user interfaces. No object is perceived as a single isolated unit, and by applying the following basic principles you enable the user to better understand and structure the information. Hierarchy in design enables quick and easy comprehension of information, helps in orienting the user, and assists in identifying the most important or relevant information from a massive amount of information. A well-structured design enables information to be organized in a way that can be quickly scanned, and most relevant pieces can be identified quickly and easily. When a design lacks hierarchy, the user often doesn't know where to start or end. It may result in confusion, misinterpretation, and poor decisions.

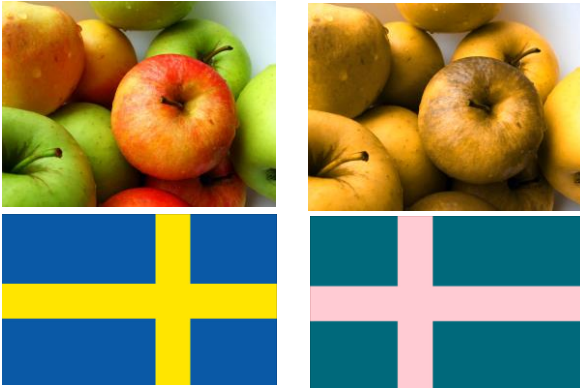
Your audience will appreciate being able to understand the substance of the data in a short time rather than spending time trying to understand every detail of the data. An orderly design provides the highlights first and then presents more details, if needed.

### 4.8.1 Elements that create hierarchy in visual design

Size, alignment, color and contrast, spacing including negative space, position, typography, grid, grouping, density and weight, indentation, bullets, and rules are the various elements that can be used to create a good visual and contextual order to designs. These elements help define the primary, secondary, and supporting features on a page.

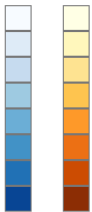
### 4.8.2 Contrast and Color

Contrast not only in color hue and intensity, but also in font size and font style (bold, regular) creates a distinction between the important highlights and the secondary details. Also trying to design for the color blind audience is imperative. Approximately **7%–10% of all males** in the world have a red-green color defect. Blue-yellow defects affect roughly 2.5% of all males. For women, the conditions are much less frequent, Approximately 1% of the world's female population have a color vision deficiency of some sort. The following visual depicts how the red-green colors may appear to a color blind person as well as to those facing the blue-yellow defect.



### Possible Color of Sequences

Sequential



Diverging



Qualitative

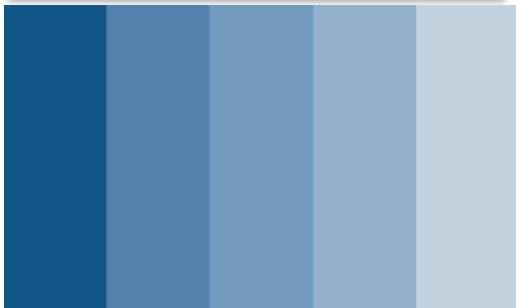


See the visual above for reference. As you can see, we do not perceive hues in a sequential manner, even when they are arranged according to their spectral values as the example on the left is. The best way to encode sequential values using color is to vary color intensity, especially through variations of lightness, from light to dark. This can be done by varying the intensity of a single hue or by varying hue to some degree as well, as shown in the example to the right, as long as you differentiate the colors primarily by intensity as well.

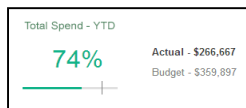
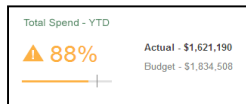
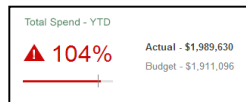
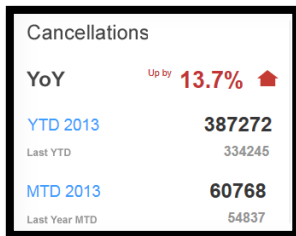
The color scale could be used to encode a single sequential series of values, from the lowest value at the bottom to the highest at the top. Notice that the color scale in the middle consists of two distinct hues (red in the upper half and blue in the lower half). The different expressions of each of these hues vary sequentially. The blue increase in intensity as they proceed downwards, and the reds increase in intensity as they proceed upwards. This is an example of a **diverging scale**, which is one that has a breakpoint somewhere in the middle, with one set of values that proceeds upwards and one that proceeds downwards from that breakpoint. A typical example of values that a **diverging color scale** can encode is a set that consists of both *positive* and *negative* values, with zero as the breakpoint in the middle. Another example might be values that are above the norm (for example, above average) and those that are below the norm. Use **color** to *encode* the data.

Different colors carry different weights. When you design a document, color saturation is an important consideration. Colors can be considered saturated or desaturated. Saturated colors are the most rich, vibrant, bright versions of a color. Saturated colors like deep red, bright orange, or yellow carry more weight than off white or sky blue. Saturated colors are normally used for emphasis and to highlight content that needs to grab the user's attention.

Lighter colors are used for backgrounds and bigger areas. You can guide users to look where you want them to look through the proper use of color in your reporting design.

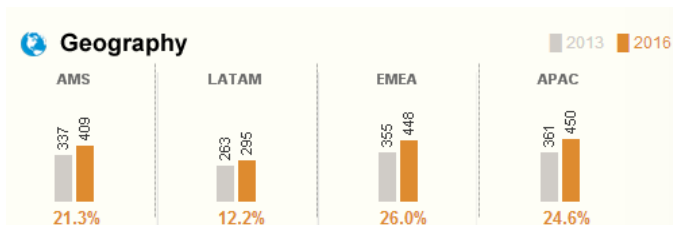


Use **Color** to Highlight and Emphasize



#### 4.8.3 Repetition

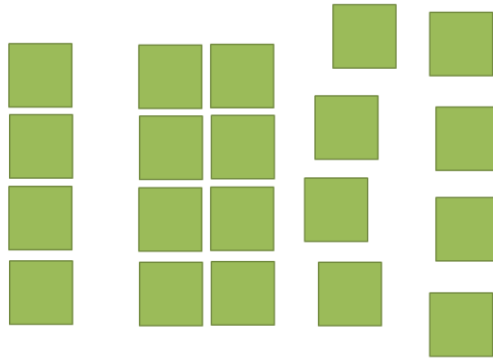
Repetition helps in communicating that the repeated elements are at the same level of design.



#### 4.8.4 Alignment

Alignment, like contrast, helps differentiate information at different levels and helps break the content into segments for easy detection. The Gestalt system's rule of proximity<sup>1</sup> explains that the human mind perceives objects placed close to each other as a group. Having that in mind, you can create groups of information by simply positioning the objects without the need of any other graphical elements such as borders or frames.

<sup>1</sup>[http://en.wikipedia.org/wiki/Gestalt\\_psychology](http://en.wikipedia.org/wiki/Gestalt_psychology)



#### 4.8.5 Size

Size plays a big role in defining the topics which need to be highlighted like the heading of the page, KPI's, or important charts, and plays an important role in helping the user focus on the most meaningful information.



## 5 Advanced Reporting User Story

### Objectives

- Understand the value of defining User Stories and User Roles
- Demonstrate the benefits of using Advanced Reporting to analyze and resolve customer issues

Now that we have covered the basics, it is time to identify the benefits of utilizing the Advanced Reporting tool to create a user story and define user roles within these stories. In this chapter, our goal is to demonstrate one particular user story that will help to understand a typical customer issue. Through visualizations created in the Advanced Reporting tool we will be able to provide analysis and updates that will clarify answers to typical customer questions.

### 5.1 User stories

User stories can be built based on the powerful capabilities of the Advanced Reporting tool using real life customer issues accumulated over various industries. You will be educated in one sample user story and case study. If you are interested in examining other user stories, they will be provided in Basic Sales Module covering a few different types of scenarios emulating real customer issues that have been resolved using the Advanced Reporting tool with clear, flexible and robust visualizations.

Customer requirements are formulated as so-called user stories. A user story is a simple statement about what a user wants to do with a feature in the application, written from a user's perspective—an alternative to writing lengthy requirement specifications up front. A user story must not use technical jargon or state design goals. User stories must be written in business language that is understandable to all. The purpose of the user story is to create an organized flow to your app and have a clearly defined user roles who will benefit from using the app to answer questions. It also helps to define the type of analysis results the end user may find from this app. As a guide, they can follow this basic construct:

**As a [user role], I want to [goal], so I can [reason]**



## Activity 5.1: Reporting Dashboard – Sales by City, Job Type and Customer

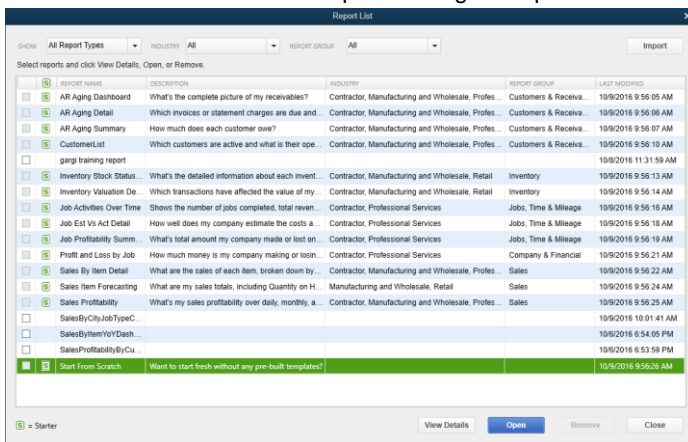
### Challenge

Now that we've worked through understanding the components of a basic app and created list boxes, added basic visualizations and charts, looked at modifying properties of sheet objects and examined the basic definitions of dimensions and measures, we will be able to create a more advanced report that will take this to a more industry specific app. We have also learned to apply proper design methodology in Chapter 4. We are now prepared to create a cohesive, flexible and robust app using what we have learned from the previous chapters and bring it all together in a user story.

Create an interactive dashboard that allows you to explore how different cities, job types, and customers are performing together.

### Step by Step

21. From the Advanced Reporting page, click on the **Report List**.
22. Select **Start From Scratch** template to begin a report from scratch.



23. In the Library click on **Text & Utility**.
24. Double click to add the following:
  1. *Current Selection*
  2. *Report Title*
5. Right click on the **Report Title** and select *Properties*.
6. In the **General** tab, enter "Sales by City, Job Type and Customer Dashboard". If the entire title does not display and shows ellipses, right click on the title, select

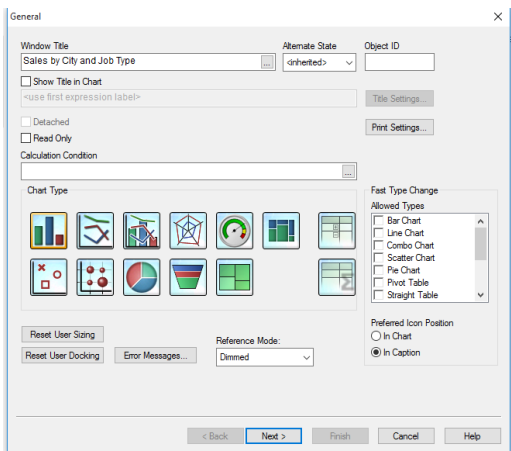
**Properties** and go to the **Layout** tab. Go to **Border Width** and change to *1 pt.* Now you can adjust the size of the border window to see the whole title. Extend it out, go back to **Properties** and **Layout** and change back the Border Width to 0 if you do not want to see a border framing the title.

7. In the **Library**, click on **Date** and then double-click on **Transaction** to add that date to the sheet. The date elements added are *Year, Month and Quarter.*
8. Before adding any sheet objects, let's go to the **Library** on the left hand side and under **Text & Utility** let's add a **Current Selection** box. This will display inside the Current Selections box, all the items we are selecting.
9. Now, let's add some *sheet objects*. We will add a stacked **bar chart**, a **pivot table** and a **pie chart**.

## Bar Chart

### Step by Step

1. Right click on the sheet and select **New Sheet Object -> Chart**.
2. Go to the **Window Title** and type in "Sales by City and Job Type". Deselect "Show Title in Chart".



3. Select the bar chart option from the **Chart Type** selections. Click **Next**.
4. In the **Dimensions** dialog box, go to **Show Fields from Table** and select the **Transactions** table. If there are many tables, this narrows the search to a limited number of fields within one table.
5. Pick the dimension, **Transactions.Bill Address City** from the *Available Fields/Group* list of dimensions and add it to the *Used Dimensions* box on the

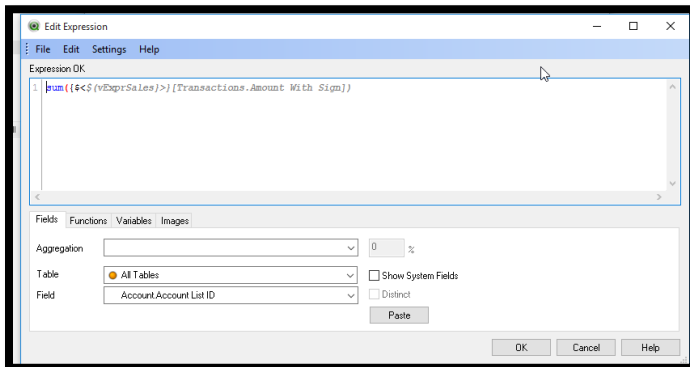
right hand side. **NOTE:** There is a **Transactions.Address City** too. Picking this will not generate any data.

6. From the *Show Fields from Table* box, select *All Tables*.
7. Now pick the dimension, **JobType.Full Name** from the *Available Fields/Group* list and add it to the *Used Dimensions* box on the right hand side. Click **Next**.
8. The **Expression Editor** dialog box shows up. Using the `<$(vExprSales)>` modifier in the set expression filters the data for **Transactions.Amount With Sign** that are non-pending sales transactions, where **Transactions.Account Type** is also set to 'Income' and **Transactions.Txn Type** is set for either 'Invoice', 'Sales Receipt', 'Credit Memo', 'Charge' or 'ARRefund'.

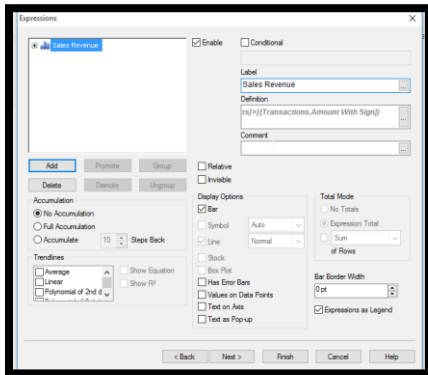
Type in the following for the expression:

***Sum(<\$(vExprSales)>[Transactions. Amount With Sign])***

**NOTE:** In the above expression the aggregation function “Sum” is not case sensitive. In fact all the aggregation functions (avg, min, max, sum, count) are not case sensitive. However, the **field names** such as **Transactions.Amount With Sign** has to be spelled exactly the way it has been brought in from the table. Also if there are spaces in the field name, it is best to surround the name in square brackets.

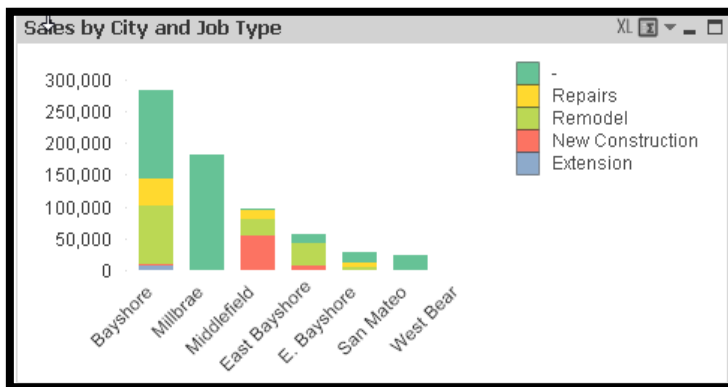


9. Click **OK**. Enter *Sales Revenue* in **Label**.



10. Click **Next** to go to the **Sort** tab. Uncheck **State**.
11. Check **Expression**. Select *Descending*. Click on the ellipsis and type the following in the expression editor:  

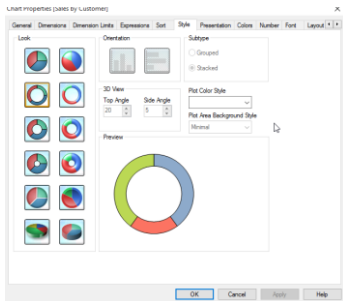
$$\text{sum}(\{<\$(vExprSales)>\}[Transactions.Amount With Sign])$$
12. Click **Next**.
13. Go to the **Style** tab and select *Stacked*.
14. Click **Next** twice and in the **Axes** tab select *Primary Dimension Labels* to be 'I' for the **Dimension Axis**. Click **Finish** to complete your chart.



## Pie Chart

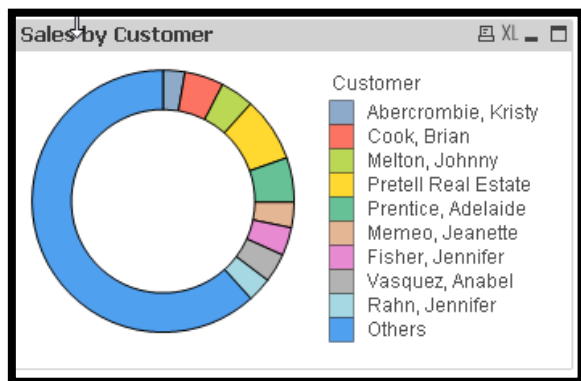
### Step by Step

1. Simplify the steps a bit by cloning the bar chart in order to create a pie chart.
2. Right click on the *Bar Chart* and click **Clone**.
3. Click in the header area to move the cloned bar chart to an open area or if you are having trouble moving it, hold the **Alt** key down and drag the cloned bar chart from anywhere.
4. Right click on the cloned bar chart and select **Properties**.
5. In the **General** tab enter "Sales by Customer" in the *Window Title*.
6. Click the **Pie Chart** under the **Chart Type** area. Since this is a clone of the bar chart, there is no NEXT button. You just click on the tabs to make changes.
7. In the **Dimensions** tab, remove the existing dimensions and add the following dimensions: **Customer.Parent Full Name** and label it **Customer**. Select **Suppress When Value is Null**.
8. In the **Dimension Limits** tab, click *Restrict which values are displayed using the first expression* and show only the largest **10**.
9. In the **Style** tab, pick a donut style for your pie chart (second one from top on the left hand column).



10. In the **Number** tab, select **Sales Revenue** and set *Money* as the **Number** Format.
11. Click **OK** to see your completed pie chart.

### Solution



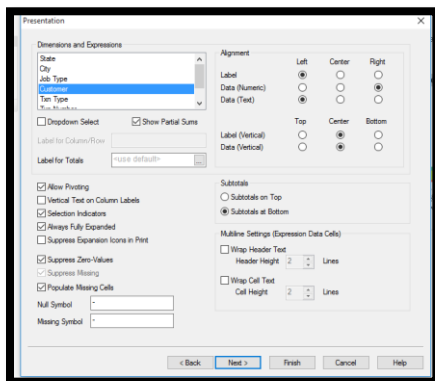
**Figure: Pie Chart**

## Pivot Table

### Step by Step

1. Right click on an empty space on the sheet and click **New Sheet Object > Chart**.
2. In the **General** tab, enter *Sales Revenue* for the *Window Title*.
3. Select **Pivot Table** under **Chart Type**.
4. Click **Next**.
5. In the **Dimensions** window, pick the following dimensions and label it according to the labels specified below:
  - a. **Transactions.Bill Address State**, Label: **State**
  - b. **Transactions.Bill Address City**, Label: **City**
  - c. **Job Type.Full Name**, Label: **Job Type**
  - d. **Customer.Parent Full Name**, Label: **Customer**
  - e. **Transactions.Txn Type**, Label: **Txn Type**
  - f. **Transactions.Ref Number**, Label: **Txn Number**
6. For all of the above dimensions, make sure to select *Suppress When Value is Null*.
7. Click **Next**.
8. In the **Expressions** editor add the following:  

$$\text{Sum}(\{<\$(vExprSales)>\}[Transactions. Amount With Sign])$$
9. Click **OK**. Enter *Sales Revenue* in **Label**.
10. Click **Next** twice to go to the **Presentation** tab.
11. Check *Always Fully Expanded* check box. This applies to all *Dimensions* and *Expressions*.
12. Select **Customer** in the **Dimensions** and **Expressions** list and check **Show Partial Sums**.



13. Click **Next** three times to go to the **Number** tab.
14. Under **Number** format Settings select *Money*.
15. You can **pivot** on a certain column for a different perspective. Click on the header of the column you want to pivot until you see a vertical arrow. Drag the arrow to the right and move up horizontally. This motion is a smooth motion from left to right and then up.

## Solution

State	City	Job Type	Customer	Txn Type	Txn Number	Sales Revenue
CA	Bayshore	Extension	Baker, Chris	Invoice	1049	\$5,989.85
			Total			\$5,989.85
		New Construction	Balak, Mike	Invoice	1022	\$1,999.00
			Overfield, David	Invoice	1027	\$1,999.00
			Total			\$3,998.00
		Remodel	Abercrombie, Kristy	Credit Memo	4002	(\$660.00)
					1043	\$1,237.00
				Invoice	1044	(\$37.20)
					1084	\$2,887.50
					1091	\$4,522.00
			Burch, Jason	Sales Receipt	1100	\$3,394.00
					3004	\$1,017.50
				3006	\$743.75	
			Freeman, Kirby	Invoice	1063	\$5,768.40
					1083	\$1,005.00
				1015	\$1,844.07	
			1016	\$1,844.07		

**Figure: Pivot Table**



## 5.2 Enhancing your Sheet

### Activity 5.2: Adding List Boxes

#### Step by Step

1. Right now you cannot make a more granular analysis since you have no way of specifically choosing a **customer** or **job type**.
2. We will create **list boxes** which will act as *filters* for selections you make and update your charts and visualizations to reflect those filters.
3. Right click on an empty space on the sheet and choose **Select Fields**.
4. Select from the *Available Fields* the field **Customer.Parent Full Name** and **Job Type.Full Name**.
5. To pick another field called **Transactions.Bill Address City**, right click on an empty space on the sheet and choose *Select Fields*. This time you will filter the table you are searching on.
6. Choose the **Transactions** table from *Show Fields from Table*.
7. Select **Transactions.Bill Address City** from the list under *Available Fields*.
8. Notice the list boxes pictured below may not have such user friendly names. You can change the name to a more user friendly name like “City” for **Transactions.Bill Address City** or “Customer” for **Customer.Parent Full Name** and “Job Type” for **Job Type.Full Name**.
9. We can change the look and feel by right clicking on each of the list boxes, going to **Properties** and in the **Title** box under the **General** tab, change the names to the ones listed in step 8.
10. The list boxes will now look like this:



## Activity 5.3: Enhancing the Bar Chart

### Challenge

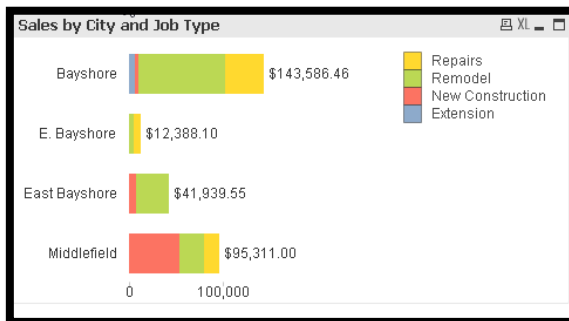
Sometimes the visualizations will show skewed data or data that has dashes in the values. These generally show up when there are null values that need to be taken out of the dimension values or expression values. If you look at the bar chart that was added in Activity 5.1, you see that under the **Job Type.Full Name** legend, there is a dash. That is due to null values present in that field value for **Job Type.Full Name**.

Let's go ahead and *suppress the null values*. Also, make the chart more appealing in appearance.

### Step by Step

1. Right click on the *Sales City by Job Type* bar chart.
2. Go to the **Dimensions** tab and click on **Job Type.Full Name** under the **Used Dimensions** box and check off the box for **Suppress When Value is Null**.
3. In the Dimensions tab, uncheck the Label box for both **Job Type.Full Name** and **Transactions.Bill Address City**.
4. Under the **Style** tab change the orientation to *Horizontal*.
5. In the **Expressions** tab, check off the box for **Values on Data Points**.
6. In the **Number** tab, select the *Sales Revenue* and pick the radio button for **Money** to put this in the correct format.

### Solution



## Activity 5.4: Adding Fast Type Change to the Bar Chart

### Challenge

In this activity, we will show an interesting feature of Advanced Reporting tool that will allow you to use your space efficiently to show visualizations in limited space but communicating data in multiple ways. For instance, perhaps a Finance Manager in your company likes to see the data and numbers in a table format but your Creative Business Analyst and Designer enjoys a representation that is more visual. We can please both audiences by using a convenient setting called Fast Type Change which is found in the General tab adjacent to the Chart Type selections.

### Step by Step

1. In this activity, please go to the “Sales by City and Job Type” bar chart created earlier and right click on it and select Properties.
2. In the **General** tab, over to the right side is a box called **Fast Type Change**.
3. Click on the box for the original chart type, **Bar chart** and check off the box for the **Straight Table**.
4. Select the **Preferred Icon Position** to be *In Caption*. You could have selected *In Chart* as well. This places a **Fast Type Change** icon in the caption area or the chart area depending on your selection.
5. Additionally, if a user does not have the ability to access *Advanced Reporting* but wants to see the data, you can add a **Send To Excel** icon in the caption area by going to **Properties>Caption** and under the *Special Icons* box check off **Menu** and **Send to Excel**. This will allow you to send the data to Excel when you click on the **XL** icon in the caption.
6. Click **OK**. Now you can toggle between the bar chart and the straight table.

**NOTE:** In **Fast Type Change** box, you have to check off the original chart type that was created and then you can check off other chart types. This will now toggle amongst the chart types selected and present several visualizations in one area saving space.

Solution



## 6 Advanced Reporting with Filters, Sheet Objects and Navigation

### Objectives

- Create **sheet(s)** and define **sheet properties**.
- Explain how to create a consistent **navigation** menu with **list boxes**, multi boxes, and the search object.
- Identify how to present **current selections**.
- Identify when and where to use **actions** in *Advanced Reporting*.

### 6.1 Sheets and sheet objects

An *Advanced Reporting* document can have one or several sheets on which the sheet objects are placed. Within each sheet, it may contain its own sheet objects. If two fields are logically connected, it does not matter if the references to these fields are placed on the same sheet or on different sheets. The logical result when making selections is still the same.

Each **sheet** has a **tab** attached to it containing the name of the sheet. The tab helps you find the sheet you are looking for. By clicking on a **tab**, you activate the sheet attached to it. You recognize an **active tab** from the bold text and its 3-dimensionality. When there is only one **sheet**, a sheet tab is not displayed.

**NOTE:** In the *Advanced Reporting* environment for this course work, 1-3 sheets will be created. The sheet objects placed on multiple sheets may require more RAM for processing the data efficiently and may cause performance degradation as multiple sheets are added with several sheet objects within each of these sheets. In order to keep it at optimum performance, a maximum of 3 sheets is suggested. However for the purposes of demonstration we will create more than 3 sheets so we do not have to maneuver from one report to another.

### 6.2 Sheet properties

You set the *sheet properties* by right clicking in an empty space on the sheet and selecting **Properties** from the menu. The resulting **tabs** will allow you to make changes to the sheets. For instance, under the **Objects** tab you can delete the specific sheet object or view the properties of a specific sheet object. You can also access Sheet Properties by using the keyboard combination **Ctrl+Alt+S**.

#### 6.2.1 General tab

Control settings for the sheet are found on the **General** tab of the **Sheet Properties** dialog. Sheet settings include *Title*, *Background color*, and *Background image*.

### 6.2.2 Fields tab

On this tab, you decide what fields to display as list boxes on the sheet.

### 6.2.3 Objects tab

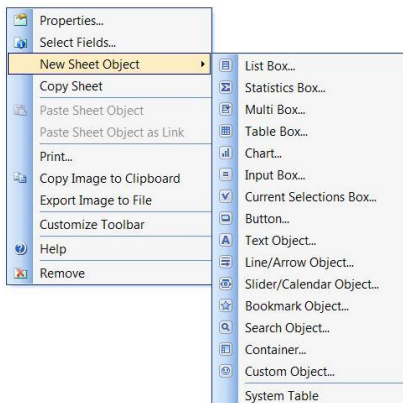
This tab contains a list of all sheet objects on the current sheet. You may delete the sheet objects from here or view their properties.

### 6.2.4 Security tab

This tab is useful for documents with access restriction. By deselecting an option in the list, the ADMIN user inactivates that particular command or function, thus preventing undesired changes. The Security tab is not available for people with USER privileges.

## 6.3 Sheet objects

Sheet objects include all the various types of objects available to you when working with *Advanced Reporting*. Sheet objects are any charts, list boxes, buttons, search box, tables or generally anything you place on a sheet. A sheet object will also have an object ID associated with it. If you go to the **Properties->General** tab, you will find the Object ID on the right hand side. Most of these objects are covered in this course. The following displays a screen shot of the **New Sheet Object** menu, which is activated when you right-click in an empty area of the sheet and select **New Sheet Object**. This will give you the ability to pick different sheet objects you can place on the current sheet from list boxes, to a search object to charts of various types as well as a current selections box which is extremely important for a great design in the reporting structure.



## 6.4 A consistent navigation menu

By now, you have loaded the data and verified that the data is correct. First, you create the sheets, define sheet backgrounds, and arrange the order of the sheets in a logical order. Then, you create the basic objects for filters and navigation and place them on the sheets.

## 6.5 Filters (current selections, list box, multi box, search object)

Part of creating a consistent navigation is building a design framework using list boxes, current selections box, search object and including other objects you may want to place on every sheet to deliver a consistent look and feel for navigating from one area to another easily. In this section, you design an overall framework for the application that allows users to filter the data and navigate through the application and selections.

You learn how to:

- Create, and align list boxes
- Design list boxes that are optimized for displaying a calendar
- Combine several fields in a multi box
- Configure a search box
- Configure Current Selection

## 6.6 Keyboard Combinations for Report Properties

There are several key combinations that will allow you to change the properties of the document, the sheet and create/define/remove variables. It is important to memorize these keyboard combinations as they may not be found in any menu or tabs on the reporting page.

### 6.6.1 Sheet Properties

**Sheet Properties** may be accessed by using **Ctrl+Alt+S**. With this dialog box, you can customize the background for one specific sheet to be different than the background for others. You can delete sheet objects by going to the Objects tab.

### 6.6.2 Variable Overview

**Variable Overview** dialog box may be accessed by using **Ctrl+Alt+V**. This gives you the variable name, the definition of the variable and allows you to create new ones and remove any old ones you have no need to keep in your report.

### 6.6.3 Document Properties

**Document Properties** may be accessed by using **Ctrl+Alt+D**. Sometimes you need to click in an open area of the sheet first before the keyboard combination works.

This dialog box allows you to change the properties uniformly across the whole reporting document. For instance, if on all the sheets in the report you wanted to change the Sales format to Money, you can generically set that up in Document Properties.



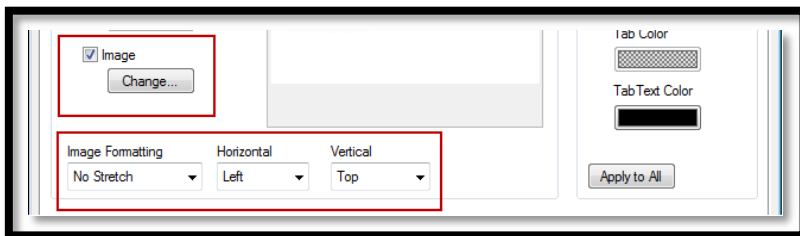
## Activity 6.1: Sheet Basics

### Step-by-step

1. Build a report from scratch by going to Report List and selecting “Start from Scratch” and click **Open**.
2. A blank report opens with the Library panel on the left hand side. Go to the **Text & Utility** section and double click on **Report Title**.
3. Right click on the Report Title and go to Properties->General tab. In the Text box type the report title as “Customer Transactions”.
4. Save this report by going to the **Save As** button at the bottom right corner and giving it a name: “Customer Transactions”. This will have the file extension of **.qvr**. You have now created a report file called **Customer Transactions.qvr**.

#### Place a background image on the sheet

5. Right-click the sheet, and then select **Properties or Ctrl+Alt+S will bring up the Sheet Properties dialog box as well**. The **Sheet Properties** dialog opens.
6. On the **General** tab, select **Sheet Settings** in the **Background** area.
7. Select **Image** checkbox and check it off and then click **Change**.
8. Locate the folder where you have stored your image file and then select **background\_with\_header\_line.jpg**. Click **Open**.
9. Under **Image Formatting**, select **No Stretch**.
10. Under **Horizontal**, select **Left** and under **Vertical**, select **Top**.



11. Click **OK**.

#### Add a Text Box to Display an Image on the current sheet

1. Right Click in an empty area of the sheet and select **New Sheet Object->Text Object**.
2. Under **Representation** select **Image**.
3. Under **Background**, select the radio button for **Image** and click on the **Change** button.
4. Select **QuickBooks-Logo-Vertical-RGB\_(2).png** graphic and place at the top right corner by dragging and dropping in place. Click **Open**.
5. Under the **Layout** tab, change border width to **1 pt**.



6. If the image has a border it makes it easier to move and resize. If you can't move it , use the **Alt** button and when you see the cross, drag the image to a location of your choice.



## Activity 6.2: Create and align list boxes for navigation

### Challenge

Build a consistent navigation that allows the user to filter and navigate the data easily across one or more sheets. Choose list boxes appropriately so that you can filter on data that will be represented in your charts and tables on the sheets.

### Hints

Create the following list boxes on the sheet. You can create a list box by going to **New Sheet Object->List Box**, but this will create only one list box at a time. Remember, a quick way to create several list boxes simultaneously is to use the **Select Fields** command by right clicking in an empty area of the sheet. This takes you to the **Fields** tab in **Sheet Properties**.

- *Item.Full Name*
- *Account.Full Name*
- *Transactions.Customer Full Name*
- *Transactions.Account Type*

Align the boxes and place them on the left hand side of the sheet

### Remember

Some keyboard shortcuts will allow you to move the list boxes in several directions by 1 or 10 pixels.

**Ctrl+Arrow:** move 1 pixel

**Ctrl+Shift+Arrow:** move 10 pixels

### Step by Step

1. Right click and choose **Select Fields** from the menu.
2. There are a couple of ways to choose list boxes.
3. The first one is to pick the actual field from the left hand side and add it to the right hand side by double clicking on the field or clicking on the Add button. The other method is to limit the number of fields by choosing a specific table from the **Show Fields from Table** box.
4. Select the **Transactions** table from the **Show Fields from Table Box**.
5. Choose **Transactions.Customer Full Name** and **Transactions.Account Type**. Click on the **Add** button to add these to the **Fields Displayed in Listboxes**.
6. Then select *All Tables* from the **Show Fields from Table** box.

7. Now select the fields **Account.Full Name** and **Item.Full Name** and add them to the **Fields Displayed in Listboxes** area.
8. If you want to remove a field you did not want from the **Fields Displayed in Listboxes** area, just click on the field name and click **Remove**.
9. Click on **OK**.
10. The list boxes are all sitting on top of each other on the top left corner of the sheet.
11. Drag these list boxes to fit on the left hand side and use the handles to resize to the list boxes to the size you want so they all fit neatly on the left hand side of the sheet together vertically.
12. You can also make selections in these list boxes to see how the green-white-gray principle works.
13. You can also give the list boxes much more user friendly names.

### Change titles of list boxes

Some of the field names need to be renamed in order to make them more comprehensible for your business users.

Right-click the **Item.Full Name** list box, and select **Properties**.

On the **General** tab, type *Item Name* for **Title**.

Repeat the procedure and rename the list box titles for:

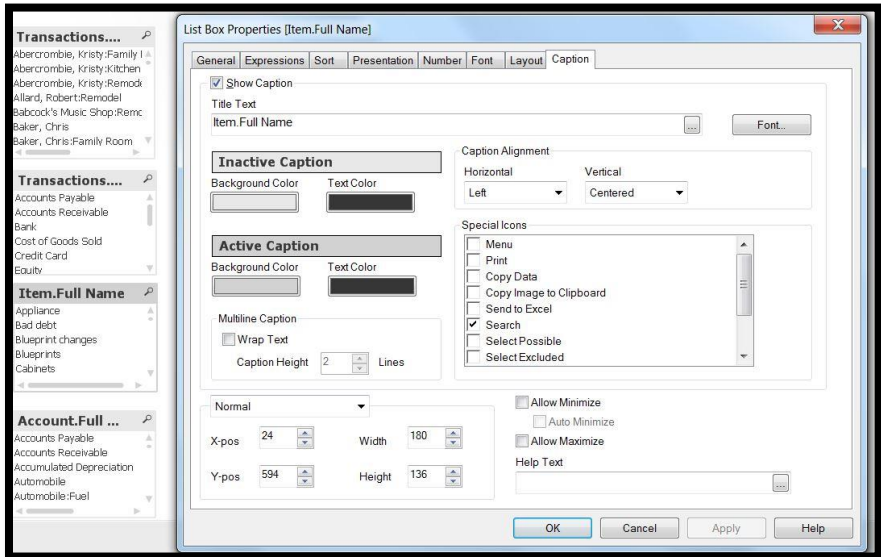
- *Account.Full Name* to *Account Name*
- *Transactions.Customer Full Name* to *Customer Name*
- *Transactions.Account Type* to *Account Type*

14. If the list boxes are still not aligned perfectly you can use a technique called **Pixel Perfect** shown below.

## Pixel perfect

To do this, go to the list box, right click, select **Properties** and go to the **Captions** tab. Setting the **X-pos**, **Y-pos**, **Width** and **Height** allows sheet objects to be aligned just right according to your requirements on the sheet. Some calculations need to be made in advance to get the objects to align exactly as you want on the sheet.

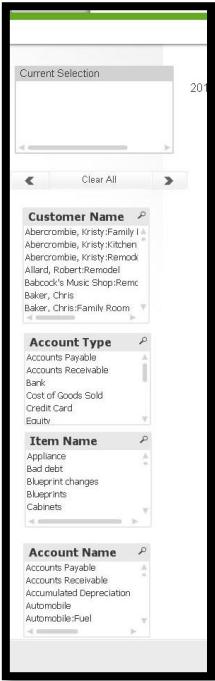
The following illustration shows the position of the **Item.Full Name** list box on the top.



## Current Selections Box

1. Finally add a **Current Selections** box from the **Text & Utility** section of the **Library** panel to the left hand side navigation above your list boxes so you can see the selections you make and delete them if necessary.
2. To delete the selections from the list boxes, click on the eraser icon next to the selections inside of the **Current Selections** box or pick the **Clear All** button below the **Current Selections** box to clear all selections at once.

Solution



## Activity 6.3: Create a calendar

### Challenge

You need to show date fields, such as *Year*, *Quarter*, and *Month*, in order to provide filters for time dimensions throughout the application. The type of boxes you have just created consume much screen real estate; therefore, you need to design the list boxes for the calendar differently.

### Hints

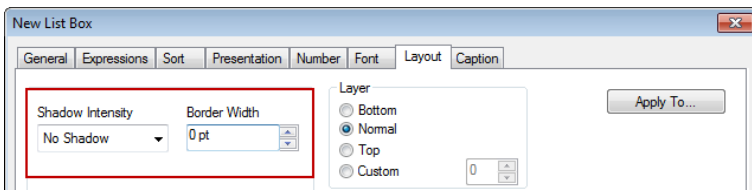
You can configure a list box so that the values are shown in several columns and the list box has a horizontal orientation. Create single row list boxes for *Year*, *Quarter*, and *Month* on the sheet. Or you can simply use the pre-defined Dates created in the Library Panel. Both methods will be demonstrated.

### Step-by-step

1. Right-click the sheet and choose **Select Fields->General** tab.
2. Under the Available Fields section, type the letter 'Y' and it takes you to the field 'Year' directly.
3. Do not delete the other fields listed under the **Fields Displayed in Listboxes** box as it will delete these list boxes from the sheet that were previously added.
4. Now trying to move the handles in the Year list box will only move it up and down and present a scroll bar, but does not move horizontally.
5. On the **Presentation** tab, clear **Single Column**.




6. In the **Layout** tab, set **Border Width** to 1 pt so you can move the Year list box easily and then readjust the border to 0 later.



7. In the **Caption** tab, clear **Show Caption**. Use the handles to resize it to one single row for the Year

2013	2015
2014	2016



8. Or you can double click on **Transaction** from under the **Date** category in the *Library* panel and it will automatically add *Year*, *Month* and *Quarter* and the text “*Transaction Date*” in one step.

### Create list boxes for quarter and month

9. Right-click on the sheet and pick **Select Fields**. Now you can pick both *Month* and *Quarter* by holding the Ctrl key down and picking both from the Available Fields box and adding them to the right hand side.
10. Repeat the steps 5 through 7 to change the appearance of the list boxes for *Month* and *Quarter*.
11. If you have trouble moving any of these list boxes, first try and hold the Alt key until you see a clear cross and then drag the boxes around to the location desired. **NOTE:** Using a *Border Width* of 1 set in the **Layout** tab helps to move the boxes as well.
12. Arrange the list boxes as shown in the following figure below:

Transaction Date																		
2018	2019	2020	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Q1	Q2	Q3	Q4



## Activity 6.4: Create a Navigation Box

### Challenge

You need to provide users feedback on their current selections on all sheets throughout the entire application. Use the navigation box and align it with the list boxes you have created on the same sheet. The **Navigation Box** or **Current Selections Box** is a good object to have on every sheet in your report as it displays what the user/customer has selected in the list boxes for filtering.

### Hints

Start with creating a **Current Selections** box. There are two ways to do this. Both methods will be demonstrated.

### Step-by-step

#### Method 1:

1. From the **Layout** view, select **New Sheet Object**, and then **Current Selections Box**.
2. Click **OK**.
3. Place the **Current Selections Box** above the list boxes.
4. Using this method will require that you add the buttons for *Back*, *Forward* and *Clear All* separately.

#### Method 2:

1. Go to the Library panel on the left hand side and double click **Current Selections** under the **Text & Utility** section to add it to the sheet.
2. You can position this above the list boxes. Notice that buttons for *Back*, *Forward* and *Clear All* are provided underneath the **Current Selections** box without having to create them individually as in the first method.
3. Always try to position the **Current Selections** box in a prominent position, usually top left since it is an important component of good design.




**NOTE:** Moving this box may be hard so either use *Pixel Perfect* to position the **Current Selections** box or use the **Alt** key.

## Activity 6.5: Create Navigation Buttons

Place the navigation buttons underneath the **Current Selections** box. The images for the navigation buttons are in the **Images** folder. Clicking the left arrow button takes the user back one step in navigation, clicking the Clear Selection button clears all selections, clicking the right arrow button takes the user one step forward. Create these buttons **ONLY** if you did not double click on **Current Selections** from the **Text & Utility** section of the **Library** panel to add a **Current Selections** box.

### Hints

Use the button object and actions to configure the navigation buttons. Use the following images for the buttons and apply the actions as shown in the following table:

Image	Image name	Action
	icon_back.png	Selection/Back
	clear_selections.png	Selection/Clear All
	icon_forward.png	Selection/Forward

### Step-by-step:

#### Back button

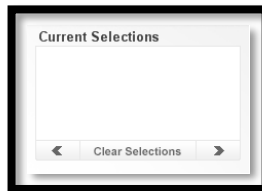
1. Right-click the sheet, and select **New Sheet Object->Button**.
2. The **New Button Object** dialog opens.
4. On the **General** tab, under **Background**, select *Image*.
5. Select **Single Image**.
6. Click **Select Image**. The **Select Image** dialog opens. Navigate to the folder where the images reside for your company files and then select the image for the back button. This is the **icon\_back.png** file.
7. Click **Open**.
8. Select the **Actions** tab.
9. Click **Add**. The **Add Action** dialog displays.
10. Under **Action Type**, select *Selection*, and under **Action**, select *Back*.
11. Click **OK** twice.

### Forward button

1. Follow steps 1-5 as you have done for adding the **Back** button.
2. Click **Select Image**. The **Select Image** dialog opens. Navigate to the folder where the images reside for your company files and then select the image for the back button. This is the **icon\_forward.png** file.
3. Click **Open**.
4. Select the **Actions** tab.
5. Click **Add**. The **Add Action** dialog displays.
6. Under **Action Type**, select *Selection*, and under **Action**, select *Forward*.
7. Click **OK** twice.

### Clear button

8. Follow steps 1-5 as you have done for adding the **Back** button.
9. Click **Select Image**. The **Select Image** dialog opens. Navigate to the folder where the images reside for your company files and then select the image for the back button. This is the **clear\_selections.png** file.
10. Click **Open**.
11. Select the **Actions** tab.
12. Click **Add**. The **Add Action** dialog displays.
13. Under **Action Type**, select *Selection*, and under **Action**, select *Clear All*.
14. Click **OK** twice.



## Activity 6.6: Search object

### Challenge

You need to provide search functionality for use anywhere in the application.

### Hints

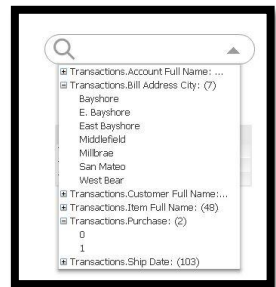
Create a search object and define the following fields as searchable:

- *Transactions.Account Full Name*
- *Transactions.Customer Full Name*
- *Transactions.Item Full Name*
- *Transactions.Purchase*
- *Transactions.Ship Date*
- *Transactions.Bill Address City*

In the **Presentation** tab, under **Visual Style/Appearance**, choose *Rounded*.

### Step-by-step

1. Right-click the sheet, and select **New Sheet Object**, and then select **Search Object**.
2. The **Search Object** dialog opens.
3. On the **General** tab, under **Search In**, select **Selected Fields** radio button.
4. Select the following fields:
  - *Transactions.Account Full Name*
  - *Transactions.Customer Full Name*
  - *Transactions.Item Full Name*
  - *Transactions.Purchase*
  - *Transactions.Ship Date*
  - *Transactions.Bill Address City*
5. In the **Presentation** tab, under **Visual Style and Appearance**, choose *Rounded*. Click **OK**.
6. Place the **search box** below the graphic for **QuickBooks** on the right hand side. Notice there is a downward pointing arrow. Click on this to see all the categories selected to be placed in the search object.



## Activity 6.7: Create Multiple Sheets with Consistent Navigation

### Challenge:

As you learned in previous lessons, you need to structure how the information is displayed on a top level.

Do not fragment information that belongs together. Keep everything relevant within human eye span on a single screen. If the user has to flip between sheets for an answer, there is a risk that information is lost while the user is navigating between the sheets.

Find the right balance between keeping coherent stories together without overloading the sheets. *Advanced Reporting* supports an iterative design process. It is likely that you need to move or change sheets at a later state. Remember, any object you create can be moved on whatever sheet you have created.

### Hints

Consolidate the business plan and define coherent chunks of information. You have loaded dimensional data about *Customers*, *Item Lists* and *Transaction Data*. How many sheets do you recommend?

Our solution is based on several sheets but as you may have much more data in your reports, it is best to stick to about 3 sheets in your reports for optimum performance. Our reporting structure is based on using 6-7 sheets total to demonstrate some of the important features and components of *Advanced Reporting* that will be used. For now we'll start out creating the following three listed below:

- Dashboard
- Customer Details
- Product Details

### Step-by-step

#### Create multiple sheets:

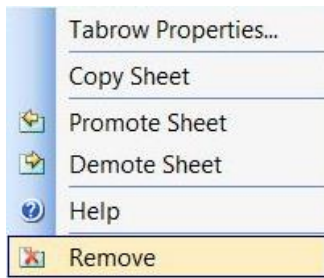
1. **Currently we have not named the sheet we have been working on.**
2. **Right click in an empty area of the sheet and select Copy Sheet. Now you see two tabs. Both sheets, the blank and the 'Copy Of' have the same exact sheet objects on them.**
3. **Click on the first tab so it appears 3 dimensional.**
4. **Right click on it, go to Sheet Properties->General and name the sheet.**
5. **Name the first sheet Dashboard.**
6. **Go to the sheet named 'Copy Of', right click it, go to Sheet Properties and the General tab and name this one Customer Details.**

- To add another sheet, right click on the tab with the **Customer Details** title and select **Copy Sheet**. This will create another tab with the title **Copy of Customer Details**. Right click on the tab and go to **Sheet Properties** and **General** tab to name this sheet **Product Details** in the title box.

### Remove a sheet

You can now remove any sheet by right clicking on the sheet tab and selecting *Remove* from the drop down menu.

**NOTE:** When copying sheets, make sure you delete any sheet objects from the original sheet that were replicated into the copied sheets that you do not need. Right click on an empty area of the sheet, select **Properties**, go to the Objects tab and delete the appropriate sheet object.



### Move a sheet

You can rearrange the order of the sheets.

Right-click the tab, and then choose **Promote Sheet** or **Demote Sheet** until the sheets display as *Dashboard*, *Customer Details* and *Product Details*. Promoting a sheet will move it to the left, demoting a sheet will move it to the right.

Change the wallpaper image for the **Customer Details** and **Product Details** sheets. Click the **Customer Details** tab to activate this sheet. Then do the same for the **Product Details** sheet.

1. Right-click the sheet, and then select **Properties**. The **Sheet Properties** dialog opens.
2. On the **General** tab, select **Sheet Settings** in the **Background** area.
3. Select **Image**, and then click **Change**.
4. Locate the folder where your image has been placed and select **background\_with\_header\_navigation.png**.

Configure how the image is displayed on the sheet

5. Under **Image Formatting**, select *No Stretch*.
6. Under **Horizontal**, select *Left* and under **Vertical**, select *Top*.
7. Click **OK**.

You may wonder why the background image needed to be changed here since it didn't look much different than the one on the **Dashboard**. There is a gray vertical ombre band on the left hand side for the **Customer Details** and **Product Details** background image. This is where the list boxes and **Current Selections** box will be placed. The **Dashboard** may not have these list boxes in the long run for navigation and may look slightly different in appearance.

## Solution



## Activity 6.8: Create a multi box

### Challenge

List boxes are versatile objects that allow the user to make selections and give immediate response on how the data is connected. However, a drawback with list boxes is that they require much screen area.

Too many list boxes on the same sheet limit the space you need for charts and tables. The multi 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 without losing the overview.

### Hints

Create a multi box on the **Customer Details** sheet. Create a multi box showing the **Transactions.Customer Full Name, Transactions.Description, and Transactions.Billable Status** fields. Label the fields and arrange the multi box as shown in the following example:

### Step-by-step

1. On the **Customer Details** sheet, right-click the sheet and select **New Sheet Object** and then select **Multi Box**.
2. Go down to the **Show Fields from Table** box and pick the **Transactions** table.
3. On the **General** tab, under **Available Fields**, select the **Transactions.Customer Full Name, Transactions.Description, and Transactions.Billable Status** fields.
4. Click **Add**.
5. Place the **Multi Box** right below the **Search** box on the right hand side.

### Explore the multi box behavior

Select *Heather Campbell* in the **Transactions.Customer Full Name** field. It shows that Jennifer Fisher has multiple **Transactions.Descriptions**, but you cannot see them in one view unless you use the dropdown arrow to see the values. Same with the **Transactions.Billable Status** field. If you pick multiple customers you won't be able to see all the values for the other fields unless you use the drop down list to examine the values. **Multi-box** works best in a one to one lookup function capacity.



Solution

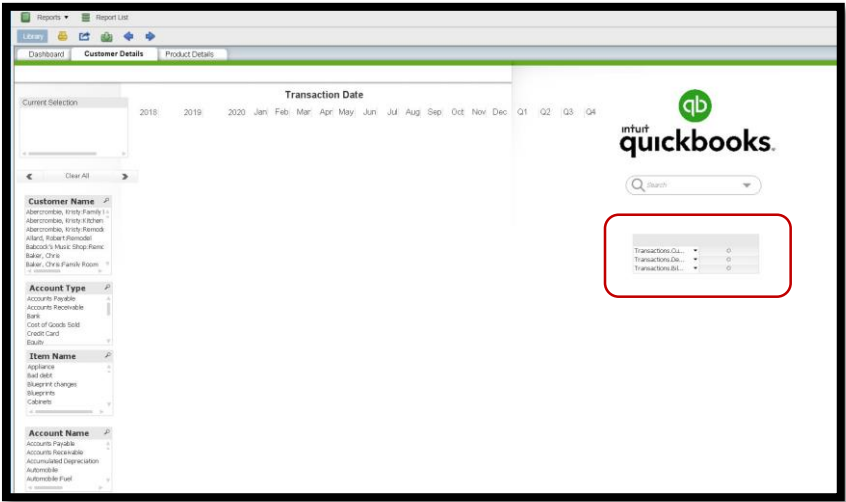


Figure: Completed Filters and Navigation

## 7 Discovering charts

### Objectives

- Explain what is meant by dimensions and expressions.
- Identify the best chart type to visually represent the type of data.
- Create and configure charts.
- Create container objects.

Charts and tables are **sheet objects** that can efficiently illustrate numbers. You can show monetary values distributed over different fields such as *year*, *month*, and *account number*. Charts, pivot tables, and straight tables are different methods of showing the same data. Hence, from here on, we simply refer to them as **charts**.

---

*Charts can thus be shown as bar charts, pie charts, scatter charts, line charts, combo charts (bar/ line), radar charts, grid charts, gauge charts, straight tables, pivot tables, or block charts.*

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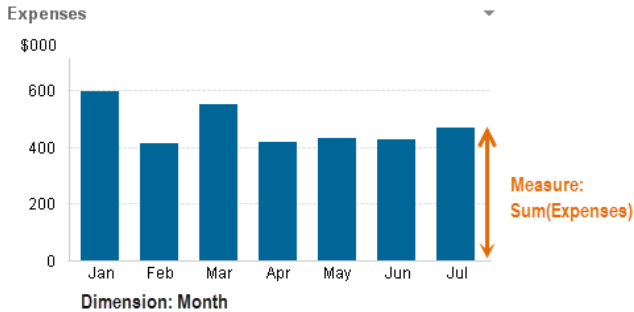
### 7.1 Dimensions and Measures

In order to create a chart in *Advanced Reporting*, you need to understand what **dimensions** and **expressions** are.

When you design a **chart**, ask yourself the question: “What do I want to show?” The answer is usually *Sales*, *Quantity*, or some other number. This is your expression, or, more correctly, your **measure**. In *Advanced Reporting*, we have traditionally called this an expression, but **measure** is really the correct word. (There are expressions that are not measures, for example, expressions used as labels, or as sort order definitions).

Then ask: “How many times should this be calculated? Per *what* do I want to show this measure?” The answer could be per month, per customer, per supplier, or something similar. This is your **Dimension**.

The following bar chart shows one bar per month. As a general rule there is one data point for each dimensional value in a chart.



## 7.2 Measures

A database or a report consists of thousands or millions of records that each contain a small piece of information. An expression is simply a calculation that is made over multiple records in this data set. The calculation always returns one single value that summarizes all relevant records. This type of calculation is called an **aggregation**. The following are some common aggregation functions: *Sum()*, *Count()*, *Min()*, *Max()* and *Avg()*.

### 7.2.1 Aggregation functions

#### Sum()

Returns the sum of expression over a number of records.

#### Count()

Returns the count of expression over a number of records. The optional **DISTINCT** qualifier sets the function to ignore duplicate values.

#### Avg()

Returns the aggregated average of expression or field over the chart dimensions.

#### Max()

Returns the maximum numeric value of expression over a number of records.

#### Min()

Returns the minimum numeric value of expression over a number of records.

**Expressions** are used for **measures** almost anywhere in the *Advanced Reporting* structure: in charts, in text boxes, as labels for objects, or in gauges. Typical measures are *Revenue*, *Number of orders*, *Performance*, *Cost*, *Quantity*, and *Gross Margin*.

## 7.3 Dimensions

Contrary to measures, **dimensions** are descriptive attributes—typically textual fields or discrete numbers. A **dimension** is always an array of distinct values and the **measure** is calculated once per element in the array.

### 7.3.1 Example

The **Customer** field is used as **dimension**. The individual customers are then listed and the **measure** is calculated once per customer.

Typical **dimensions** are *Customer*, *Product*, *Location*, *Supplier*, *Activity*, *Time*, *Color*, and *Size*.

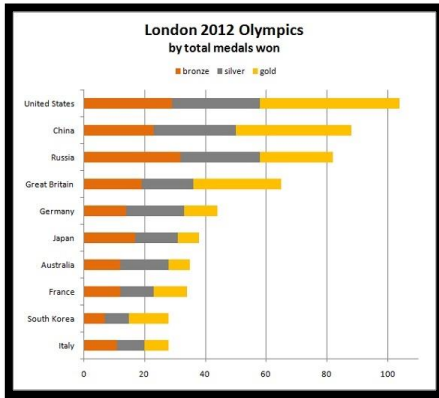
### 7.3.2 For-Next loop

You can regard a chart like a **For-Next** loop: The **dimension** is the *loop variable*. The calculations are made once per dimensional value. So the dimension determines how many rows, bars, points, or slices the chart has. The measure is what is calculated in each loop.

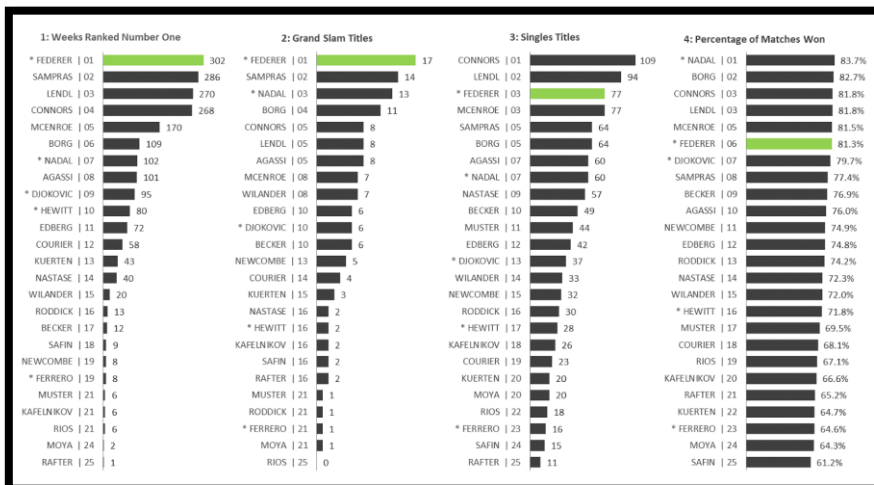
## Activity 7.1: Discuss dimensions and expressions

Can you come up with examples for charts and define the dimensions or expressions?  
Consider sharing your company's expressions and dimensions or sharing other examples from club activities or other interests.

### Example 1: What is the dimension, what is the measure?



### Example 2: What would be dimension and measures here?



## Activity 7.2: Build your first bar chart

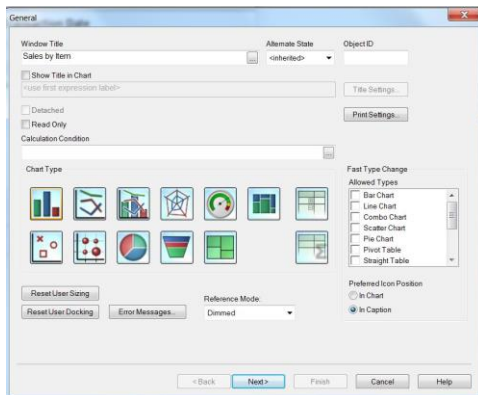
### Challenge

Your users need a fast overview of sales by item. On the **Product Details** sheet, you need to design a chart that enables the user to compare the Sales by Item. There is no need to display the actual numbers, but it is important to provide an overview of the categories and how they perform.

### Step-by-step

1. Go to your report.
2. Select the **Product Details** sheet.
3. Right click on the sheet and select **New Sheet Object>Chart**.
4. Under **Window Title** give the name **“Sales by Item”**.
5. **Clear Show Title in Chart**.
6. **Select the bar chart icon under the Chart Type area.**

**NOTE: Do NOT select the bar chart or any other chart types under the Fast Type Change box. This will be discussed later on in this chapter.**



7. Click **Next**. Define the *dimension*.
8. Under **Show Fields from Table**, select the **Transactions** table. Select the field **Transactions.Item Full Name** from the Available Fields/Groups box. Click Add to add this field to the Used Dimensions box on the right hand side.
9. Check off the box for **Suppress When Value is Null** to disregard any null values in the item list. Clear the box for **Label**.
10. Click **Next**. The **Expression Editor dialog box** displays. Enter the expression for your measure in this dialog box. Remember to check the message at the top left of

the editor to make sure it says "Expression ok". If there are errors a message designating this will be shown there.

11. Type in the following below for **Sales** in the expression editor:

**sum({<\$(vExprSales)>}[Transactions.Amount With Sign])**

When you start typing *Transactions...* it will pull up several field values. Pick the one you want rather than typing it all in (less chance of errors). Label this **Sales** under the **Label** box.

12. Under **Style**, pick the first one. Under **Orientation** pick *Horizontal*.
13. Keep the defaults for **Presentation**, **Axes**, and **Color**.
14. For the **Number** tab, pick *Integer* radio button and Configure the **Symbol**, **Thousand Symbol**, and **Million Symbol** as shown in the following figure below.
15. For the **Font** and **Layout** tabs, keep the default values.

Symbol \$	Thousand Symbol K\$
Million Symbol M\$	Billion Symbol 

16. Click the **Captions** tab.
17. Under **Special Icons**, clear all items, except **Menu**.
18. Clear **Allow Minimize** and **Allow Maximize**.
19. Click **OK**.
20. The chart is not sorted properly and looks disorganized. Let's go back and sort this.
21. Right click on the chart and go to **Properties->Sort**.
22. Sort by **Expression**. Copy the expression for **Sales** and check the *Expression box* in the Sort tab.
23. Copy the expression for **Sales** and sort in *Descending* order:  
**sum({<\$(vExprSales)>}[Transactions.Amount With Sign])**
24. Click **OK**.

### More about the use of special icons in the caption

Many of the object **menu** commands of the sheet objects can be configured as **caption icons**. Selecting only the special icon for menu helps keep the design clean and uncluttered. Clicking the menu icon opens the objects properties menu.

Solution

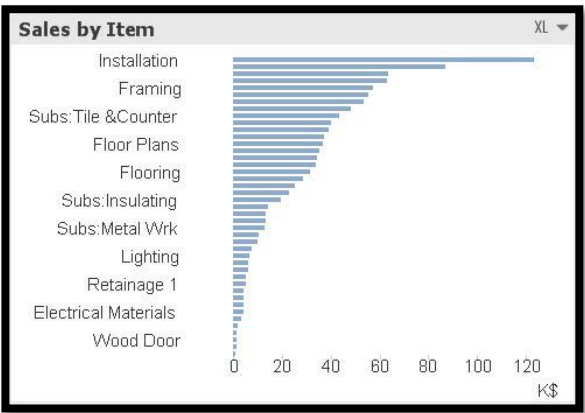
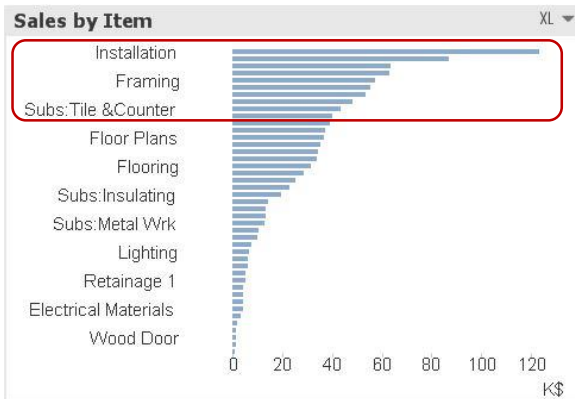


Figure: First Bar Chart

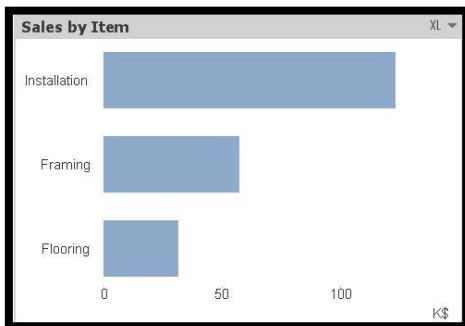


## Activity 7.3: Selections in charts

There are several methods to make **selections** directly in the charts:



1. To just select **one bar**, left click on it. That selection is now highlighted by itself. To clear it, click on the eraser icon within the Current Selections box before you do a new selection.
2. To select **consecutive bars**, hold the left mouse button and lasso around the *five consecutive bars* in the **Sales by Item** chart to encircle the area of selection. The five bars will be highlighted now.
3. To select multiple **non-consecutive bars**, hold down the **Ctrl** key and select the individual bars. Your selections do not display until you release the **Ctrl** key.



## Activity 7.4: Show the ratio of Sales by City

### Challenge

Based on company requirements, the user needs to build a report to show the ratio of sales by city.

### Hints

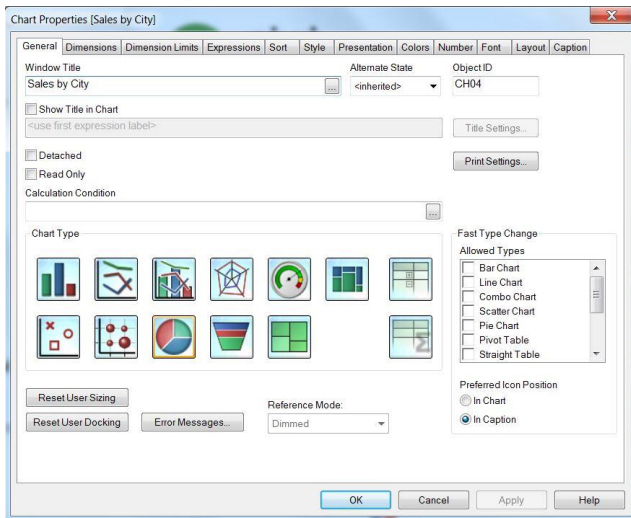
- In this particular case, you want to show the relative values instead of absolute numbers. You do not need to alter the expression for that. Find the checkbox that sets the calculation to *relative*.
- You also want to show the numbers (in %) in the legend.
- Remove all redundant information.

## Step-by-step

1. Right-click on the **Dashboard** sheet.
2. Select **New Sheet Object>Chart**. The **General** dialog displays.

### General

1. For **Chart Type**, select the *pie chart*.
2. For **Window Title**, type *Sales by City*.
3. Clear **Show Title in Chart**.
4. Click **Next**.



### Dimension

5. For **Dimension**, in the **Available Fields/Groups**, select *Transactions.Bill Address City*.
6. Click **Add**.
7. Clear **Label**.
8. Click **Next**. The **Edit Expression** dialog displays.

### Expression

9. Select *Sum* in the **Aggregation** drop-down list.
10. Select *[Transactions.Amount With Sign]* in the **Field** drop-down list. Any field that has space in the name require square brackets around the name or it will give an error. Also the field names are case sensitive. Paste this. Add the variable expression, *\$(vExprSales)* before the *[Transactions.Amount With Sign]* to limit what will be shown. The final expression will read as:  
***Sum({<\$(vExprSales)>}[Transactions.Amount With Sign])***

The variable  **$\$(vExprSales)$**  limits the values to those that have a transaction account type as “income”, has transactions that have been paid and limited to certain transaction types (invoice, sales receipt, credit memo, charge, ARRe-fundCreditCard).

11. Click **OK**. The **Edit Expressions** dialog closes.
12. In **Expressions**, for **Label**, type *Sales*.
13. Select **Relative**. This option allows you to display the relative values of the calculated expression for each dimension value instead of their absolutes.
14. Click **Next**. The **Sort** dialog displays.

### Sort

15. Keep the **Sort** default settings. Click **Next**. The **Style** dialog displays.

### Style

16. Select the style as shown here:



17. Click **Next**. The **Presentation** dialog displays.

### Presentation

18. Ensure that **Show Numbers in Legend** is selected.
19. Click **Next**. The **Color** dialog displays.

### Colors

20. Check the box for *Persistent Colors*. These maintain the colors for a segment of the pie chart when you are drilling down to a specific segment. Click **Next**. The **Number** dialog displays.

### Numbers

21. Notice that the **Show in Percent (%)** option is already checked. This happens by default when you select *Relative* in the **Expression** tab.
22. Set the **Number Format Settings** to **Fixed to 2 decimals**.
23. Click **Next**. The **Font** dialog displays.

**Font**

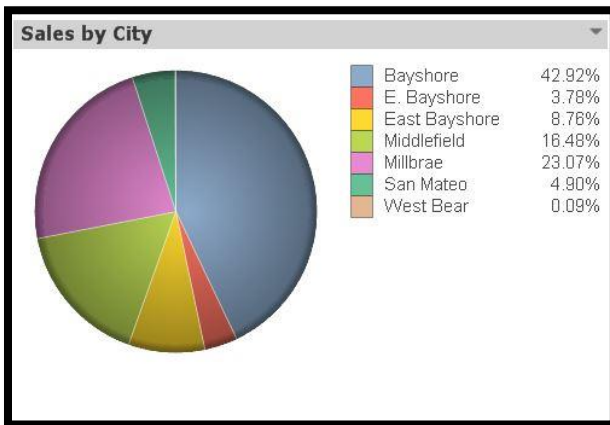
24. Click **Next** to keep the **Font** default settings. The **Layout** dialog displays.

**Layout**

25. Under **Border Width** select *0 pt.*
26. Click **Next**. The **Caption** dialog displays.

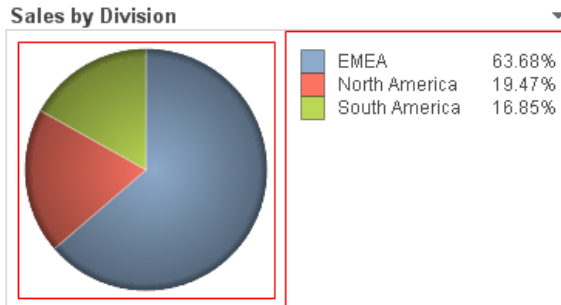
**Caption**

27. Under **Special Icons**, clear all settings except **Menu**.
28. Clear **Allow Minimize**.
29. Clear **Allow Maximize**.
30. Click **Finish**.
31. Place the chart as shown in the following example:

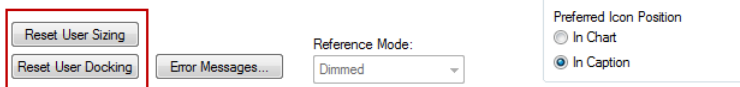
**Solution**

## 7.4 Chart components

So far, you have defined *object captions*, *titles*, *legends*, and *borders*. When you press **CTRL+Shift** on the keyboard and at the same time click in the chart, you notice red lines that indicate the borders of the chart components. It is possible to resize and move those components.



Use the **Reset User Sizing** and **Reset User Docking** buttons by going to **Properties->General** if you want to reset the components back to the default position and size if trying to move the legend did not work out to your advantage.

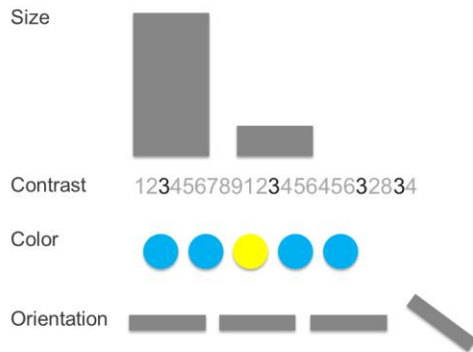


## 7.5 Best practices in chart design

Now that you have learned the basic of creating charts in *Advanced Reporting*, it is time to learn more about the fundamentals of Data Visualization. Research tells us that information, when presented in the form of visuals, is better perceived by the human brain than text. Furthermore, qualitative and quantitative data can be deciphered more quickly when shown in the form of visualizations than numbers or text.

## 7.6 Pre-attentive attributes

Certain attributes of objects like *size*, *position*, *color*, and *contrast* are perceived by the human mind **pre-attentively**, and if you make use of those attributes in the correct way you are able to build powerful visualizations. But there are also instances when text is a better form of conveying information than a picture or a visual. For instance, when showing the population of a city, the quantitative number is the most appropriate form to represent the information. There are many different ways to visually represent data when the information is contextual.



Data Visualization has become a common practice today in newspaper, journals, marketing, and more importantly in the business world where numbers have to be analyzed at lightning speed in order to make decisions and take action. This is where the need for using popular data objects like pie charts and bar graphs arises. Designers must take care to create data visualization objects that include only necessary elements. The most commonly used bar graph and line charts, can cause data to be misrepresented and misinterpreted.

However, if used correctly, the same bars and lines are life savers. As stated in the article by Julie Steele ‘Why Data Visualization matters’<sup>2</sup>, “The best data visualizations are ones that expose something new about the underlying patterns and relationships contained within the data. Understanding those relationships—and being able to observe them—is key to good decision making.” Even a slight misrepresentation adds to complexity that can jeopardize the entire business.

In the context of a Business Dashboard, it is very important to know whether the data objects are conveying the information in the most intuitive way or are leading the user to confusion. In the following section, you discuss how the charts that we use frequently are appropriate and intuitive. You learn how to optimize chart types using simple and effective designs to make the information decoding easy for the user.

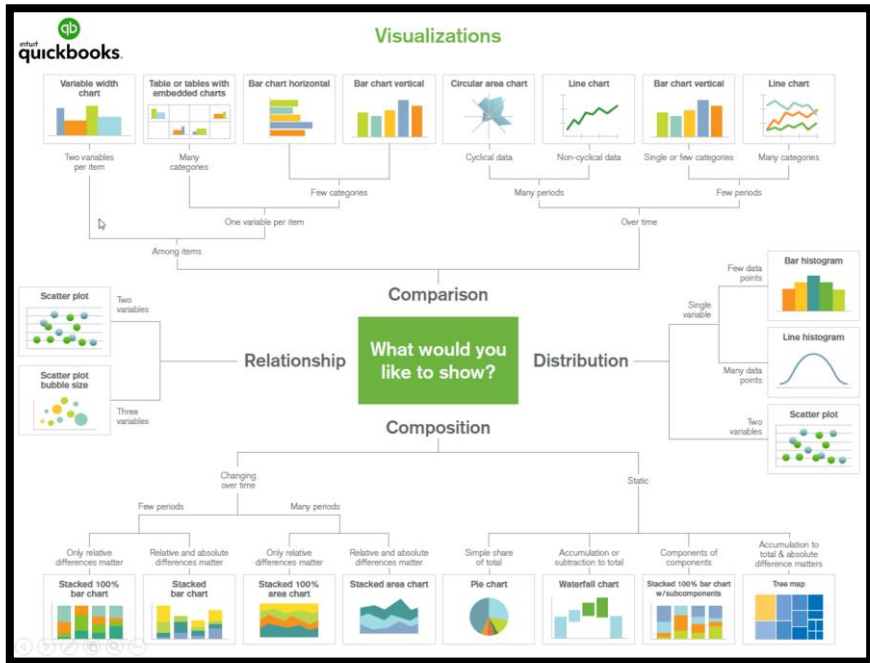
## 7.7 Prioritize the data

Remember, always show the data. Don’t use effects without any good reason, such as for emphasis. Use contrast to separate information in the data from other information. Usually, you work with a limited screen area and every pixel in your application has to be there for a reason. If it does not contain information, it should not be there. It is important to document the data, but you do not need to be over-explicit. Having a caption displaying the title *Year* may be unnecessary.

<sup>2</sup> <http://strata.oreilly.com/2012/02/why-data-visualization-matters.html>

## 7.8 What chart to use?

This section is meant to serve as a reference guide for picking the right object or chart to fit the type of analysis and highlighting some of the pitfalls to avoid.





### 7.8.1 Comparison

You can't perform meaningful analysis without comparing certain sets of the data with others. Questions to ask include:

- How is Sales current quarter compared to last quarter?
- How are the actual figures compared to budget figures?
- How does product group A perform compared to product group B?

One of the most effective visualizations you can choose for showing comparison is the bar chart.

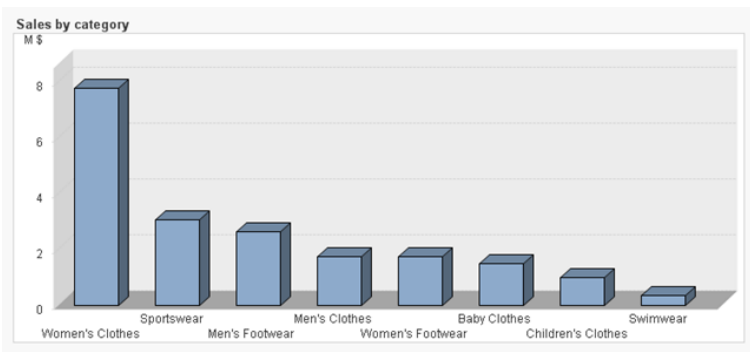
The length of lines is perceived pre-attentively and therefore, it takes very little effort to compare different sets of data. When comparing a set of items side by side to show the quantitative behaviors, use bar charts.

Bar charts are classic diagrams that usually give a good picture of the data. A drawback is that when there are many bars, labeling becomes problematic. Therefore, use a scroll-bar in the chart to display the first "n" bars.

They also imply that the data is discrete; if your data is continuously changing over time, consider a line graph instead. Avoid comparisons with different units (\$ and Quantity) on the same scale.

Using a 3D effect with a bar chart can mislead the user into thinking that there is a third dimension. It also tends to increase the data ink ratio which is not recommended. Three dimensional bars in a bar chart are unintuitive and misleading and should be avoided at all times.

#### Avoid



Best practice



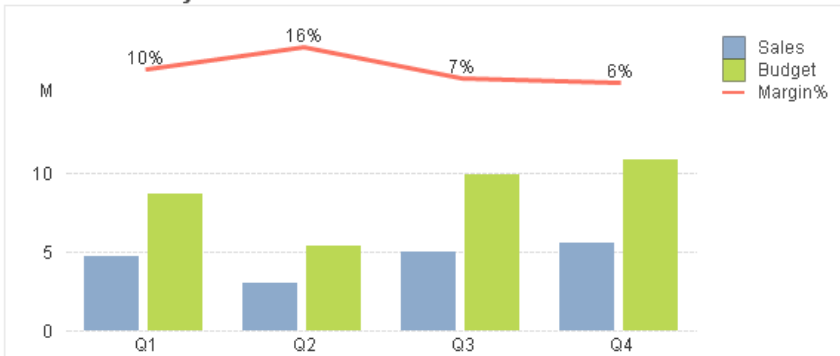
### 7.8.2 Compare different measurements

Sometimes there is a need to compare different measurements in the same chart. It is important to visually separate the measures from each other. The ability to create a **combo chart** in our reporting tool allows you to define a visualization style for each measure using two axes with their own separate scale to plot the measurements against.

#### 7.8.3 Examples:

- Two measurements: Currency Amount and Quantity or Amount and Percentage
- Two axes: Different measurements on left and right axis
- Two or more axes: Split axes horizontally

Combo Chart: Many Measurements

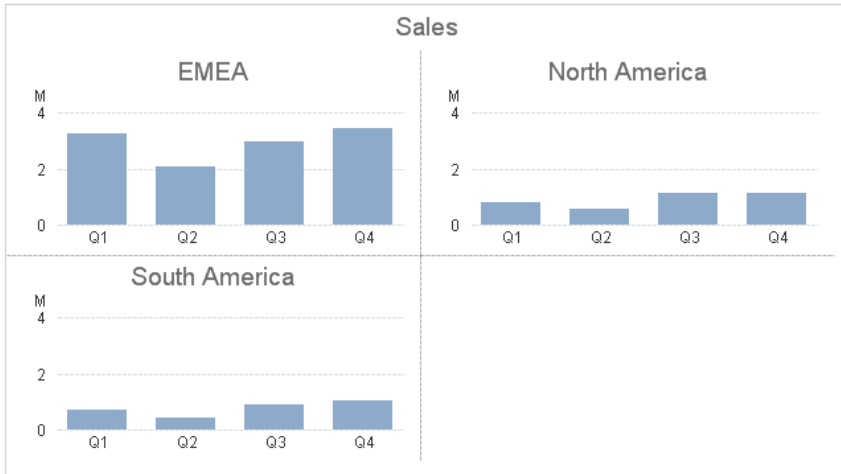


## 7.9 Trellis charts

A **trellis chart** is a grid of small charts. It is a repetition of a chart across a grid. Usually, at least two dimensions are used, one for the grid variable and another for the x-axis within each small chart.

This chart allows you to analyze the metrics of each chart without a query (a selection) and compare the metrics for each member of the group. This allows you to identify the irregular behaviors among the variables.

Trellis



The individual charts share the same y-axis; therefore, you can accurately compare the metrics across the grid.

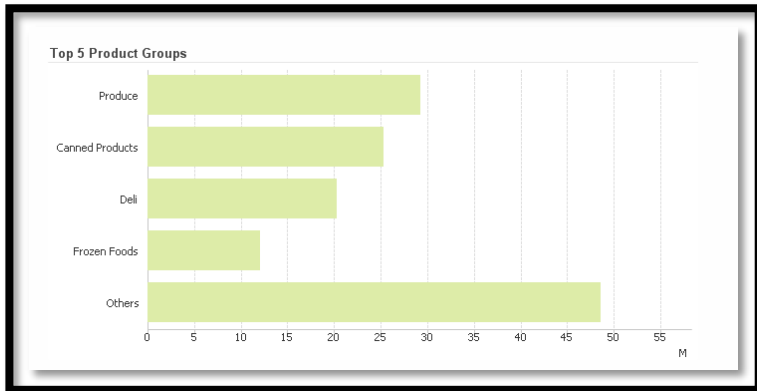
### 7.9.1 Sorting

Sorting is a special type of *comparison*. You define the primary sort order in the chart properties. Then the reporting tool enables the business user to sort and order values in a table's column in a very intuitive way. *Dimension Limits* is a way to limit the number of values shown and can be used for visualizations like Top 5 or Bottom 5 performers.

Customer Details							
Company	Sales \$	Margin \$	Qty	Order Trend	#Orders	Latest Order	Avg Discount
	18,368,357	1,655,631	633,977				
Boleros	872,547	75,874	33,875		328	3/25/2016	8.29%
Th Fashing	943,485	95,037	33,131		303	3/16/2016	8.58%
The Corner Store	856,562	45,150	33,493		298	3/30/2016	9.24%
Eintrach GS	778,423	66,184	29,323		264	3/22/2016	9.64%
Grunewald	883,477	87,574	28,206		257	3/31/2016	9.12%
Warp AG	614,569	51,214	19,963		200	3/31/2016	8.09%

## 7.10 Dimension limits

**Dimension limits** allows a chart to show total, other segments, and limits to top/bottom performing dimension values. Dimension limits are set for chart types, but are not used for gauge charts and pivot tables. The **Dimension Limits** tab controls the number of dimension values you can see in a given chart. The initial chart building process does not show the dimension limits tab until the chart has been created. Once the chart has been created, the **Dimension Limits** tab will appear.

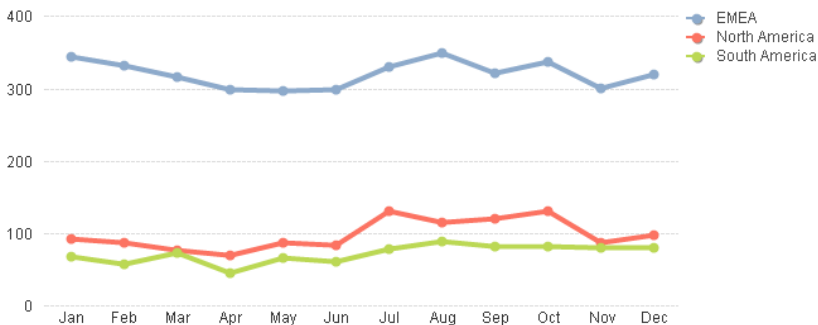


## 7.11 Movements and trends

In most applications you need to analyze data over some sort of *time dimension*. **Line charts** are an effective way to display trends. **Line charts** make use of the pre-attentive attribute of *position*, and therefore, it is easy to identify negative or positive trends.

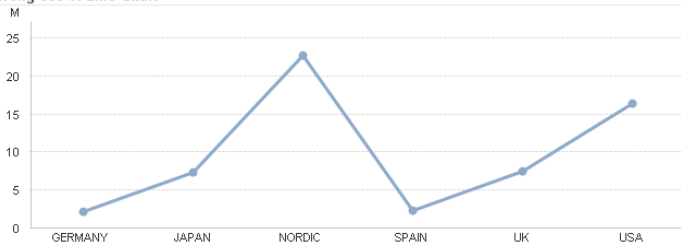
With **line charts** it is important to have a relation between the dimensions values. It is also important that the dimension values are in sequence and at equal intervals between the data points.

Line Chart: Over Time



## Avoid

Wrong Use of Line Chart



## Activity 7.5: Show top- and bottom- selling products

### Challenge

The report requires an immediate view of *top* and *bottom* sellers. This is when working with **dimension limits** comes in handy. Continue working on the **Product Details** sheet and add two more objects, one showing the *Top 5 Items* and the other showing the Bottom 5 Items.

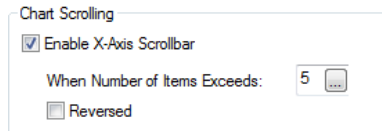
### Hints

You do not have to create the charts from scratch.

Clone the **Sales by Item** chart on the **Product Details** sheet.  
Keep the expression.  
Rename the title to *Top 5 Items*.

#### Alternative 1

On the **Presentation** tab, in the **Chart Scrolling** area, select **Enable X-Axis Scrollbar** and **When Number of Items Exceeds 5**.



#### Alternative 2

Select the **Dimension Limits** tab.  
Select **Restrict which values are ...**  
Select **Show only 5 Largest** values.  
Clear **Show Others**.

Now, create a chart to show the bottom selling products.  
Sort the chart **Y-value Descending**.

### Discuss

**Sometimes** the **Bottom 5 Products** chart only shows one single item or product. Sometimes the lowest values are **0** values. If you suppress **0** values only one or a few values may show on the chart.

In the **Object Properties**, click the **Presentation** tab, and clear **Suppress Zero-Values**

## Step-by-step

### Create a copy of the Sales by Item chart

1. On the **Product Details** clone the **Sales by Item** chart by right clicking on the chart and selecting *Clone*.
2. You have now created a copy of the **Sales by Item** chart.

### Configure the new chart

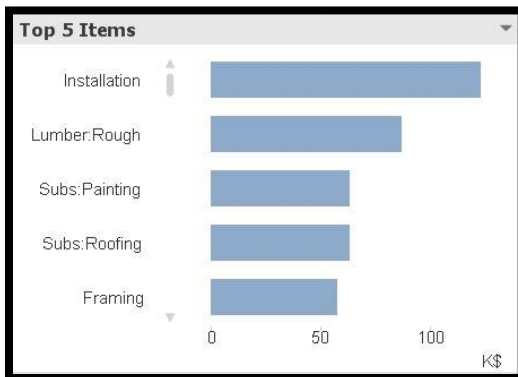
3. Right-click the new chart and select **Properties**, and then select **General**.
4. Under **Window Title**, type *Top 5 Items*.

### Alternative 1: Enable a scroll bar

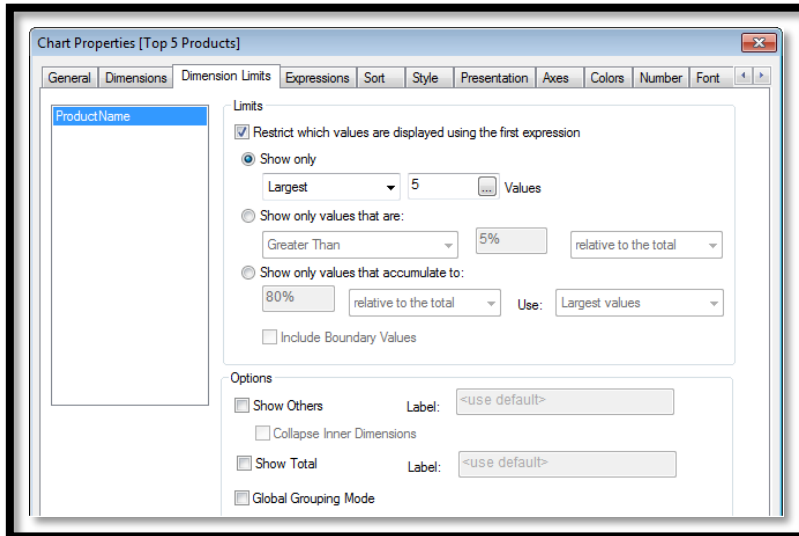
5. Select the **Presentation** tab.
6. Under **Chart Scrolling**, select **Enable X-Axis Scrollbar**, and for **When Number of Items Exceeds**, type 5.
7. Click **OK**.

### Alternative 2: Define Dimension limits

8. Right-click the chart, and select **Properties**, and then select **Dimension Limits**.
9. Under **Limits**, select **Restrict which values are displayed...**
10. Select **Show Only**, and *Largest 5 Values*.
11. Under options, clear **Show Others**.
12. Under the Sort tab, select *Y-value Descending*.
13. Click **OK**.







**Figure: Dimension Limits for Top 5 Items**

## Bottom 5 Items

### Create a copy of the Top 5 Items chart

1. On the **Product Details** sheet, select the **Top 5 Items** chart and clone this chart by right clicking and selecting **Clone**.
2. You have now created a copy of the **Top 5 Items** chart.

### Configure the new chart

3. Right-click the new chart and select **Properties**, and then select **General**.
4. Under **Window Title**, type *Bottom 5 Items*.

### Define Dimension limits

5. Select **Dimension Limits**.
6. Under **Limits**, select **Restrict which values are displayed...**
7. Select **Show Only**, and *Smallest 5 Values*.

### Expressions

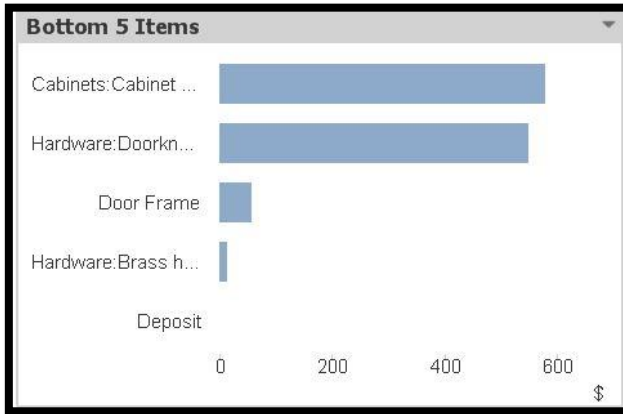
8. If you apply the expression for **Sales**:  
**sum[Transactions.Amount With Sign]** you may get negative values representing unpaid invoices. To disregard any negative values use the variable, *vExprSales*, within the expression to only show Sales that have positive values or paid invoices. The final expression will look like this:  
**sum[<\$(vExprSales)>}Transactions.Amount With Sign]**

### Sort the chart

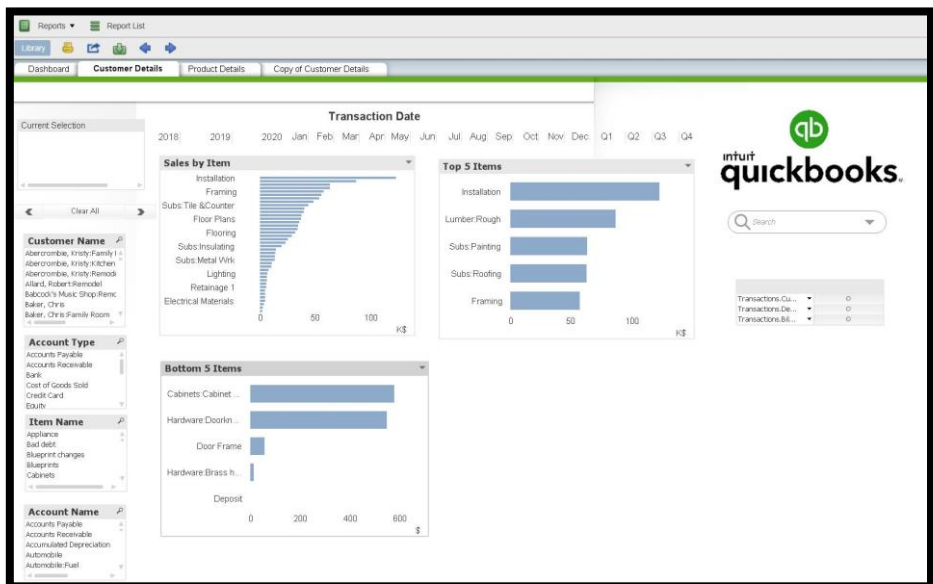
9. Select **Sort**.
10. Under **Sort By**, select **Y-value** and *Descending*.
11. Click **OK**.

### Show products that never been sold

12. Right-click the chart and select **Properties**, and then select **Presentation**.
13. Clear **Suppress Zero-Values**. Clearing this field will represent bottom values that are 0 valued item sales. Click **OK**.



## Solution



## Activity 7.6: Add a second dimension to a chart

### Challenge

The charts you created so far are one-dimensional. Now you need to show sales by item *and* quarter. You could choose to create another chart, but because you want to limit the amount of objects, you modify the **Sales by Item** chart.

### Hints

In the **Dimension** properties, add the new dimension, *Quarter*. Change the order of the dimensions (using the **Promote** and **Demote** buttons) and notice how the chart is rendered depending on what dimension is the first dimension.

In the **Style** properties, choose between stacked or grouped subtype.

#### Decrease font size

- You need to set the **Font** size to 8 points in order to display all item labels.

#### Move the legend

- Improve the use of the screen real estate. Assign more space to display the bars.
- Move the legend to the bottom of the chart and display it in a single row.

#### Persistent Colors

- Ensure that the colors representing the quarters stay the same when you make selections in the chart. For that, you have to select **Persistent Colors** in the **Color** properties.

## Step-by-step

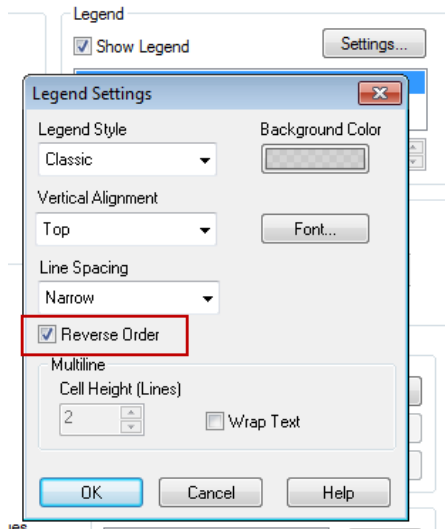
1. On the **Product Details** sheet, right-click the **Sales by Item** chart and select **Properties**, and then select **Dimensions**.
2. Under **Available Fields/Groups**, select *Quarter* and click **Add**.
3. Ensure that *Quarter* is the second **dimension**. Use the **Demote**, **Promote** buttons in order to change the order of the dimension.
4. Clear **Label** for *Quarter*.

### Select the Style

5. Select the **Style** tab.
6. Under **Subtype**, select **Stacked**.

### Configure the legend

7. Select the **Presentation** tab.
8. Ensure that **Show Legend** is selected, and then click the **Settings** button.
9. The **Legend Settings** dialog displays.
10. Select **Reverse Order**.



11. Click **OK**. The **Legend Settings** dialog closes.

### Choose persistent colors

12. Select the **Colors** tab.
13. Select **Persistent Colors**.

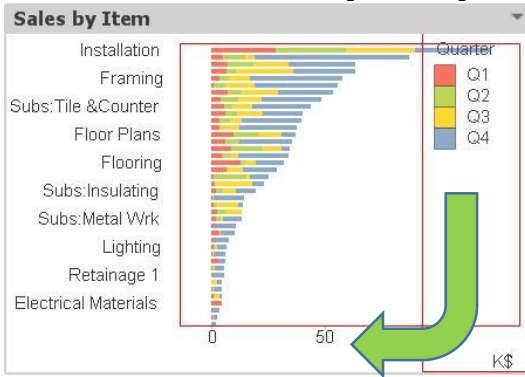
### Decrease font size

14. Select the **Font** tab.

15. Under **Size**, type 8.
16. Click **OK**.

#### Move the legend to a horizontal position

17. Press **Ctrl+Shift** and click the chart.
18. Place the pointer over the legend, and while pressing **Ctrl+Shift**, hold the left mouse button, and drag the pointer to the left bottom corner position. Observe that the orientation of the legend changes to horizontal.



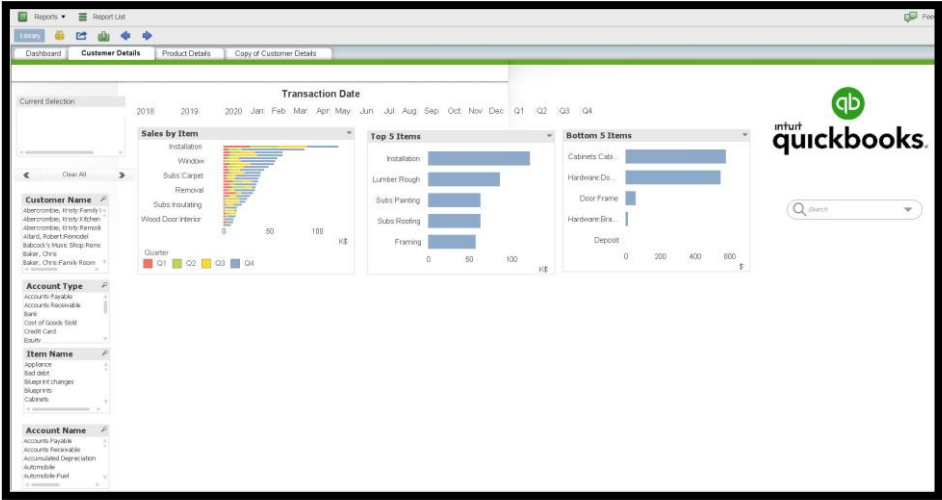
#### Switch the legend back to the default position

19. Right-click the chart, and select **Properties**, and then select **General**.
20. Click **Reset User Sizing** for setting the component's size to default.
21. Click **Reset User Docking** for moving the components to the default position.

#### Arrange the objects on the Product Details sheet

22. Size and arrange the **Sales by Item**, the **Top 5 Items**, and **Bottom 5 Items** as shown in the following example:

Solution



## Activity 7.7: Build a Chart to Show Transactions Trend

### Challenge

In this report we need to see the trend of transactions by month. Determine what will be your dimension and what will be the measure.

### Step-by-step

1. Right-click the **Dashboard** sheet.
2. Select **New Sheet Object> Chart**.
3. On the **General** tab, for **Window Title**, type *Transactions Trend*.
4. Clear **Show Title in Chart**.
5. Under **Chart Type**, select **Line Chart**.

### Define the dimension

6. Click **Next**. The **Dimensions** dialog displays.
7. Under **Available Fields/Groups**, select *Month*, and then click **Add**.
8. Clear **Label** for *Month*.
9. Click **Next**. The **Edit Expression** dialog opens.

### Define the expression

10. Basically this is the number of transactions. In the **Fields** tab, for **Aggregation**, select *Total Count* and *Distinct*. *You want distinct values for Transactions.Ref Number so check the box next to Distinct*.
11. For **Field**, select *Transactions.Ref Number*.

The screenshot shows the 'Edit Expression' dialog box with the 'Fields' tab active. The 'Aggregation' dropdown is set to 'Total count'. The 'Table' dropdown is set to 'All Tables'. The 'Field' dropdown is set to 'OrderID'. The 'Distinct' checkbox is checked and highlighted with a red rectangle. A 'Paste' button is located at the bottom right of the dialog.

12. Click **Paste**.
13. Click **OK**. The **Edit Expression** dialog closes.
14. For **Label**, type *#Orders*.
15. Under **Display Options**, for **Symbol**, select a symbol you like (triangles, squares or diamonds) and for **Line**, *Normal*.
16. *You can also check the box for "Values on Data Points" under the Display Options area. This shows value amounts at each plot point.*
17. Click **Next**. The **Sort** dialog displays.

### Sorting

18. Ensure that *Month* is selected and for **Numeric Value**, select *Ascending*.



19. Ensure that other sort settings are cleared.
20. Click **Next**. The **Style** dialog displays.

### Look

21. Ensure that **Plot Area Background Style** is set to *Minimal*.
22. Click **Next**. The **Presentation** dialog displays.
23. Under **Line/Symbol Settings**, set the **Symbol Size** to 3 pt.
24. Click **Next**. The **Axes** dialog displays.

### Define the grid

25. Under **Expression Axis**, select **Show Grid**. This is optional and is a design choice. You can opt to display grid lines or not to show these lines.

Expression Axes

Expressions

#Orders

☐ Log Scale ☒ Forced 0 ☐ Hide Axis

☒ Show Grid ☐ Show Minor Grid

Axis Color

Font...

Width

0 pt

Scale

☐ Static Min ☐ Static Max ☐ Static Step

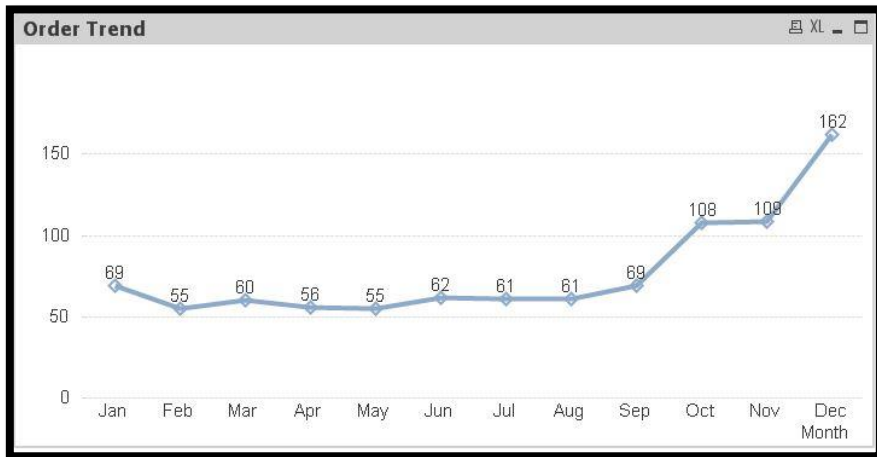
Position

☒ Left (Bottom) ☐ Right (Top)

☐ Split Axis

Primary 67 %

26. Click **Finish**.
27. Place the chart as shown in the following illustration:



**Figure: Line Chart**

## Activity 7.8: Show different measures in a single chart

### Challenge

This report will analyze **Sales, Margin, and Margin%** by month in a single chart and compare these figures with the transactions trend. You need to find a visualization that enables you to show those three measures over the time dimension **Month**. A **combo chart** serves the purpose of combining multiple measures in one chart and the ability to see the behavior of these **measures** in one visual representation.

### Hints

So far you have created charts with one or two dimensions. Now you add more expressions to a chart.

1. Create the chart on the **Dashboard**.
2. **Sales, Margin, and Margin%** use different units of measure. Therefore, you need to use a chart type that allows you to show different measures with different units. Use the **combo chart**.
3. Define the **dimension** as Month.
4. Define the expression **Sales, Margin, and Margin%** measures.
5. The **Margin%** is calculated simply as Margin/Sales. We define how we calculate Margin and how we calculate Sales and from the two we can find the value for Margin%.
6. One axis will be used to compare the Sales and Margin. We will have a separate axis to show the Margin% line graph. Assign the Sales and Margin measures to the left axis, the Margin% to the right axis.

Measure	Expression
Sales	Sum({<\$(vExprSales)>}[Transactions.Amount With Sign])
Margin	[Sales]-sum({<\$(vExprSales)>}[Item.Average Cost])*[Transactions.Quantity With Sign])
Margin%	Margin / Sales

**NOTE:** An interesting characteristic of writing expressions in Advanced Reporting is that once you have attributed a **measure label**, e.g. *Sales*, that label or name of the measure may be used in other expressions within the same chart properties. If you create a new chart, those labels are not recognized anymore. This becomes useful when you have large expressions that you may not want to re-type.

## Step-by-step

1. On the **Dashboard** sheet, right-click and select **New Sheet Object>Chart**. The **General** dialog displays.
2. For **Window Title**, type *Sales Trend*.



3. Clear **Show Title in Chart**.
4. Under **Chart Type**, select **Combo Chart**.
5. Click **Next**. The **Dimension** dialog displays.

### Define the dimension

6. Under **Dimension**, in the **Available Fields/Groups** box, select *Month*.
7. Click **Add**.
8. Clear **Label**.
9. Click **Next**. The **Expressions** and the **Edit Expression** dialog box displays.

### Define the expressions

10. You need to calculate **Sales**, so type:  
`sum({<$(vExprSales>}[Transactions.Amount With Sign])`

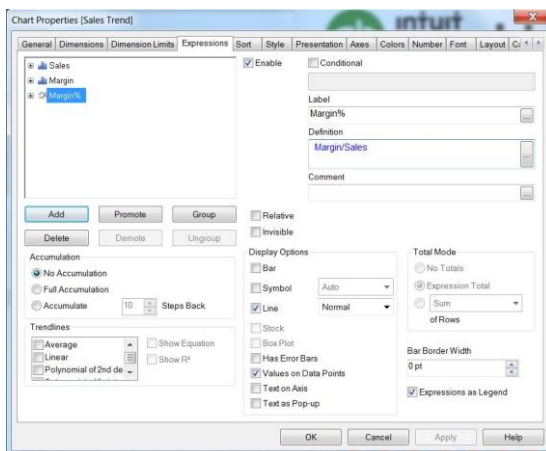
**NOTE:** There are a few things to observe in this expression creation. The Field **Transactions.Amount With Sign** should be enclosed in brackets since the name is derived from a table field name and has spaces. Brackets are required around field names with spaces. Field names are case sensitive so any misspelling will result in an error message generation. The variable surrounding the field name, **Transactions.Amount With Sign**, is **\$(vExprSales)** and is placed preceding the field value to limit how we make selections. This will be discussed further in Chapter 9.

11. Click **OK**.
12. In the **Expressions** dialog box, for **Label**, type *Sales*.
13. Under Display Options, **Bar** should be checked off.
14. You need to show the **Margin**. Click **Add under the expression box** in order to add a new expression.
15. In the **Edit Expression** dialog box, type:

**[Sales]-sum({<\$ (vExprSales)}([Item.Average Cost])\*[Transactions.Quantity With Sign])**

**NOTE:** Once the value for the label *Sales* has been defined, we can use *Sales* instead of re-typing the whole formula for *Sales* in this expression for **Margin**.

16. Click **OK**.
17. For **Label**, type *Margin*.
18. Under **Display Options**, ensure that only **Bar** is selected; uncheck the box next to **Line**.
19. You need to show the **Margin%**. Click **Add** in order to add a new expression.
20. In the **Edit Expression** dialog, type *Margin / Sales*, using the benefit of the labels instead of re-typing long expressions for **Margin** and **Sales**.
21. Click **OK**.
22. For **Label**, type *Margin%*.
23. Under **Display Options**, ensure that only **Line Normal** is selected for this measure.
24. Select **Values on Data Points**.



25. Click **Next**. The **Sort** dialog displays.

## Sort

26. In the **Dimensions** box, select *Month*, and under **Sort by**, select **Numeric** and **Ascending**.
27. Click **Next**. The **Style** dialog displays.

## Style

28. Under **Orientation**, select .
29. Under **Plot Area Background Style**, select *Minimal*.
30. Click **Next**. The **Presentation** dialog displays.

## Presentation

31. Leave the default settings as they are.
32. Click **Next**. The **Axes** dialog displays.

## Assign axes for the expressions

33. Under **Expression Axes**, in the **Expressions** box, select *Sales*.
34. Under **Position**, select **Left (Bottom)**.
35. Under **Dimension Axis**, for **Primary Dimension Labels**, select diagonal (/).
36. Under **Expression Axes**, in the **Expressions** box, select *Margin*.
37. Under **Position**, select **Left (Bottom)**.
38. Under **Expression Axes**, in the **Expressions** box, select *Margin%*.
39. Under **Position**, select **Right (Top)**.

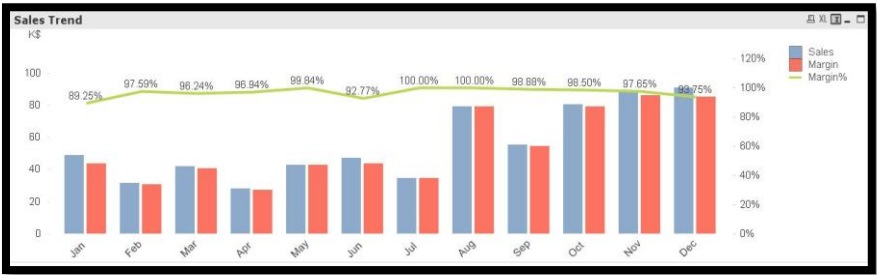
The screenshot shows the 'Expression Axes' dialog box. On the left, under 'Expressions', there is a list box containing 'Sales', 'Margin', and 'Margin%'. Below this list are checkboxes for 'Log Scale', 'Show Grid', 'Axis Color', 'Forced 0', 'Show Minor Grid', 'Hide Axis', and a 'Font...' button. To the right of the list box are three input fields for 'Scale': 'Static Min', 'Static Max', and 'Static Step'. Below these is a 'Position' section with radio buttons for 'Left (Bottom)' and 'Right (Top)'. To the right of the 'Position' section is a 'Split Axis' section with a 'Primary' input field and a '%' checkbox. At the bottom, there is a 'Width' input field set to '0 pt'.

40. Click **Next**. The **Colors** dialog displays.
41. Click **Next**. The **Number** dialog displays.

## Define the number format

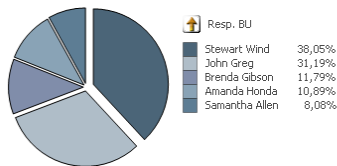
42. In the **Expressions** box, select *Sales* and *Margin*, and under **Number Format Settings**, select **Integer**.
43. For **Symbol**, type \$, for **Thousand Symbol**, type K \$, for **Million Symbol**, type M \$.
44. In the **Expressions** box, select *Margin%*, and under **Number Format Settings**, select **Integer**.
45. Select **Show in Percent (%)**. Click **Finish**.

Solution



## 7.12 Share and distribution

Pie charts are popular visualizations for displaying visual distribution of measurements and are used very frequently. Because the human mind has difficulties comparing areas (in this case, the size of the slices of the pie) it is not recommended that you show a lot of data categories within the pie chart. Apart from being difficult for the user to distinguish between the angles, it also becomes hard to apply colors that are far apart in hue from each other to clearly differentiate between the pie slices. Some pie charts also ship with a variety of effects that may look appealing at a first glance, but can complicate the correct interpretation of the data.



The best-case scenario of displaying information in the form of a pie chart is when the dimension values to be compared are less than seven. If showing more than seven categories becomes inevitable, then the data can be better shown as a bar chart.

Another good practice is to combine smaller pie slices into one category named “Others.”

### Examples:

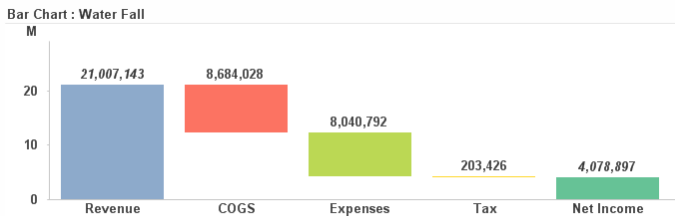
- What contributes how, to the whole — Regional Sales
- Yes / No analysis

Other chart types: Mekko chart, Block chart, and Stacked line chart

**Tip:** The pie chart above is using a **Pie popup** expression to define the distance between segments in the pie by clicking on the + sign next to the expression on the **Expressions** tab in the **Chart properties**

### 7.13 Quantitative share to total

Instead of taking the total as 100% and displaying the breakdown as percentage, show the data in quantitative matter and still display the actual amounts.



Waterfall charts are used often for financial figures to show the subtractions from a whole to reach the net amount. By displaying the steps of subtractions, these charts present the difference between the start (whole) and the end (net) figures. At the same time, each subtraction can be compared to the starting amount (whole) to see the ratios.

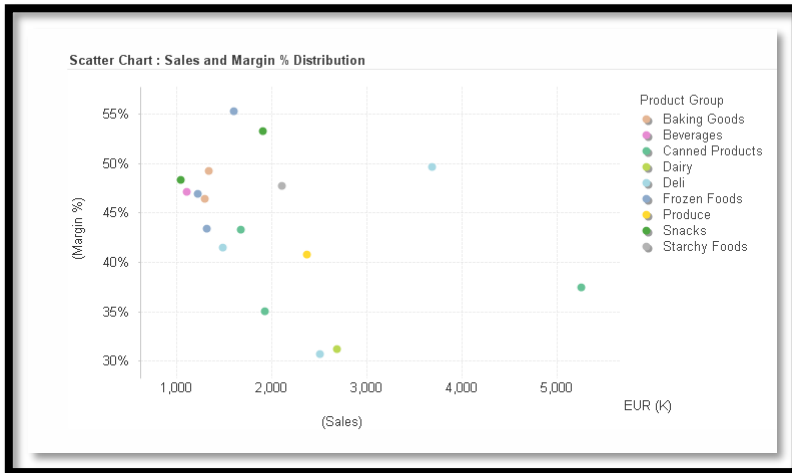
**Tip:** You can create a waterfall by using a **Bar offset** expression to define the starting point of the bar by clicking on the **+** sign next to the expression on the **Expressions** tab in the **Chart properties**



## 7.14 Correlation

Another key part of analysis is to discover if there is a **correlation** between distinct measures.

- What impact does customer satisfaction have on Sales?
- Is there a correlation between number of sick-leave days and number of overtime hours among your staff?



The **scatter chart** is the perfect visualization if you want to display **correlation**. Also, a line chart with separate lines allows you to analyze correlation over time.

## Activity 7.9: Scatter chart

### Challenge

This report will need to analyze the **correlation** of customer sales by city and quantity.

### Hints

As you learned earlier in this lesson, a scatter chart is a powerful tool to visualize correlation between measures.



The **scatter chart** differs from the bar, line, and combo chart because the dimension is shown as dots. The positions of the X and Y values are defined by the measures. In your chart, each customer is represented by a dot.

Refer to the business plan for the definition of the measures. The first time you create a scatter chart, the expression tab looks different than the one you worked with earlier. You see a simplified version of the traditional expression tab.

Choose a field for the **X-axis** expression and another one for the **Y-axis** expression. The aggregation is set to Sum by default. If you need to work with Count, Avg, or other aggregations, you need to switch to the advanced mode. In our case, it works fine, because we only use Sum aggregations.

## Step-by-step

1. Right-click the **Customer Details** sheet.
2. Select **New Sheet Object>Chart**. The **General** dialog displays.
3. For **Window Title**, type *Sales and Quantity by Customer and City*.
4. Clear **Show Title in Chart**.



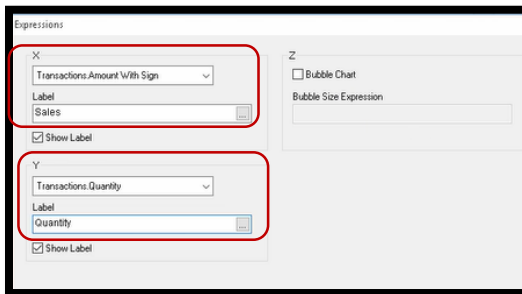
5. Under **Chart Type**, select the scatter chart.
6. Click **Next**. The **Dimensions** dialog displays.

### Define the dimension

7. In the **Dimensions** dialog, in the **Available Fields/Groups** box, select *Customer.Full Name*.
8. Click **Add**.
9. For **Label**, type *Customer*.
10. Click **Next**. The **Expressions** dialog displays. For the scatter chart, a simplified version of the **Expressions** dialog is displayed by default.


### Define the expressions

11. For **X**, select *Transactions.Amount With Sign*, and then type *Sales* for **Label**.
12. For **Y**, select *Transactions.Quantity*, and then type *Quantity* for **Label**.
13. Ensure that **Z Bubble Chart** is cleared.



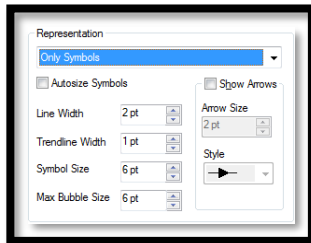
14. Click **Next**. The **Sort** dialog displays. Keep the default values here.
15. Click **Next**. The **Style** dialog displays.

**Select a look**

16. Under **Look**, select .
17. Ensure that **Under Plot Area Background Style**, *Minimal* is selected.
18. Click **Next**. The **Presentation** dialog displays.

**Define presentation settings**

19. Under **Representation**, select *Only Symbols*.
20. Clear **Autosize Symbols**, and set the **Symbol Size** to 6 pt.



21. Click **Next**. The **Axes** dialog displays.
22. Click **Next**. The **Colors** dialog displays.

**Select persistent colors**

23. Select **Persistent Colors**.
24. Click **Next**. The **Numbers** dialog displays.

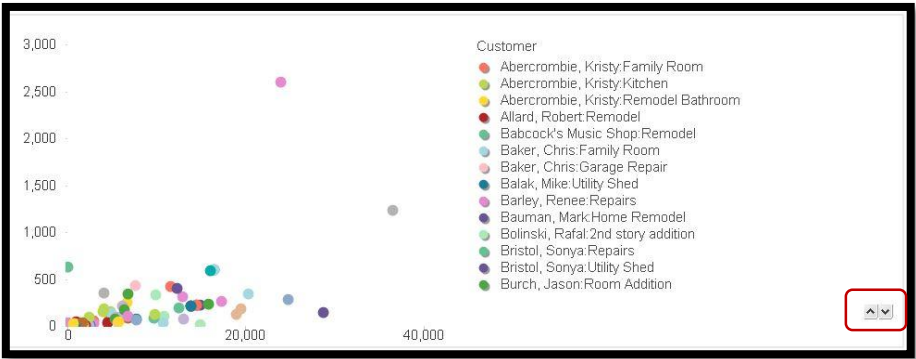
**Define the number format**

25. In the **Expressions** box, select *Sales* and *Quantity* and under **Number Format Settings**, select *Integer*.
26. Click **Finish**.

**Making Selections**

You can now make particular selections on the **scatter plot**. You can click on a particular bubble to drill-down to information on one specific customer. Or you can encircle several bubbles and see a grouping of customers. You can also go up and down using the arrows on the bottom right hand side of the customer legend to see more customers. If you hover over the bubble, it gives you more information on the customer in a tool tip without clicking on it and drilling down.

Solution



## Activity 7.10: Group by a second dimension

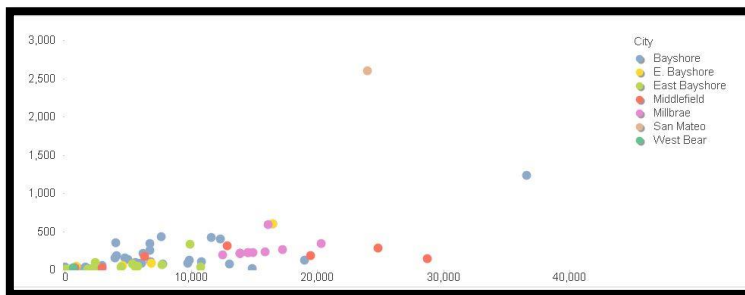
### Challenge

It would be interesting to group the customers by city and drill down by city, the customer sales by quantity. In the following steps, you explore how you can group the customers by city.

The solution is simple and straightforward; just add a second **dimension** to the chart, in our case, *Customer.Bill Address City*.

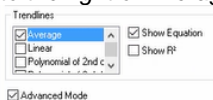
### Step-by-step

1. Right-click the scatter chart you have created in the preceding activity.
2. Select **Properties**, and then **Dimensions**.
3. In the **Available Fields/Groups** box, select *Customer.Bill Address City*.
4. Click **Add**.
5. For **Label**, type *City*.
6. Select **Suppress When Value Is Null**.
7. Click **OK**.



Show a trend line that displays the average number of products.

8. Right-click the scatter chart, and select **Properties**.
9. On the *Expression* tab, select **Advanced Mode**. The advanced **Expressions** tab opens.
10. Select the *Quantity* expression, and then under **Trendlines**, click on the *Average* check box. You can show the equation by checking the *Show Equation* box to the right of *Average*. Click **OK**.

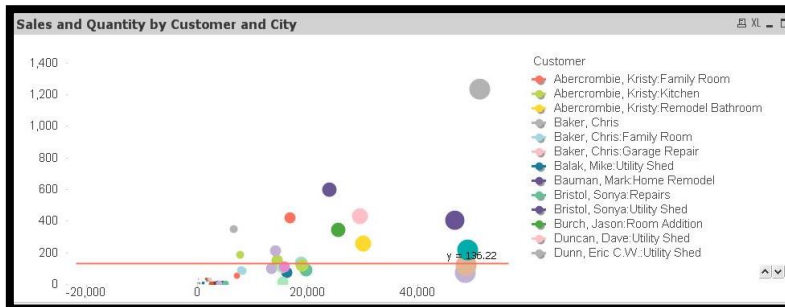


## Activity 7.11: Add a Third Expression

Finally, add a third expression that defines the size of the dots. Use Margin as the third expression.

### Step-by-step

1. Right-click the **scatter chart** you have created in the preceding activity.
2. Select **Properties**, and in the **Expressions** tab click **Add**.
3. In the **Edit Expression** dialog box type the following for *Margin*:  
 $[Sales] - \text{sum}(\{<\$(vExprSales)\}([Item.Average Cost]) * [Transactions.Quantity With Sign])$
4. The above expression translates to **Sales – Cost = Margin**.
5. Click **OK**.
6. For label, type *Margin*.
7. Click the *Presentation* tab.
8. Select **Max Bubble Size to 8 pt**.
9. Click **OK**.



### Adjusting the Sales and Null Values

When we brought in the **Sales** expression we used an Expression editor which looked different in the scatter plot. Now go back into the **Properties** of the scatter plot and change the **Sales** expression show as follows in the **Expressions** tab below:  $\text{sum}(\{<\$(vExprSales)\}[Transactions.Amount With Sign])$

*Notice that without adjusting for the parameters set in the  $\$(vExprSales)$  variable, the scatter plot just doesn't show the correct values. Now it will look fine.*

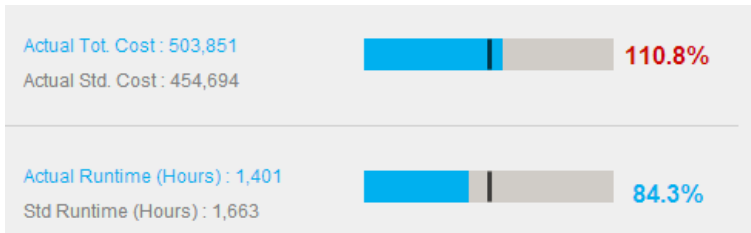
*Also, under the city list you see a dash in the legend. That comes from null values. Go to the **Dimensions** tab, click on **Customer.Bill Address City** and check the box for "Suppress When Value is Null".*

## 7.15 Gauge chart

The gauge chart has been in the business intelligence dashboard industry for a long time and is a very popular chart type. A gauge chart was first used to determine the approximate volume of liquid inside a tank. They are generally used to determine the range of a given value. Gauges, like an automotive speedometer, have been adapted to show data in the business dashboard world.

They work very well in a factory setting where the circular dial shows the range of a certain value and the user can very quickly identify whether output is good or bad. As a business dashboard component, it only works effectively in attracting the user's attention but doesn't work so well in getting the point across.

A linear gauge uses the space more effectively, and reducing the chart decoration makes the chart more intuitive.





## Activity 7.12: Create a linear gauge

### Challenge

In this report, we need to monitor the Margin% for the current year to date. Create a chart that displays the KPI Margin Percent based on the selection status. The chart must display the Margin Percentage, include segments for the target Margin Percentage, and clearly show which values fall above or below that point. Gauge charts are used to display the value of a single expression without dimensions.

These are the Margin% KPI's target values:

- Poor performance: Lower bound = up to 20%
- Mediocre performance: Mid bound = up to 60%
- Good performance: Upper bound = over 60%

Optimize your use of screen area. That's why you choose a linear gauge.

### Step-by-step

1. Right-click the **Dashboard** sheet, select **New Sheet Object**, and then **Chart**.
2. Under **General**, **Chart Type**, select the gauge chart.



3. Click **Next**. Gauges are dimensionless charts; therefore, click **Next**.
4. The **Edit Expression** dialog opens.

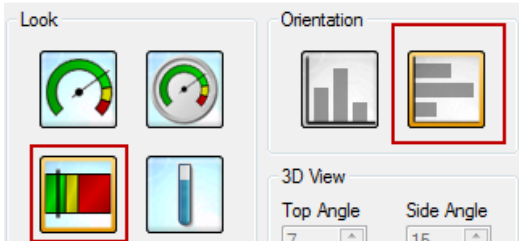
### Define the expression

5. Type the expression *Margin / Sales for Margin% where Margin is Sales - Cost*. When expanded the expression to type in is the following:  

$$\frac{(\text{sum}(\{<\$(vExprSales)>\}[Transactions.Amount With Sign]) - \text{sum}(\{<\$(vExprSales)>\}[\text{Item.Average Cost}]) * [Transactions.Quantity With Sign])}{(\text{sum}(\{<\$(vExprSales)>\}[Transactions.Amount With Sign]))}$$
6. Click **OK**.
7. For **Label**, type *Margin%*.
8. Click **Next**. The **Sort** dialog displays.
9. Click **Next**. The **Style** dialog displays.

### Define the style

10. Select **Look** and **Orientation** as shown here.



11. Click **Next**. The **Presentation** dialog displays.

### Define the scale

12. Clear **Autowidth Segments**.
13. For **Min** type -0.5 and for **Max**, type 1.0.
14. Under **Indicator, Mode**, select **Fill to Value** and for **Style** select **Line**.
15. Under **Show Scale** clear the check box.
16. Clear **Show Labels on Every Major Unit**.
17. Select **Hide Segment Boundaries**.
18. Select **Hide Gauge Outlines**.

### Define the segments

Three segments are required

- **Segment 1:** Poor performance: Lower bound = up to 20%
- **Segment 2:** Mediocre performance: Mid bound = up to 60%
- **Segment 3:** Good performance: Upper bound = over 60%

The segment's width is defined by its lower bound and the lower bound of the next segment.

Segment 1	Segment 2	Segment 3
Lower Bound=-0.5	Lower Bound=0.20	Lower Bound=0.60
<b>Min</b> Value = 0		<b>Max</b> Value = 1.0

19. Select *Segment 1* and then select a **Lower Bound** color, by clicking the color tile, which opens the **Color Area** dialog.
20. Under **Base Color**, click the color tile to bring up the **Color** window and select a new, *red* color.
21. Click **OK** twice.
22. Ensure that the **Lower Bound** value for this segment is set to -0.5.
23. Select *Segment 2* and then select a **Lower Bound** color, by clicking the color tile, which opens the **Color Area** dialog.

24. Under **Base Color**, click the color tile to bring up the **Color** window and select a new, *yellow* color.
25. Click **OK** twice.
26. Set the **Lower Bound** value to *0.20*.
27. Under **Segments Setup**, click **Add**. A new segment is created, *Segment 3*.
28. Select *Segment 3* and repeat the preceding steps to select a new, *green* color.
29. Set the **Lower Bound** value to *0.60*.

#### Add a reference line

30. Under **Reference Lines**, select **Add**. The **Reference Lines** dialog opens.
31. For **Label**, type **Goal**.
32. For **Expression**, type *0.6*.
33. Click **OK**.

#### Show the number in the chart

34. Under **Text in Chart**, select **Add**.  
Under **Text**, type  

$$=Num((sum(\{<\{vExprSales\}[Transactions.Quantity With Sign]) - sum(\{<\{vExprSales\}([Item.Average Cost])*[Transactions.Quantity With Sign])) / (sum(\{<\{vExprSales\}[Transactions.Quantity With Sign])), '##.##\%')$$
35. You can access the **Edit Expression** dialog box using the ellipse button. This is the same expression for **Margin%** but with a number formatting in percentage.
36. Click **Font**. The **Font Dialog** opens.
37. Select **Font Style** *Bold*, and **Font Size** *11*.
38. Click **OK**. The **Font Dialog** closes.
39. Click **OK**. The **Chart Text** dialog closes.
40. Click **Next**. The **Actions** dialog displays.
41. Click **Next**. The **Colors** dialog displays.

#### Select a transparent background

42. Under **Frame Background**, set the slider for **Transparency** to *100%*.
43. Click **Next**. The **Number** dialog displays.

#### Define number format

44. Select *Margin%* and under **Number Format Settings**, select **Fixed to 2 Decimals**.
45. Select **Show in Percent (%)**.
46. Click **Next**. The **Font** dialog displays.
47. Click **Next**. The **Layout** dialog displays.
48. Click **Next**. The **Caption** dialog displays.

#### Remove the caption

49. Clear **Show Caption**.
50. Click **Finish**.



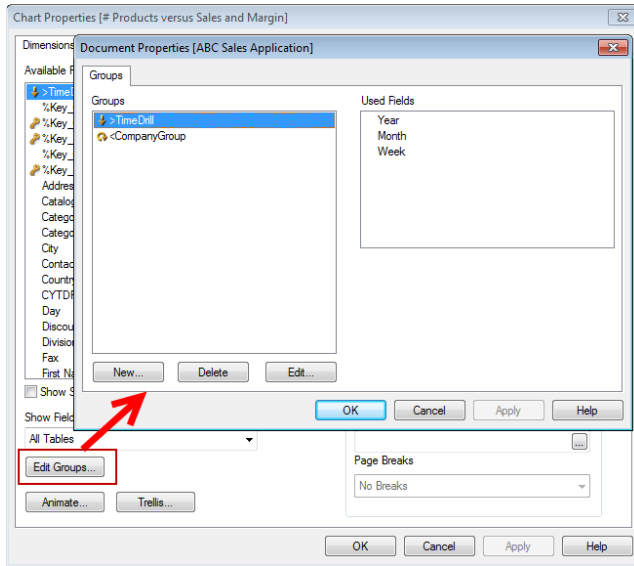
### Move the text in chart

51. Press **Ctrl + Shift**, and use your mouse to resize and move the gauge components for best display and fit. Resize the gauge to your dimensions using the handles.



## 7.16 Dimension groups

You can create drill-down or cyclic field groups to be used as dimensions.



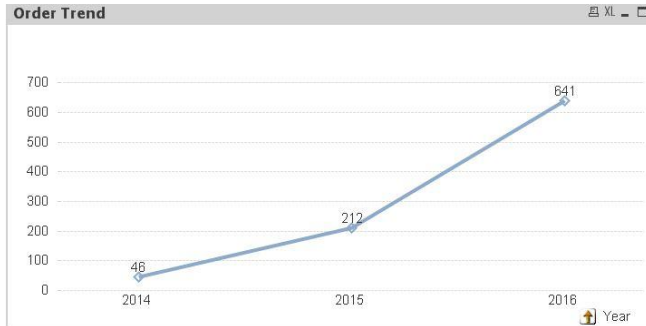
A list shows all groups in the document. An icon to the left of each group name indicates whether it is a drill-down group or a cyclic group. You can select a group by clicking in the list. The selected groups are shown in the **Used Fields** area.

### 7.16.1 Drill-down groups

When several fields form a *natural hierarchy*, it makes sense to create a **drill-down group**. Typical examples of hierarchic groups are:

- **Time:** Year, Quarter, Month
- **Geography:** Continent, Country, State, City

When you use a **drill-down group** as a **dimension** in a chart, the chart uses the first field in the group's list of fields that has more than one possible value. If you make selections that cause the field to have only one possible value, the next field in the list is used instead, provided that it has more than one possible value. If no field in the list has more than one possible value, the last field is used anyway.

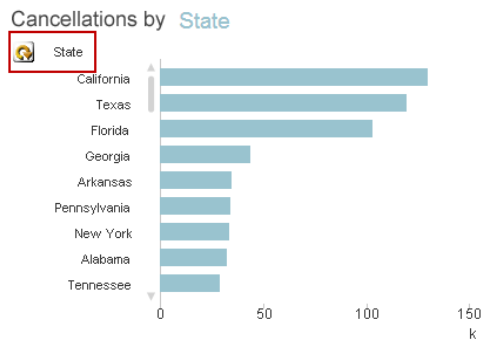


In the first example, *Year* is used as chart **dimension** until a single year is selected. The chart then shows *Quarter*. If a single quarter is selected, the chart switches to *Month*.

As selections disappear so that more than one field becomes available in the upper fields of the group's field list, the chart is automatically drilled back up. You can force a drill-up by clicking on the drill-up icon in the chart.

### 7.16.2 Cyclic groups

Sometimes you may find it useful to group fields that do not form a natural hierarchy. You then enable the user to make quick changes to the data to be displayed in the chart or list box.



You can group any fields together in a **cyclic group**. When a **cyclic group** is used as a chart **dimension**, the chart initially uses the first field in the list. You may then switch to another field by clicking the *cycle icon* in the chart. The fields are displayed in the order in which they appear in the group's field list. When the last field in the list has been used, the turn goes back to the first field again. In this way, the chart may cycle through the fields indefinitely.

## 7.17 Fast Type Change

As a designer, you are often challenged by the limited screen area. Imagine you have two different user types in your audience. One group, prefers visual charts and the other wants to see the numbers in a table.

It is possible to create one object to serve both user types using the fast type change option on the **Chart Properties > General** tab.

An icon showing the next available chart type (allowed types selected for fast type change) displays in the chart. When you left-click the icon, the chart changes to the indicated type. When you right-click the icon, you see a drop-down menu with all selected types.

As the application designer, you can select the **Preferred Icon Position** of the fast type change icon. If you select **In Caption**, the icon displays in the chart caption, provided that a caption is shown. If you select **In Chart**, the icon displays inside the chart, provided that the chart is not a pivot table or straight table. If the preferred position is not available, Advanced Reporting attempts to use the other option. In table charts without captions, no icons are shown.

## 7.18 Creating contrast in charts

You can create structure and hierarchy by applying the principle of contrast even in a single chart. To start, define which parts of the chart are most important. Is there anything that can be taken away or dimmed? Is a dimension's label equally important as the expression values? You can use lighter grays for the axis or grid and highlight important parts like values on data points in a darker font.

## Activity 7.13: Add a Fast Type Change option

### Challenge

On the **Dashboard**, you want to show the **Sales Trend** as a table. The CMO wants to see the actual numbers for *Sales* and *Margin* without navigating to another sheet. Perhaps the Designer in your team wants to see the same Sales Trend chart as a visualization. You can make both of them happy by using the **Fast Type Change** option which toggles from one chart type to another in the same space or location. This is a great space saving technique.

### Hints

Add a **Fast Type Change** option to the **Sales Trend** combo chart. Ensure that you select both the original chart type and the one you change to.

### Step-by-step

1. Right-click the **Sales Trend** chart on the **Dashboard** sheet, and select **Properties**.
2. On the **General** tab, under **Fast Type Change**, **Allowed Types**, select **Combo Chart** and **Straight Table**.  
**NOTE:** You must pick the original chart type as well as the other chart types you want to put into the **Fast Type Change** selection.
3. The icon for the **Fast Type Change** can be positioned in the chart or in the caption area. Click **OK**.

### Solution

**Fast Type Change Icon** →

Fast Type Change

Allowed Types

- ☐ Bar Chart
- ☐ Line Chart
- ☒ Combo Chart
- ☐ Scatter Chart
- ☐ Pie Chart
- ☐ Pivot Table
- ☒ Straight Table

Preferred Icon Position

☐ In Chart

☒ In Caption

Sales Trend			
Month	Sales	Margin	Margin%
	668,243	646,753	96.78%
Jan	48,953	43,688	89.25%
Feb	31,354	30,598	97.59%
Mar	42,041	40,461	96.24%
Apr	28,189	27,326	96.94%
May	42,684	42,614	99.84%
Jun	46,939	43,546	92.77%
Jul	34,547	34,547	100.00%
Aug	79,140	79,140	100.00%
Sep	55,129	54,512	98.88%
Oct	80,407	79,203	98.50%
Nov	88,052	85,987	97.65%
Dec	90,807	85,130	93.75%



## Activity 7.14: Create a drill-down dimension group

### Challenge

In some of your charts your users want to browse quickly between time dimensions to check trends by *Year*, *Quarter*, and *Month*.

### Hints

Create a drill-down group for the **Transactions Trend** chart. It should contain the fields *Year*, *Month*, and *Week*. Remove the *Month* dimension and use the group as dimension.

### Naming conventions

- Cycle Group starts with a “<”
- Drill-down Group starts with a “>”

Group Settings

Group Name:  ☒ Drill-down Group ☐ Cyclic Group

Available Fields:

- %Key\_Categories
- %Key\_Customers
- %Key\_Employees
- %Key\_Offices
- %Key\_Products
- Address
- CataloguePrice
- CategoryDescription
- CategoryName
- City
- CompanyName
- ContactName
- Country
- CYTDFlag
- Date

Used Fields:

- Year
- Quarter
- Month

Buttons: Add >, Add All >>, < Remove, Promote, Demote

Show Fields from Table:

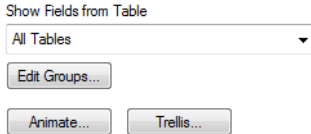
Label:

Sort Orders:

Buttons: OK, Cancel, Help

## Step-by-step

1. Right-click the **Transactions Trend** chart on the **Dashboard** sheet.
2. Select **Properties**, and then select **Dimensions**.



3..... Click **Edit Groups**. The **Groups** dialog opens.

4. Click **New**.
5. The **Group Settings** dialog displays.
6. Ensure the radio button has *Drill-down Group* selected.
7. For **Group Name**, type *>TimeGroup*.
8. In the **Available Fields** box, select *Year*, *Quarter*, and *Month*. The order of these fields do matter since drill-down groups are based on hierarchy.
9. Click **Add**.
10. Click **OK**, and then, in the **Groups** dialog, click **OK** again.
11. In the **Dimensions** dialog, in the **Used Dimensions box**, remove *Month*.
12. Select *>TimeGroup* and click **Add** from the Available Fields/Groups box.
13. Click **OK**.
14. The **Transactions Trend** chart now looks different. You can click on the *year* of your choosing and it shows you the *quarters* in that year. Clicking on a *quarter* drills down to the *months* in that quarter. Finally picking a month will give you a single point value.
15. To go back up the hierarchy, click on the upward pointing arrow on the bottom right hand side. That will take you up the levels to the topmost hierarchy level which is *year*.

## Solution

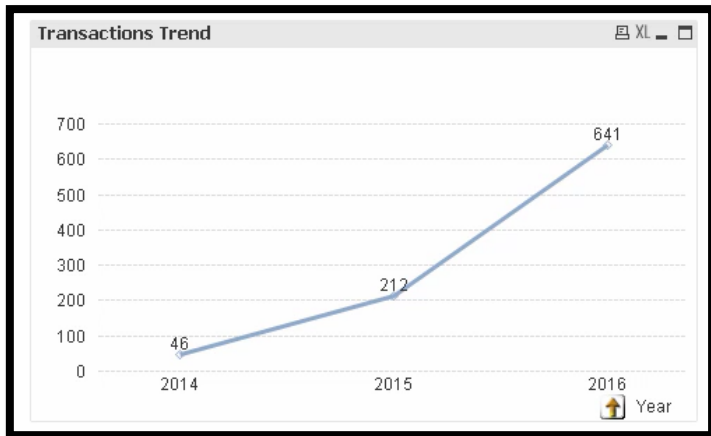


Figure Drill Down Group

## 7.19 Containers

The **Container** object serves as a container for sheet objects. Small tabs or a drop-down list enable the user to choose which object to show. The Container object can thus be used instead of the more traditional **Fast Type Change** to toggle between object types. Also, the **Container** object has the additional advantage that the objects in the container can use different dimensions and expressions.

You can group objects in a **container** by *function*, *context*, or *both*. **Container objects** give the report designers a way to present multiple perspectives on a set of facts in a single space-saving, easy-to-use object.

**Containers** simplify the presentation and enhance the analysis of any set of document objects.

You build **containers** by selecting from the list of available document objects. Users sequence the list and also indicate their preference for object selection. Before you can place objects in a **container**, you have to create them.

There are two **container** types: *Grid* and *Single Object*. *Grid* allows you to place multiple objects in columns and rows. *Single Object* allows you to display one object at a time.

## Activity 7.15: Create a container

### Challenge

There is not enough screen area to show all objects side-by-side on any of the sheets you created. You want to show the **Sales by Item**, **Top 5 Items** charts on and the **Bottom 5 Items in a separate sheet called Container**.

### Hints

- Place a container object on the **Container** sheet.

Define which charts to include in the container on the **General** tab. Each object has an ID number. Upon creation, every sheet object is assigned a unique ID.

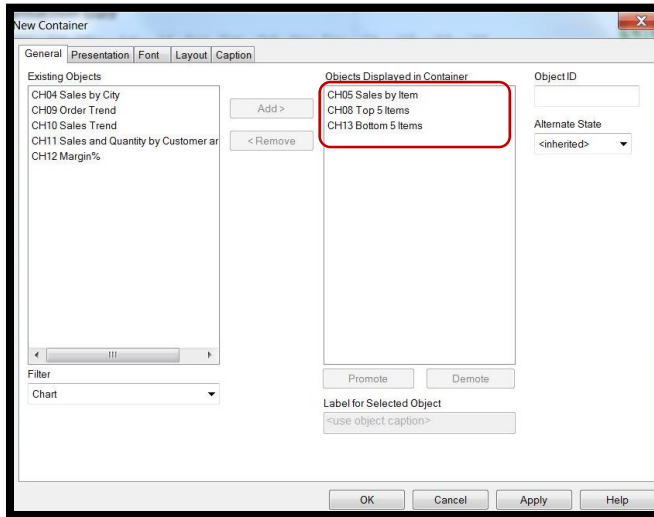
The ID consists of a combination of letters defining the type of object, as well as of a number. The first container in a document is assigned the ID *CT01*.

An object ID may be changed to any other string that is currently not being used for any other sheet object, sheet, or bookmark in the document.

- Take a look at the **Presentation** tab. Discuss how and where you can use a *Grid* or *Single Object* container.

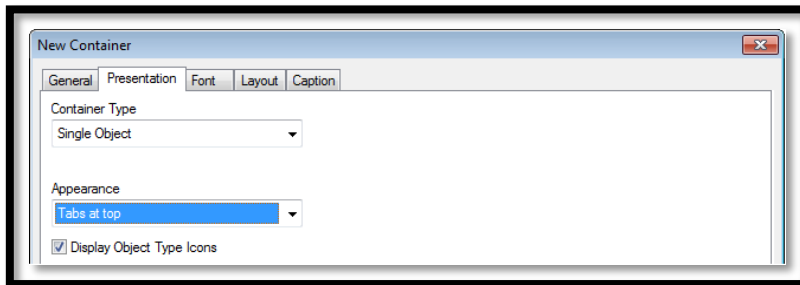
### Step-by-step

1. Right-click the **Product Details** sheet and select Copy Sheet.
2. Name the **copy of Product Details** sheet to “**Container**” by right clicking on the tab, going to **Sheet Properties**, going to the **General** tab and typing “**Container**” in the Title field.
3. Select **New Sheet Object>Container**. The **General** dialog displays.
4. Under **Existing Objects**, under **Filter**, select *Charts*, and then select the **Sales by Item**, **Bottom 5 Items** and **Top 5 Items**, and then click **Add** to add them to **Objects Displayed in Container**.



### Select the container type

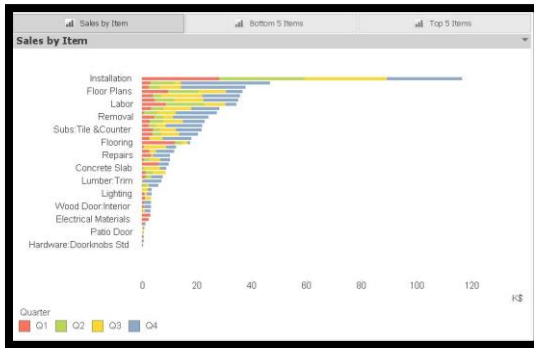
5. Click the **Presentation** tab.
6. For **Container Type**, select *Single Object*.
7. Under **Appearance** select *Tabs at top*.



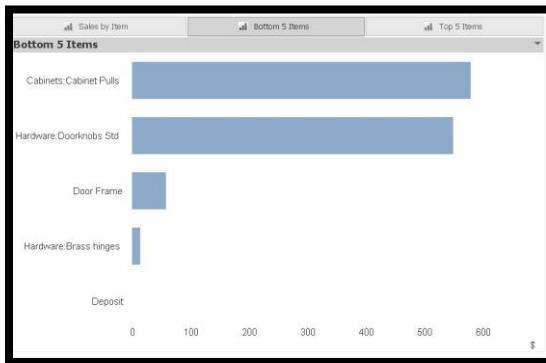
### Remove the caption

8. Click the **Caption** tab.
9. Clear **Show Caption**.
10. Click **OK**.
11. If you want to move the **Container** object on the sheet, hold the **Alt** button down and move the container at the header level. If you don't, it will dislodge one of the charts away from the container.

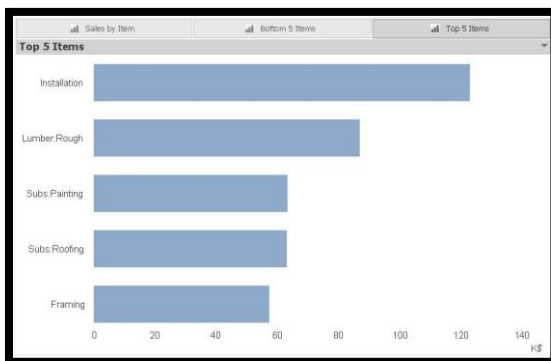
## Sales by Item - Container Object 1



## Bottom 5 Items – Container Object 2



## Top 5 Items – Container Object 3



## Solution

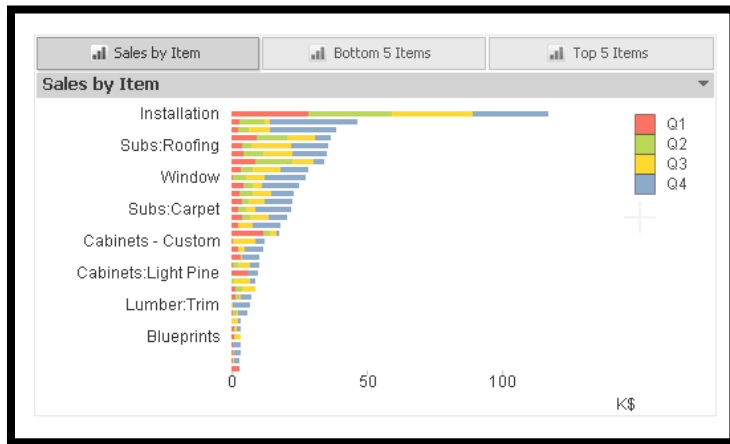


Figure Container Object with Three Charts



## 8 Table design

### Objectives

- Identify which table to use
- Explain how to select and sort values in tables.
- Define the difference between a straight table, pivot table, and a table box.
- Explain how to enhance a table with mini charts and visual cues.

### 8.1 Table box

Think of a table box as a combination of list boxes. Instead of placing each field in its own object separately, however, the table box combines them. The content of every row is logically connected. The columns may be fetched from different input tables, letting the user create tables from any possible combination of input tables.

So, when you want to present the contents of several list boxes in one table, you need a table box.

No	President	Party	Served From	Served To
1	Washington,...	Federalist	1789	1797
2	Adams, John	Federalist	1797	1801
3	Jefferson, Th...	Dem.-Rep	1801	1809
4	Madison, James	Dem.-Rep	1809	1817
5	Monroe, James	Dem.-Rep	1817	1825
6	Adams, John...	Dem.-Rep	1825	1829
7	Jackson, And...	Democrat	1829	1837
8	Van Buren, ...	Democrat	1837	1841
9	Harrison, Will...	Whig	1841	1841
10	Tyler, John	Democrat	1841	1845
11	Polk, James ...	Democrat	1845	1849
12	Taylor, Zachary	Whig	1849	1850
13	Fillmore, Millard	Whig	1850	1853
14	Pierce, Franklin	Democrat	1853	1857
15	Buchanan, J	Democrat	1857	1861

A table box is a table with rows and columns. Each column corresponds to a field (just like the column in a list box). The rows correspond to every possible combination of data in these columns.

There are, of course, numerous settings for table boxes such as the layout and sort order. They are found under **Properties** of the table box.

## 8.2 Selections in table boxes

With Advanced Reporting's associative logic, the contents of the table box are automatically updated when you make selections in other objects.

As in a list box, when you select cells in a table box they turn green, but when you release the mouse button, they revert to their original color. The size of the table is adjusted to display only the result of your selection.

Selections in a column are indicated with a beacon to the right of the field name.



Customer.Full N...	Customer.Ba...	Customer.Paid	Transactions....	Customer.Cust...	Customer.Bill Address 2	Customer.Bill Address...
Bauman, Mark:Home...	0	1	990 Residential	910 S. Ivy	Bayshore	
Fisher, Jennifer:Home...	0	1	990 Residential	7882 N. Lantana Lane	E. Bayshore	
Melton, Johnny:Dental...	8618.64	0	990 Commercial	300 Main St, Suite 3	Bayshore	
Morgenthau, Jenny:...	0	1	990 Residential	37105 E. Oasis Dr.	Middlefield	
Nelson, Wilma:Office ...	0	1	990 Commercial	300 Main St, Suite 5	Bayshore	
Cook, Brian:Kitchen	3979.33	0	980 Residential	345 Cherry Lane	Middlefield	
Mawoo, Jeanette:Utili...	0	1	978.39 Residential	6313 Orange Blossom Dr	Bayshore	
Ruff, Bryan:Utility Shed	0	1	975.8 Residential	782 Skyline Dr	East Bayshore	
Luke, Noelani:Remodel...	0	1	975 Residential	913 Bay View	East Bayshore	
Baker, Chris:Family R...	0	1	973.36 Residential	415 W. Desert Bloom	Bayshore	
Milner, Eloyse:Room ...	0	1	970 Residential	4242 Cypress Hill Rd	Bayshore	
Atelleo, Ernesto:Kitchen	0	1	966 Residential	376 Pine St, #5E	Bayshore	
Overfield, David:Utility...	0	1	962 Residential	7762 N. Litterer	Bayshore	
Abercrombie, Kristy:Ki...	0	1	960 Residential	5647 Cypress Hill Rd	Bayshore	
Overhead	0	1	950.23 -	-	-	
Pretehl Real Estate:195...	5026.5	0	950 Commercial	222 Middlefield Ave	Middlefield	
Freeman, Kirby:Reno...	0	1	929.5 Residential	6856 Ocean View	Bayshore	
Nelson, Wilma:Office ...	0	1	925 Commercial	300 Main St, Suite 5	Bayshore	
Easley, Paula:Garage	0	1	912 Residential	140 Bay View	East Bayshore	
Overhead	0	1	912 Residential	140 Bay View	East Bayshore	

When you right-click a certain column in a table box, an object menu displays that contains many of the options found in the list box object menu.

## 8.3 Sorting in Table Boxes

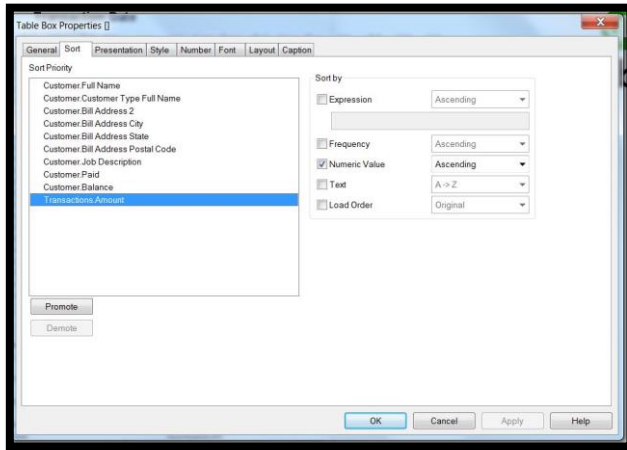
There are two different methods of sorting in table boxes. First, you can set the order in which the columns are displayed, from left to right. You do this by clicking the title row of a column and dragging it to a new position. A blue outline of the field indicates that you are performing a drag-and-drop operation.

You can also set the order in **Table Box Properties>General** dialog by means of the **Promote** and **Demote** buttons.

Secondly, table box rows are sorted according to the sort order for the values of specific fields. This is done in **Table Box Properties>Sort** dialog. There you can also set a sort priority by moving fields up or down in the list. The sort priority is independent from the order in which the columns are displayed.

An alternative and convenient way is to right-click the column of the field you to sort and select the **Sort** command from the table box menu. Double-clicking the column header promotes the field name to the top position of the Sort Priority list. Repeated use of this command toggles the sort order for the selected field between ascending and descending order. A small arrow icon at the top of the column indicates by which field the table is sorted and if the sort order is in ascending or descending order.

### Sorting in Table Boxes



The **Number**, **Font**, **Layout**, and **Caption** dialog tabs are almost the same as those for list boxes and do not require further presentation.

#### 8.4 Setting the Alignment of Columns

The **Table Box Properties>Presentation** tab contains the options for text alignments in the columns. You can separately determine the alignment of text and numbers. Select one of the Fields and make the necessary adjustments under Alignment. It is a design best practice to choose the same alignment for the column label, and text and numbers.

## Solution:

Customer Full Name	Customer Balance	Customer Paid	Transactions	Customer Cust...	Customer Bill Address 2	Customer Bill Address...
Bauman, Mark Home ...	0	1		990 Residential	910 S. Ivy	Bayshore
Fisher, Jennifer Home...	0	1		990 Residential	7882 N. Lantana Lane	E. Bayshore
Melton, Johnny Dental...	8618.64	0		990 Commercial	300 Main St, Suite 3	Bayshore
Morgenthau, Jenny...	0	1		990 Residential	37105 E. Oasis Dr.	Middlefield
Nelson, Wilma Office ...	0	1		990 Commercial	300 Main St, Suite 5	Bayshore
Cook, Brian Kitchen	3979.33	0		990 Residential	345 Cherry Lane	Middlefield
Memo, Jeanette Utili...	0	1		978.39 Residential	8313 Orange Blossom Dr	Bayshore
Ruff, Bryan Utility Shed	0	1		975.8 Residential	782 Skyline Dr	East Bayshore
Luke, Noelani Remodel...	0	1		975 Residential	913 Bay View	East Bayshore
Saker, Chris Family R...	0	1		973.36 Residential	415 W. Desert Bloom	Bayshore
Milner, Elyse Room ...	0	1		970 Residential	4242 Cypress Hill Rd	Bayshore
Nathello, Ernesto Kitchen	0	1		966 Residential	376 Pine St, #5E	Bayshore
Overfield, David Utility...	0	1		962 Residential	7762 N. Littner	Bayshore
Abercrombie, Kristy Ki...	0	1		960 Residential	5647 Cypress Hill Rd	Bayshore
Overhead	0	1		950.23 -	-	-
Pretell Real Estate 155...	5026.5	0		950 Commercial	222 Middlefield Ave	Middlefield
Freeman, Kirby Remo...	0	1		929.5 Residential	6856 Ocean View	Bayshore
Nelson, Wilma Office ...	0	1		925 Commercial	300 Main St, Suite 5	Bayshore
Easley, Paula Garage	0	1		912 Residential	140 Bay View	East Bayshore
HomeAdvisor - Workshop	0	1		905 Residential	8647 Pioneer Hill Rd	Bayshore

## 8.5 Straight table

In opposition to the pivot table, the **straight table** cannot display subtotals or serve as a cross table. However, any of its columns can be sorted and each of its rows contains one combination of dimensions plus expressions.

A **straight table** is often used with one **dimension**. Having the dimension as a cyclic or drill-down group offers more flexibility in looking at the same metrics.

A **straight table** is often used with one **dimension**. Having the dimension as a cyclic or drill-down group offers more flexibility in looking at the same metrics.

**Mini Charts** may be used with straight tables only. Mini charts have the benefit of showing a visual representation of the data in a smaller area within the chart. **Mini charts** can display lines to show movements and trends, bars to show quantitative values, and whiskers to show win/loss values.

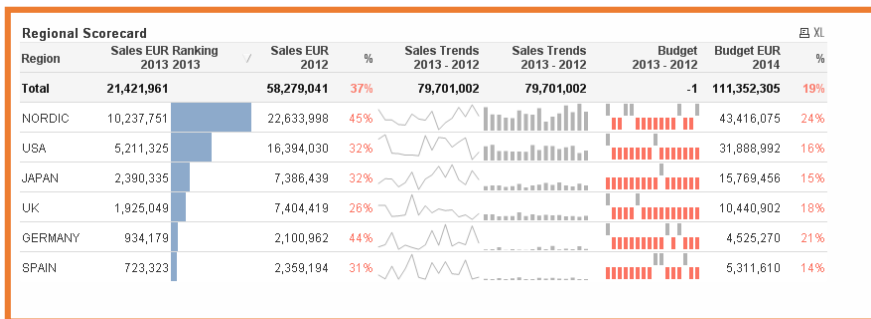


Figure: Mini Chart

## 8.6 Pivot table

The **pivot table** is one of the most powerful tools for analyzing data. It offers substantial functionality but is still easy to use.

Account Group		Expenses				Expenses			
Desc	Account Desc	CY	Budget	Variance	%	LY	Variance	%	
General Costs	Audit Fees	\$1	\$0	-\$1		\$0	\$1		
	Bad Debts	\$78	\$906	\$828	91.3%	\$94	-\$16	83.0%	
	Claims	\$32	\$386	\$354	91.6%	\$121	-\$88	26.9%	
	Commission	\$1,256	\$9,165	\$7,910	86.3%	\$2,982	-\$1,727	42.1%	
	Communications	\$184	\$1,427	\$1,243	87.1%	\$417	-\$233	44.1%	
	Computer Costs	\$0	\$0	\$0		\$0	\$0		
	Consumables	\$49	\$290	\$241	83.2%	\$114	-\$65	42.8%	
	Discount Allowed...	\$432	\$1,440	\$1,008	70.0%	\$0	\$432		
	Entertainment	\$87	\$554	\$467	84.4%	\$227	-\$141	38.1%	
	Hire Contract Ch...	\$0	\$0	\$0		\$0	\$0		
	Insurance	\$47	\$254	\$206	81.3%	\$97	-\$49	49.1%	
	Lease Costs	\$327	\$2,310	\$1,983	85.8%	\$827	-\$500	39.5%	

**Pivot tables** show *dimensions* and *expressions* in rows and columns, for example, in cross tables. You can group the data in pivot tables. Pivot tables can show *partial sums*.

## 8.7 Comparing tables

Table boxes, pivot tables, and straight tables may look similar, but they are distinctly different object types. Each deals with the problem of presenting data in table form in its own way, as summarized in the following table:

	Pivot table	Straight table	Table box
Type of Sheet Object	Chart	Chart	Table box
Type of data in the table	Dimension + expression values	Dimension + expression values	Field values
Making selections in field?	Dimension values only	Dimension values only	Yes
Sorting of values?	Limited to changing the settings for dimension values in Properties: Sort	Yes, dimension + expression values	Yes
Quick sorting in columns?	No	Yes, dimension + expression values	Yes
Calculations/expressions?	Yes	Yes	No
Grouping of data?	Yes	No	No
Partial sums?	Yes	No	No
Total sums?	Yes	Yes	No
Mini Charts	No	Yes	No

## Activity 8.1: Create a table box

### Challenge

The report needs to login the customer's profile in a table so that at a glance the Customer's balance, contact information and other information may be seen.

### Hints

- Create a table box on the **Customer Details** sheet.
- Select the fields by filtering on the *Customer* table only.
- Add the *Transactions.Amount* field from the *Transactions* table.
- Add drop-down selects to fields where you need to search for names or amounts.

### Step-by-Step

1. Right-click on the **Customer Details** sheet.
2. Select **New Sheet Object>Table Box**. The **General** tab displays.
3. Under **Title**, type *Customer Details*.
4. Under **Show Fields from Table**, select *Customer*. This selects the customer table only.

#### Select some fields

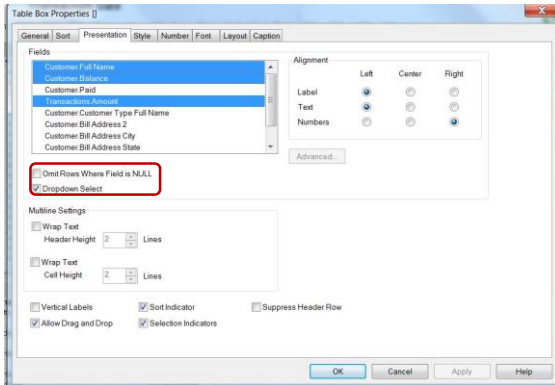
5. Under **Show Fields From Table**, select the Customers table. Select *Customer.Full Name*, *Customer.Customer Type Full Name*, *Customer.Balance*, *Customer.Paid*, *Customer.Bill Address 2*, *Customer.Bill Address City*, *Customer.Bill Address State*, *Customer.Bill Address Postal Code*
6. Click **Add**. You can add these fields one at a time or use the Ctrl key to select all of these at once and then add them to the **Fields Displayed in TableBox** list on the right hand side.
7. Under **Show Fields from Table**, select *Transactions*.
8. Under **Available Fields**, select *Transactions.Amount*
9. Click **Add**.
10. Now under **Show Fields From Table**, pick *All Tables* since you do not know exactly which table the next field comes from. Select *Item.Full Name*.
11. Nine columns have been added to our table box.

#### Select Dropdown selects

12. Click the **Presentation** tab.
13. Under **Fields**, select *Customer.Full Name*, *Customer.Balance*, *Transactions.Amount* and then select **Dropdown Select**.



14. For the field *Customer.Paid* and *Transactions.Amount*, check the box *Omit Rows Where Field is NULL*. You don't want to see any null values for these fields.
15. Click **OK**.



Solution

**Drop Down Selects**

Customer Full N...	Customer Ba...	Customer Paid	Transactions.Am...	Customer Cust...	Customer Bill Address 2	Customer Bill Address...
Overhead	0	1	415000	-	-	-
Overhead	0	1	325000	-	-	-
Overhead	0	1	296293	-	-	-
Overhead	0	1	90000	-	-	-
Overhead	0	1	78926.91	-	-	-
Overhead	0	1	60000	-	-	-
Overhead	0	1	43474.62	-	-	-
Overhead	0	1	40203.88	-	-	-
Prentice, Adelaide/Ga...	0	1	36575 Residential	1800 Applesseed Court	Bayshore	-
Overhead	0	1	27874.62	-	-	-
Vasquez, Anabel/Bas...	0	1	25471.56 Residential	5601 Legacy Parkway	San Mateo	-
Overhead	0	1	23000	-	-	-
Vasquez, Anabel/Bas...	0	1	24609.56 Residential	5601 Legacy Parkway	San Mateo	-
Vasquez, Anabel/Bas...	0	1	24563.06 Residential	5601 Legacy Parkway	San Mateo	-
Prestel Real Estate/75...	0	1	23503.14 Commercial	222 Middlefield Ave	Middlefield	-
Overhead	0	1	22641	-	-	-
Cook, Brian/2nd story...	5418	0	22427.44 Residential	345 Cherry Lane	Middlefield	-
Overhead	0	1	21883.89	-	-	-
Overhead	0	1	21692	-	-	-
Overhead	-	-	~00000	-	-	-

Activity 8.2: Explore sort options in table boxes

Sort the table by Transaction.Amount descending

- You can sort by clicking on the column and dragging the column to the left or right and positioning to where you want when you see a blue vertical arrow.
- On the **General** Properties tab, use the **Promote** and **Demote** buttons to change the order of the columns.
- Go to **Properties->Sort** of the **Table Box** and you can sort from there as well. You have choices to sort by Ascending, Descending or by Expression.

Filter Transactions amounts:

- Use the drop-down select and search for *Transactions.Amount* less than 1000 (type *<1000*). Double click on the header to see that sorting is from highest to lowest for values under \$1000 in descending order. Double click again and this column toggles and sorts in ascending order. Shown below are all Transaction values under \$1000.

Customer Full N...	Customer Ba...	Customer Paid	Transactions...	Customer.Cust...	Customer.Bill Address 2	Customer.Bill Address...
Bauman, Mark:Home ...	0	1		990 Residential	910 S. Ivy	Bayshore
Fisher, Jennifer:Home...	0	1		990 Residential	7882 N. Lantana Lane	E. Bayshore
Melton, Johnny:Dental...	8618.64	0		990 Commercial	300 Main St, Suite 3	Bayshore
Morgensthaler, Jenny...	0	1		990 Residential	37105 E. Oaks Dr.	Middlefield
Nelson, Wilma:Office ...	0	1		990 Commercial	300 Main St, Suite 5	Bayshore
Cook, Brian:Kitchen	3979.33	0		980 Residential	345 Cherry Lane	Middlefield
Memo, Jeanette:Utili...	0	1		978.39 Residential	8313 Orange Blossom Dr	Bayshore
Ruff, Bryan:Utility Shed	0	1		975.8 Residential	782 Skyline Dr.	East Bayshore
Luke, Norman:Remodel...	0	1		975 Residential	913 Bay View	East Bayshore
Baker, Chris:Family R...	0	1		973.36 Residential	415 W. Desert Bloom	Bayshore
Milner, Eloyse:Room ...	0	1		970 Residential	4242 Cypress Hill Rd	Bayshore
Natello, Ernesto:Kitchen	0	1		966 Residential	376 Pine St, #5E	Bayshore
Overfield, David:Utility...	0	1		962 Residential	7762 N. Littner	Bayshore
Abercrombie, Kristy:Ki...	0	1		960 Residential	5647 Cypress Hill Rd	Bayshore
Overhead	0	1		950.23	-	-
Prebitt Real Estate:155...	5026.5	0		950 Commercial	222 Middlefield Ave	Middlefield
Freeman, Kirby:Remo...	0	1		929.5 Residential	6656 Ocean View	Bayshore
Nelson, Wilma:Office ...	0	1		925 Commercial	300 Main St, Suite 5	Bayshore
Estley, Paula:Garage	0	1		912 Residential	140 Bay View	East Bayshore
Thompson, Susan:P...	0	1		910 Residential	8547 Cypress Hill Rd	Bayshore

- Export the list to Excel.

**Note:** Showing all Customer Details in an object at this granular level can have a negative impact on performance.

## Activity 8.3: Create a straight table

### Challenge

You need to provide a chart that shows a detailed view of the Customers' Sales, Margin, #Transactions and the Latest Transaction Date.

The users need to see the actual numbers, but also a visual representation of the sales trend and #Transactions in a linear gauge.

### Hints

- Use *Transactions.Customer Full Name* as the dimension and label it *Customer*.

### Measures

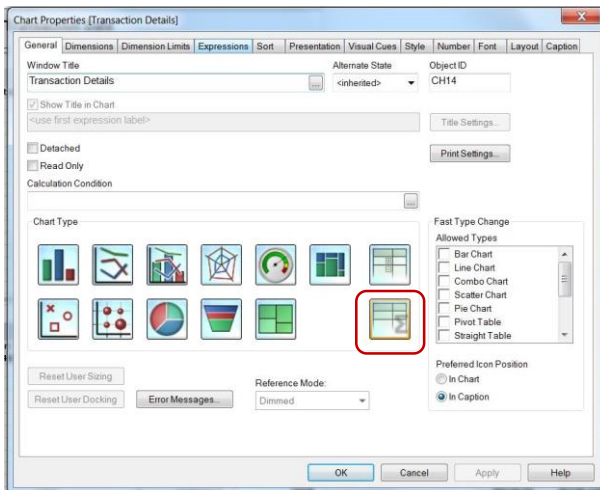
- Create the measures as stated in the following table:

Measure	Definition	Representation
Sales	<code>Sum({&lt;\$(vExprSales)&gt;} [Transactions.Amount With Sign])</code>	Text
Sales Trend	<code>Sum({&lt;\$(vExprSales)&gt;} [Transactions.Amount With Sign])</code>	Mini Chart - Bars
Margin	<code>[Sales]-sum({&lt;\$(vExprSales)&gt;} ([Item.Average Cost])*[Transactions.Quantity With Sign])</code>	Text
#Transactions	<code>Count(DISTINCT [Transactions.Ref Number])</code>	Text
#Transactions Gauge	<code>Count(DISTINCT [Transactions.Ref Number])</code>	Linear Gauge
Latest Transaction Date	<code>Max(Transactions.Txn Date)</code>	Text

## Step-by-step

### Create a straight table

1. Right-click on the **Product Details** sheet.
2. Select **New Sheet Object**, and then select **Chart**. The **General** dialog box displays.
3. Under **Chart Type**, select the *straight table*. Straight table and pivot table fall into the chart object type.
4. For **Window Title**, type *Transaction Details*.



5. Click **Next**. The **Dimensions** dialog box displays.

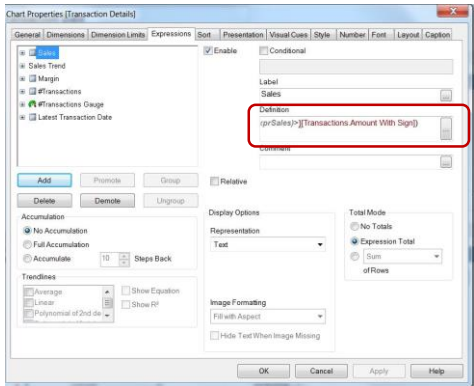
### Define the dimension

6. In the **Available Fields/Groups** container, select *Transactions.Customer Full Name* and Type *Customer* for **Label**.
7. Click **Next**. The **Expressions** and the **Edit Expression** dialog display.

### Define the expressions

8. You need **Sales**, so type  $\text{Sum}(\{<\$(vExprSales)>\}[Transactions.Amount With Sign])$ . Click **OK**.
9. In the **Expressions** dialog, for **Label**, type *Sales*.
10. Click **Add**. The **Edit Expression** dialog box displays.
11. You also need the **Margin**, so type:  
 $[Sales]-\text{sum}(\{<\$(vExprSales)>\}([Item.Average Cost])*[Transactions.Quantity With Sign])$ . Because the expression for *Sales* has been labeled as "Sales", you can use this shortcut instead of typing out the whole expression for "Sales". This simplifies the writing of expressions quite a bit

12. Click **OK**.
13. For the **Label box**, type *Margin*.
14. Click **Add**. The **Edit Expression** dialog box displays.
15. You also need the number of transactions, so type *Count(DISTINCT [Transactions.Ref Number])*. Notice that once you start typing in Transactions.Re..., it suggests several field names. When you see the Transactions.Ref Number, arrow down and press ENTER. It is best to let the system autocomplete the field value to avoid any errors in spelling. Also, by doing this the system adds the square brackets around the field name. Square brackets are absolutely necessary when the field name has spaces.
16. Click **OK**.
17. For **Label**, type *#Transactions*.
18. Click **Add**. The **Edit Expression** dialog box displays.
19. You also need the latest transaction date, so type *Max([Transactions.Txn Date])*.
20. Click **OK**.
21. For **Label**, type *Latest Transaction Date*.
22. The expression part of the straight table is complete. Now we create the two mini charts.
23. Click on *Sales* and right click and Copy. Go to an empty area of the box and Paste in the Expressions box.
24. Change the label to Sales Trend. Keep the Definition the same.
25. Under **Display Options**, change the Representation to **Mini Chart**.
26. Click on the **Mini Chart Settings** button. Select *Month Year* for Dimension and *Bars* under Mode. Click **OK**.
27. Go to the Expressions area and click on *#Transactions*, right click and select Copy. Go to an empty area and Paste in the Expressions box.
28. Keep the **Definition** the same.
29. Go to the **Display Options** and select *Linear Gauge*.
30. Go to the Gauge Settings button and click on that.
31. Under Gauge Settings , select 0 for min and for Max type the following:  
`=Max(aggr(Count(Distinct [Transactions.Ref Number]),[Transactions.Customer Full Name]))`
32. Keep one Segment, Segment1, with lower bound of **0.0**. Next to the lower bound box, you can pick the color of the linear gauge instead of using the default color.
33. Under **Indicator**, select *Fill to Value* and **Style** as *Line*.
34. Uncheck **Show Scale**.
35. Check the boxes for **Hide Segment Boundaries** and **Hide Gauge Outlines**.
36. Click **OK**.



Solution

Transaction Details							
Customer	Sales	Sales Trend	Margin	#Transactions	#Transacti...	/Latest Transa...	
Overhead	668242.7	668242.7	646752.93767	626		12/15/2016	
	0			352		12/15/2016	
Pretell Real Esta...	28731.5		28731.5	15		12/14/2016	
Cook, Brian:Kitt...	12900.5		12900.5	12		12/15/2016	
Abercrombie, Kr...	6749.5		6749.5	10		12/15/2016	
Smith, Lee:Patlo	7722		7722	9		12/02/2016	
Vasquez, Anabel...	24005.24		18740.61778	9		11/18/2016	
Freeman, Kirby...	5588		5588	8		01/07/2016	
Natiello, Ernesto...	13925.16		13356.4914	8		12/15/2016	
Ruff, Bryan:Sun...	5354.56		5354.56	8		10/01/2016	
Fisher, Jennifer...	6864		6864	7		07/25/2016	
Luke, Noelani:Kl...	10790.3		10790.3	7		09/10/2016	
Teichman, Tim:...	9757		9757	7		11/25/2016	
Abercrombie, Kr...	2961.05		-124.015	6		10/30/2016	
Burch, Jason:R...	6773.4		6464.8935	6		11/25/2016	
Craven, Pam:D...	946.8		946.8	6		08/02/2016	
Ecker Designs:O...	4984.5		4984.5	6		11/30/2016	
Transactions: Per...	7777		7777	6		12/14/2016	

## Activity 8.4: Create a pivot table

### Challenge

Your company needs to analyze item Sales and Margin values by Year, Quarter, or City. Here, you have many dimensions, but only two measures, Sales and Margin.

### Hints

- Copy the **Transaction Details** straight table and paste it on the Customer Details sheet.
- On the General tab, change Chart type to Pivot table.
- Add the following dimensions
  - *Year*
  - *Quarter*
  - *Transactions.Address City*
- Next, disable all expressions, except *Sales* and *Margin*.
- Show Partial Sums

In the **Presentation Properties**, select **Show Partial Sums** for *Year*, *Quarter*, and *Transactions.Address City*. Pivot the *Year* column

- Click and hold the mouse button on the column label *Year*, and move the cursor to the right until a vertical blue arrow appears. Continue dragging to the desired position.

## Step-by-Step

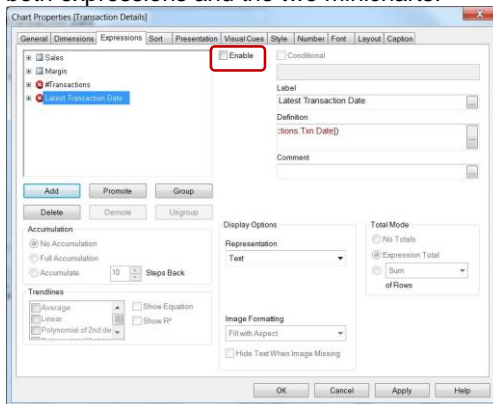
1. On the **Product Details** sheet, click on the **Transaction Details** chart and click **Ctrl+C** to copy it.
2. Paste this table onto the **Customer Details** sheet.
3. Right-click the copied table, select **Properties**, and then the **General** tab. We are re-using an existing table and modifying a few properties.
4. For **Window Title**, type *Item Details*.
5. Under **Chart Type**, select **Pivot Table**.



6. Select the **Dimensions** tab.
7. In the **Used Dimensions**, remove the *Transactions.Customer Full Name*.
8. In the **Available Fields/Groups**, select the *Year*, *Quarter*, and dimensions.
9. Click **Add**.
10. Select *Transactions.Bill Address City*, and for **Label**, type *City*.

## Define expressions

11. Ensure that the *Sales* and *Margin* expressions are enabled. Disable the *Latest Transaction Date* and the *#Transactions* by unchecking the **Enable** box for both expressions and the two minicharts.



12. Select the **Sort** tab.

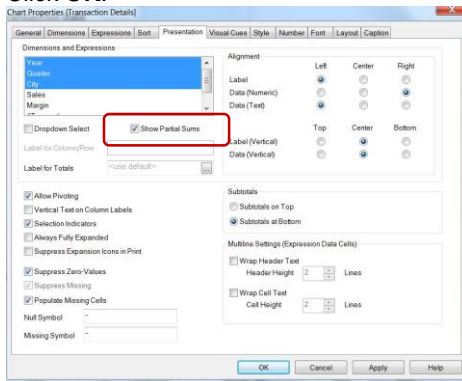


## Define Sort Settings

13. Under **Dimensions**, select *Year*.
14. Under **Sort by**, select **Numeric Value** and then select *Ascending*.
15. Under **Dimensions**, select *Quarter*.
16. Under **Sort by**, select **Text** and then select A -> Z.
17. Under **Dimensions**, select *City*.
18. Under **Sort by**, select **Text**, and then select A -> Z.

## Select partial sums

19. Select the **Presentation** tab.
20. Under **Dimensions and Expressions**, select *Year*, *Quarter*, and *City* and then select **Show Partial Sums**.
21. Click **OK**.



## Pivot the Year and Quarter

22. Right-click the *Year* column and select **Expand all**.
23. Repeat the previous step with *Quarter* and *City*.
24. Select the *Year* column.
25. While pressing and holding the left mouse button, drag the column for year to the right position and move upwards. Notice how the blue arrow changes from the vertical to horizontal position when you reach the right border.

Item Details					XL			
Year	Quarter	City	Sales	Margin				
2014	Q4	Bayshore	24091.5	24091.5				
		E. Bayshore	361.08	361.08				
		Middlefield	24824.36	21793.64804				
		Total	49276.94	46246.22804				
	Total	49276.94	46246.22804					
2015	Q1		46700.44	40679.74905				
	Q2		35778.5	35224.40344				
	Q3		58044.56	58044.56				
	Q4	Bayshore	16422.87	16317.70759				
		East Bayshore	12313.9	11706.61157				
	Total	28736.77	28024.31916					
	Total	169260.27	161973.03165					
2016	Q1		75647.84	74067.70551				
	Q2		82033.35	78261.37483				
	Q3		110772.39	110155.377				
	Q4	Bayshore	85884.91	83335.38852				
		East Bayshore	5727	5286.4185				
		Middlefield	611.40	50007.41265				

26. Move the pointer to the top of the object, and then release the mouse button.
27. The Year column is now displayed as a horizontal row.
28. You may proceed with the Quarter field and pivot that if you wish into its own horizontal row.
29. The figure below just shows the Year pivoted as a horizontal row, but the Quarter field has not been pivoted yet.

## Solution

Item Details								
Year		2014		2015		2016		Total
Quarter	City	Margin	Sales	Margin	Sales	Margin	Sales	
Q1		-	46700.44	40679.74905	75647.84	-	74067.70551	
Q2		-	35778.5	35224.40344	82033.35	-	78261.37483	
Q3		-	58044.56	58044.56	110772.39	-	110155.377	
	Bayshore	24091.5	16422.87	16317.70759	85884.91	-	83335.38852	
	E. Bayshore	361.08	-	-	-	-	-	
	East Bayshore	-	12313.9	11706.61157	5727	-	5286.4185	
	Middlefield	21793.64804	-	-	61140	-	58927.41362	
	Millbrae	-	-	-	27800	-	27800	
	West Bear	-	-	-	700	-	700	
	<b>Total</b>	<b>46246.22804</b>	<b>28736.77</b>	<b>28024.31916</b>	<b>181251.91</b>	<b>176049.22064</b>		
<b>Total</b>		<b>46246.22804</b>	<b>169260.27</b>	<b>161973.03165</b>	<b>449705.49</b>	<b>438533.67798</b>		

## 9 Advanced Interface Design

### Objectives:

- Identify when and where to use **expressions** in the interface.
- Identify when and where to use **conditional show**.
- Determine ways to use **color expressions** to enhance charts.
- Creating variables and the syntax of variables.
- Identify the use of **Chart Attribute Expressions**.

This lesson is an overview of how and where to use expressions and variables in the interface. It also introduces the reporting tool's advanced interface design features and ways to incorporate conditional statements. This chapter shows you more of the dynamic capabilities of the Advanced Reporting tool.

### 9.1 Other uses of expressions

Expressions are in no way limited to chart expressions and sort expressions. Other uses of expressions are as label expressions, conditional functions, dynamic text in text objects, chart attribute functions, or color functions. We will discuss some examples in this chapter.

In the Advanced Reporting dialogs, it is easy to determine where expressions may be used, because the edit box will display a special button with the ellipsis (...) symbol that leads to the **Edit Expression** dialog.

In terms of syntax, keep in mind that, in contrast to chart main expressions, calculated formulas must be preceded by an equal sign (=).

### 9.2 Calculated labels and dynamic text in text objects

Where you can enter a label text, you can usually also enter a label expression.

Using expressions enables the additional functionality of displaying dynamic text, that is, text that changes according to the current logical state of the application.

In order to combine text and expressions together you use the concatenation symbol &. The text would be in single quotes concatenated with the expression and the whole format of this would have to start with the "=" sign. The format may look like this: **= 'Text ' &[Expression] &'More Text' &[Another Expression]**

### 9.3 Displaying KPIs

Sometimes, numbers say more than visual charts. The dashboard users require a rapid overview of the company's performance, such as Current Year-To-Date Sales compared to Last Year-To-Date Sales, and whether the Margin reaches the 15% target. The dashboard is where these kinds of high-level KPIs belong.

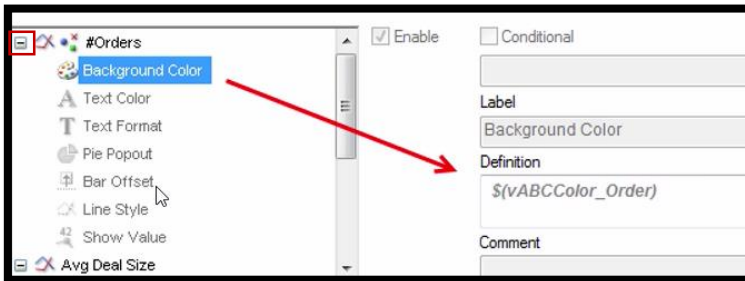
## 9.4 Conditional functions

Conditional functions are useful in different situations:

- A “show” condition determines if a sheet object is **hidden** or **displayed**, such as a chart that is only relevant when something is selected.
- A “calculation” condition determines whether a chart or table is calculated or not. It is used if calculations do not make sense until the user has selected something. Using calculation conditions saves on server processing, because objects are only rendered when the user needs to see the result.
- An enable condition determines if a button is enabled or not.
- Why would we use conditional functions?
- Sometimes it does not make sense to show something until a particular calculation is made or an item is chosen
- Many times you need to think of *performance* and not show every detail of a table that may take a long time to process.

## 9.5 Chart attribute expressions

The chart attribute expressions are accessed by clicking the expansion icon in front of a chart expression in the **Chart Properties > Expressions** tab. Attribute expressions may be used for a dynamic formatting of the expression data. Their use depends on the chart type and the display options.



## 9.6 Color expressions

The Color Area dialog allows you to define color for an area or background in a sheet area. It allows you to define a solid color, a color gradient, or a dynamic color, calculated by means of a color function.

## 9.7 Calculated fields in list boxes

There are cases where you would like a list box showing a field that has not been created by the report when bringing in the data. In this case, you can use an expression to calculate the values based on existing fields. A typical example is a field combining the values

of two existing fields. Calculated fields are defined by selecting *<Expression>* from the drop-down list **Field** in the **List Box Properties>General** page.

For example, to determine the weekday name for a given date field.

Create a new list box based on the expression:

**weekday([Transactions.Txn Date])**

where *Transactions.Txn Date* is the date you have chosen.

## 9.8 Calculated dimensions in charts

In charts, calculated dimensions work the same way as calculated fields in list boxes. They create a field that does not exist in the report and then use it as a dimension in a chart. To define a calculated dimension, click **Add Calculated Dimension** in the **Chart Properties>Dimensions** page. The process is identical to the one that is used for the **Weekday** list box.

## 9.10 Variables

Script variables are entities that are assigned any text or numeric value. When used, the variable is substituted by its value. A variable typically acquires its value using an Input Box or Slider in the layout. Use **Ctrl+Alt+V** on the sheet to get to a **Variable Overview** dialog box which will allow you to create and define variables as well as remove them. Some predefined variables may already exist in the Variable Overview box. Please do not change or delete these.

### 9.10.1 Dollar-Sign expansion using a variable

Dollar-sign expansions are definitions of text replacements used in expressions. This process is known as expansion, even if the new text is shorter. The replacement is made just before the expression is evaluated.

When using a variable for text replacement in an expression, the following syntax is used:

- **\$( variablename )**
- **\$( variablename )** expands to the value in **variablename**. If **variablename** does not exist, the expansion is the empty string.

### 9.10.2 Example:

You want to create a variable that holds the **Sales** measure. You name it *vSales*

You can define a variable and its value from an input box or use **Ctrl+Alt+V** to get the Variable Overview dialog box where variables may be created, defined and removed if not required.

For example:

*vSales= Sum(<{\$(vExprSales)>}[Transactions.Amount With Sign])*

After you have opened the report, you can use the variable in the expression fields as *\$(vSales)* and we'll explain what looks like a very complicated syntax for *vSales* further on.

Some of these variables are already predefined and some may be defined in the input box as values.

## Activity 9.1: Create KPI text boxes

### Challenge

Sometimes, numbers say more than visual charts. It would be beneficial in the reporting structure to see an overview of the company's performance, such as the KPIs for Sales, Margin%, and # of Transactions.

The dashboard is where these kinds of high-level KPIs belong since these performance indicators can be viewed with minimal analysis.

### Hints

In the following section, you create three text objects with dynamic text, one each for Sales, Margin%, and Number of Transactions. Remember to precede the formula in the text area with an equal sign. Use the **Num** function to apply a number format. You can see more of the detailed format options for the **Num** function in Chapter 12 Appendix.

#### Prepare the dashboard for the KPI text objects

- From the Margin% Gauge use the bar. Remove its scale, text in chart, border, and title.
- On the **Dashboard** sheet, create a text object for Sales.

#### Configure the object

- **General Properties, Background: Transparency** *100%*
- **General Properties, Layout: Horizontal Alignment** *Left*, **Vertical Alignment** *Top*
- **Layout, Border Width** *0pt*
- **Font** *Arial 16pt, Bold*

#### Create a text object for Margin%.

- Clone the Sales text object
- Type the formula for Margin% with formatting

#### Create a text object for Number of Transactions.

- Transactions: `= ' Transactions: ' & num(Count (Distinct Transactions.Ref Number), '#,##0')`



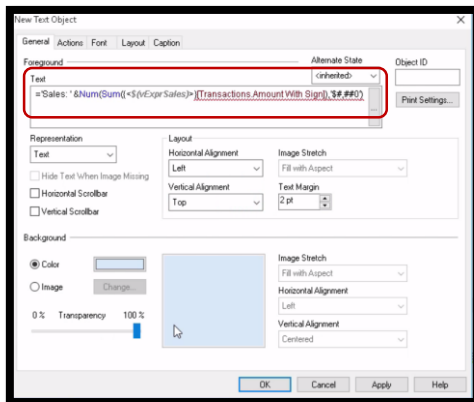
## Step-by-step

### Prepare the dashboard for the KPI text objects

1. On the **Dashboard** sheet, right-click the **Margin%** gauge, select **Properties**, and then select **Presentation**.
2. Delete the contents in the **Text in Chart** box. Click **Delete**.
3. Clear **Show Scale**.
4. Click the **General** tab, and clear **Show Title in Chart**.
5. Resize and move the linear gauge to the top.
6. Go back to the **Properties** of the linear gauge.
7. On the **Layout** tab, set **Border Width** to 0 pt
8. Click **OK**.

### Create the Sales KPI text object

9. Right-click the sheet, and select **New Sheet Object> Text Object**.
10. In the **General Properties, Foreground, Text**, type  
`=Sales: ' & Num(Sum({<$(vExprSales)>}[Transactions.Amount With Sign]), '$#,##0')`
11. Under **Background**, set the **Transparency** slider to 100%.
12. In the **General Properties**, under **Layout**, set the **Horizontal Alignment** to *Left*, and the **Vertical Alignment** to *Top*.
13. Click **Font**.
14. Select **Font Arial, Bold** for **Font Style**, and 16 for **Size**.
15. Select the **Layout** tab, and set the **Border Width** to 1 pt. Move the KPI object to where you would like and then change the **Border Width** to 0.
16. Click **OK**.



### Create the Margin KPI text object

1. Right-click the sheet, and select **New Sheet Object> Text Object**.
2. In the **General Properties, Foreground, Text**, type  

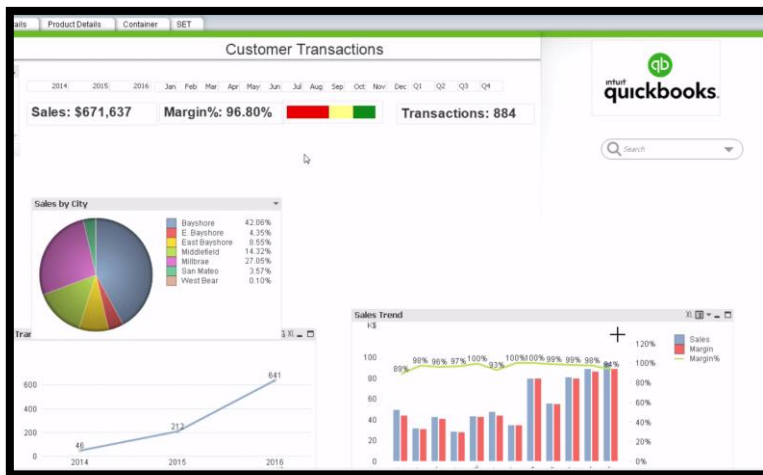
$$= \text{'Margin\%: ' \& Num( (Sum(\{<\$(vExprSales)>\}[Transactions.Amount With Sign]) - sum(\{<\$(vExprSales)>\}[Item.Average Cost]) * [Transactions.Quantity With Sign]) / (sum(\{<\$(vExprSales)>\}[Transactions.Amount With Sign])), '\#\#\#\%')}$$
3. Repeat steps 11-15 for the Sales KPI at this point.
4. Click **OK**.
5. Place this KPI for Margin % next to the gauge as both of them complement each other.

### Create the Number of Transactions KPI text object

1. Right-click the sheet, and select **New Sheet Object> Text Object**.
2. In the **General Properties, Foreground, Text**, type  

$$= \text{' Transactions: ' \& Num(Count (Distinct [Transactions.Ref Number]), '\#\#\#0')}$$
3. Repeat steps 11-15 for the Sales KPI at this point.
4. Click **OK**.
5. Arrange the objects as shown in the following illustration.

### Solution



## Activity 9.2: Set up Variables from Variable Overview

We need to be able to set up the variables before we can apply them to our reporting sheets.

### Step-by-step

1. On the sheet you are modifying, click on the sheet first and then use the keyboard combination , **Ctrl+Alt+V** anywhere in an open location and you will get a **Variable Overview** dialog box.
2. This dialog box has all the variables that have been defined either in the back end script or from the front end User Interface design.
3. To add a variable, you click on the **Add** button to the right and you will see a **New Variable** dialog box pop up.
4. Enter the name of the variable. We usually use the convention starting with lower case 'v' followed by the name. E.g. **vSales**. Click **OK**.
5. You have not completed the **definition** of the variable until you actually give it an initial value.
6. Left click on the **variable** you created. A blue bar highlights the variable. In the definition box below, type in the value for the variable or expression.
7. It can be a **numeric value**, an **RGB definition for color** or a **complex set expression**.
8. Let's define the variables for **vSales**, **vMargin** and **vMargin%** since we use these so much and the variables can be used anywhere the complex expressions are referenced instead of typing the expression in every time. Look at the table below for the variable names and definitions you should enter in the **Variable Overview** dialog box.

Variable Name	Definition
<b>vSales</b>	<b>=sum({&lt;\$(vExprSales)&gt;}[Transactions.Amount With Sign])</b>
<b>vMargin</b>	<b>= sum({&lt;\$(vExprSales)&gt;}[Transactions.Amount With Sign])-sum({&lt;\$(vExprSales)&gt;}[Item.Average Cost])*[Transactions.Quantity With Sign])</b>
<b>vMargin%</b>	<b>=(Sum({&lt;\$(vExprSales)&gt;}[Transactions.Amount With Sign])-sum({&lt;\$(vExprSales)&gt;}[Item.Average Cost])*[Transactions.Quantity With Sign]))/(sum({&lt;\$(vExprSales)&gt;}[Transactions.Amount With Sign]))</b>

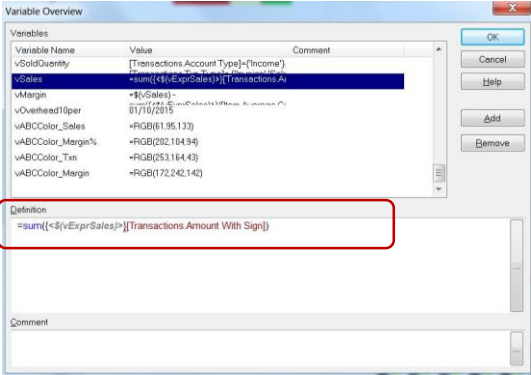


Figure: Variable Definition

## 9.3: Apply Variable Expansion to a Table

### Challenge

Now let's use our newly formed variables and use variable expansion in charts or tables to reduce the complexity of expressions and make the expression more flexible.

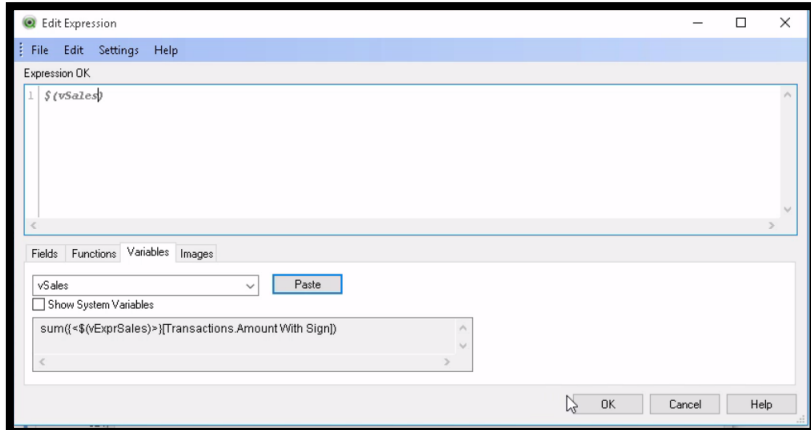
### Step-by-step

We can see that in the **Product Details** sheet, the table *Transaction Details* uses **Sales** as one of the columns.

1. Right click on the *Transactions Details* table and go to the Expressions tab.
2. Substitute the **Sales** expression with a variable for **Sales**.
3. You may not remember how you exactly named a certain variable so and place it in the following syntax in the expression editor.
4. Use this expression for Sales(this is variable expansion where it will substitute the value for Sales when it sees this syntax): **=\$(vSales)**

**NOTE:** if the variable is not valid then it won't change to an italicized look that is light gray in color. Click OK twice.

5. You should not see any changes in the value for sales when the expression has been replaced by the variable **\$(vSales)**.

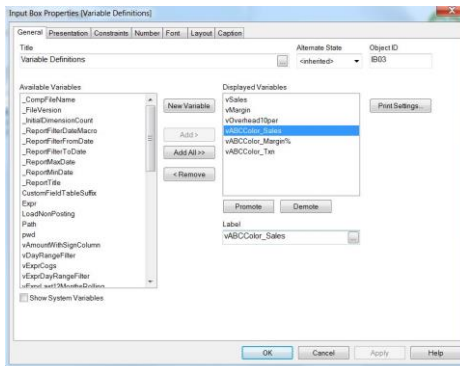


## Activity 9.4: Set up Variables Using an Input Box

1. Go to the **Dashboard** sheet.
2. Right click on the sheet and choose **New Sheet Object>Input Box**.
3. If you already have the variables created you can just add them to the right hand side from the Available Variables on the left hand side.
4. In the General tab of the **Input Box**, click on New Variable and create 4 new variables, *vABCColor\_Sales*, *vABCColor\_Margin*, *vABCColor\_Margin%* and *vABCColor\_Txn*.
5. Give the input box a name by going to the **General** tab and in the **Title** box call it "Color Palette".
6. Click **OK**. You will see the new variables in the **Input Box**. Click on the Box next to the input variable with the ellipsis (...) and define the values as shown below for the four variables.
7. These colors will be now used in charts and KPIs to create a consistent look to the sheets and sheet objects. So, if you want everything in Sales to be represented by a particular color, you can now use *vABCColor\_Sales* to define Sales.

**NOTE:** These colors are just examples. You may choose any RGB values especially if you want to customize it to Intuit's customized color palette.

Variable	Definition
vABCColor_Sales	=RGB(61,95,133)
vABCColor_Margin%	=RGB(202,104,94)
vABCColor_Txn	=RGB(253,164,43)
vABCColor_Margin	=RGB(172,242,142)



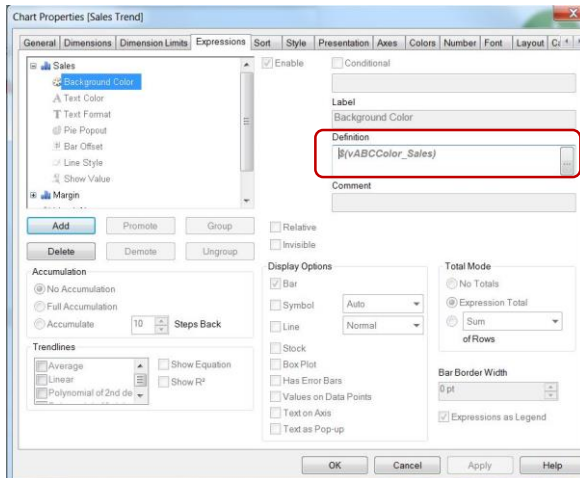
## Activity 9.5: Apply a color variable on the Sales Trend chart

### Challenge

Apply a color variable in a chart using the chart expression attributes.

### Hints

Take a look at how the expressions are displayed on the **Expressions** tab in the properties of a chart. Note the + icon next to the expression.



### Step-by-step

1. On the **Dashboard** sheet, right-click the **Sales Trend** chart, select **Properties**, and then select the **Expression** tab.
2. Click the + icon next to the **Sales** expression.
  1. Select **Background Color**.
  2. In the **Definition** field, type `$(vABCCColor_Sales)`
  3. Click **OK**.
  4. Repeat steps 1-3 for **Margin** and **Margin%** and use the variables `$(vABCCColor_Margin)` and `$(vABCCColor_Margin%)` to change the background colors of the bar and line charts using Chart Attribute expressions and going to the **Background Color**.

Solution





## Activity 9.6: Apply Color to KPI Values

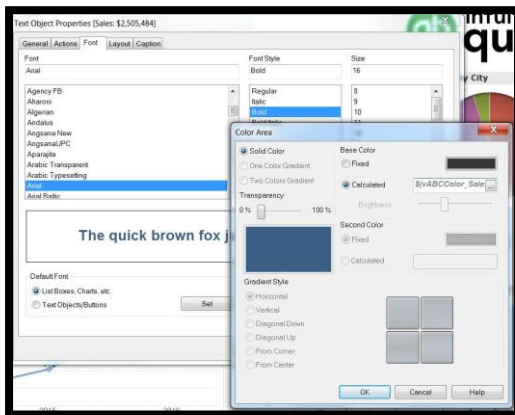
### Challenge

The following section shows you how to implement variables and apply these variables to change the color of the KPI values. The variables and definitions must be created already via the Variable Overview dialog box or through the input box.

### Step-by-step

#### Apply a color variable on the Sales KPI text objects

1. On the **Dashboard** sheet, right-click the **Sales KPI** textbox, select **Properties**, and then select the **Font** tab.
2. Click the **Color** tile. The **Color Area** dialog displays.
3. Under **Base Color**, select **Calculated**.



4. Click the ... ellipse button. The **Edit Expression** dialog opens.
5. Type `$(` in the Expression field.
6. Place the cursor between the parentheses.
7. Select the **Variables** tab.
8. Select `vABCCColor_Sales`. Click **Paste**. Your string displays as follows: `$(vABCCColor_Sales)`. This should appear in italics. If the variable does not appear in italics, it means that *Advanced Reporting* does not recognize it.
9. Click **OK**. The **Edit Expression** dialog closes. Click **OK** twice.
10. Right click on the **Margin%** text box and select **Properties**. Then select the **Font** tab.
11. Follow steps 2-7.
12. Step 8, select `vABCCColor_Margin%`. Click **Paste** to paste this variable into the **Edit Expression** dialog box. Click **OK** to close the **Edit Expression** dialog box.

13. Click **OK** twice to get back to the sheet.
14. Right click on the **Transactions** text box and select **Properties**. Select the **Font** tab.
15. Follow steps 2-7 again.
16. In step 8, use **vABCColor\_Txn**. Click Paste to paste this variable in the **Edit Expression** dialog box.
17. Click **OK** to close the **Edit Expression** dialog box.
18. Click **OK** twice to get back to the sheet.
19. The KPIs should resemble the ones shown in the figure below.

## Solution



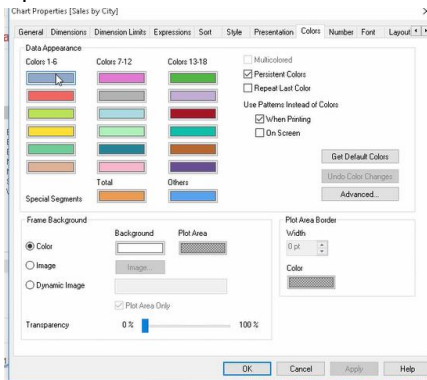
## Activity 9.7: Change the Colors on the Pie Chart

### Challenge

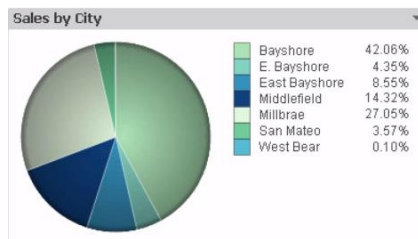
The pie chart on the Dashboard has a rainbow set of colors which has no meaning. We can assign **RGB** values for different segments using a gradient color scheme or any other color scheme that makes sense.

### Step-by-Step

1. Change the color palette by going to the **Colors** tab of the pie chart, **Sales by City**.
2. Go to the different colors and select each one and instead of using the fixed color go to the **Calculated** section and enter the **RGB** values for the color palette you wish to use.
3. You can go and use desaturated color for the smallest segment and a saturated color for the largest segment in the pie chart with the largest value.
4. Get creative and pick some **RGB** values. It is not necessary to supply them to you.



### Solution



## Activity 9.8: Show or Hide a Table

### Challenge

Sometimes you may want to hide a table or chart from users. This activity shows you exactly how to do that using a variable.

### Step-by-Step

1. Click on the **Customer Details** sheet.
2. Click on the sheet and use the keyboard combination **Ctrl+Alt+V** to get to the **Variable Overview** dialog box.
3. Create a variable called **vShow**. Give an initial definition of **1** to this variable, **vShow**.
4. Go to the *Customer Details* table and right click on **Properties** and go to the **Layout** tab.
5. In the **Layout** tab, there is a section **Show** where the radio button for Always is selected.
6. To do a **Conditional** show, select the radio button for **Conditional** and in that box type in "vShow=1" for starters. This table will only show if **vShow=1**.
7. Click **OK**.
8. Test this out by clicking on the sheet and using **Ctrl+Alt+V** to go to the **Variable Overview** box and setting **vShow=0**.
9. Now the *Customer Details* table will be hidden. As a developer you can decide when to show or hide this table.

## Activity 9.9: Conditional Show on a Button

### Challenge

Provide a navigation element that leads the user to another sheet when one item name is selected from the **Customer Name** List Box. A “*Show Transaction Details*” button shows up on the **Customer Details** sheet only when one customer is selected. Clicking on this button takes the user to the **Product Details** sheet and shows the **Transaction Details** for that one customer which was picked. Using this element, the user can easily switch between the customer’s detailed information to detailed transaction values and sales/margin related to their transactions in another sheet elegantly and also make performance better.

### Hints:

Create a button on the **Customer Details** sheet that takes the user to the **Product Details** sheet when only one customer name is selected.

- You need the *Sheet ID* of the **Product Details** sheet. Copy the *Sheet ID* from the **Product Details Properties->General**.
- Create a **Button** object on the **Customer Details** sheet.
- In the **Layout** tab under **Show**, select *Conditional* and type *Count([Customer.Full Name])=1*
- In the **Action** tab, add the action *Layout/Activate Sheet* together with the *Sheet ID* of the **Product Details** sheet.
- Select a **Customer Name**.
- Click the **Show Transaction Details** button. You will see all the customers and transactions related to the customer name selected.
- For variations, go ahead and change the conditional statement in the **Layout** tab of the button and see how the table information changes based on selections for item names that are maybe 1-3 item names chosen instead of just one. E.g. *Count([Customer.Full Name])<=3*

## Step-by-Step

You need the *Sheet ID* of the **Product Details** sheet.

- 1 On the **Product Details** sheet, right-click on an empty space and go to **Properties**.
  1. On the **General** tab, copy the *Sheet ID*.
  2. Click **OK**.
  3. Select the **Customer Details** sheet.
  4. In the **Customer Name** list box, select one customer.

### Create a button

5. Right-click the sheet, and then select **New Sheet Object**, and then select **Button**.
6. On the **General** tab, under **Text**, type *Show Transaction Details*.
7. Under **Background**, select *Plain*, and then select **Color**.
8. Click the **Color** tile and select a light gray color from the *Fixed* color tile.
9. This is your button color.
10. Click **OK** twice.

### Define font settings

11. Click the **Font** tab.
12. For **Font Style**, select *Bold* and 11 pt.
13. Click the **Color** tile, and select a dark gray color from the *Fixed* color tile. Click **OK** twice.

### Add an action

14. On the **Action** tab, click **Add**.
15. For **Action Type**, select *Layout*, and for **Action**, *Activate Sheet*.
16. Click **OK**.
17. Place the cursor in the **Sheet ID** field and paste the sheet ID you have copied from the **Product Details** sheet.

### Define a show condition

18. Click the **Layout** tab. Under **Show**, select **Conditional**, and then type *Count([Customer.Full Name])=1*
19. Click **OK**.
20. Ensure that you have one and only one customer name selected from the **Customer Name** list box. If you pick more than one customer, the *Show Transaction Details* button will not show.
21. Place the button below the **Customer Details** table.
22. Click on the button to ensure it moves to the **Product Details** page and shows only customer transaction values for the customer chosen in the **Customer Name** list box.
23. If you pick more than one customer name the *Show Transaction Details* button does not show.

Solution

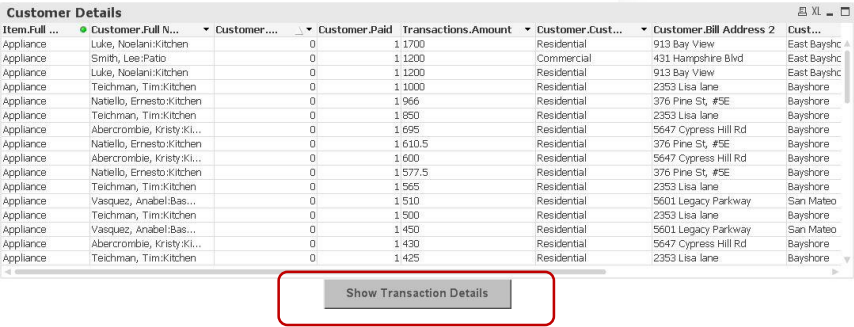


Figure: Show Conditional Button

## Activity 9.10: Conditional calculation

### Challenge

The **Customer Details** table box contains many rows for many customers. In order to optimize performance, you are going to define a calculation condition. If the condition is not true, the table is not displayed if the calculation condition is not fulfilled. You also provide an error message to alert the user. This is generally done to increase performance by showing customer details for selective customers.

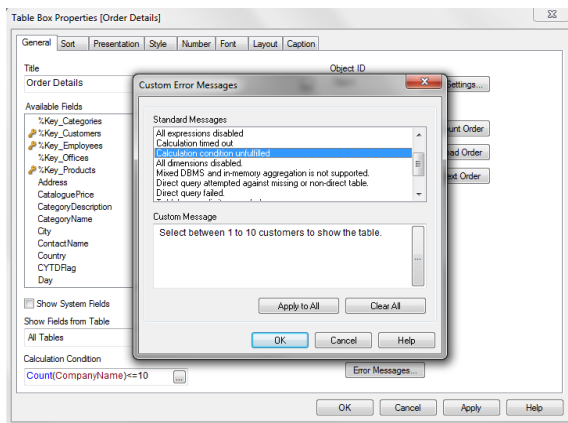
### Hints

Because it is very unlikely that your users want to show *Customer Details* for more than ten customers at a time, you can set the condition to only perform the calculation for the **Customer Details** table box if the user has selected between 1 and 4 customers.

It is important to inform the user about that restriction. By default, an error message is displayed if the condition is not fulfilled.

You can choose to modify the standard message:

- Open **Table Box Properties/General**
- Click **Error Messages...**
- Select **Calculation condition unfulfilled**.
- In the **Custom Message** field type:  
*Select between 1 to 4 customers to show the table.*

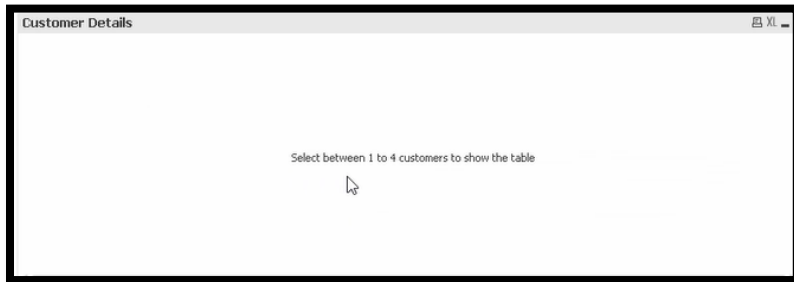




## Step-by-Step

1. On the **Customer Details** sheet, right-click the **Customer Details** table box.
2. On the **General** tab, under **Calculation Condition**, type:  
*Count([Customer.Full Name])<=4*
3. Click the **Error Message** button. The **Custom Error Messages** dialog opens.
4. Under **Standard Messages**, select *Calculation condition unfulfilled*, and in the **Custom Message** field, type *Select between 1 to 4 customers to show the table*.
5. Click **OK**. The **Custom Error Messages** dialog closes.
6. Click **OK**.
7. Clear all selections. The table displays as shown in the following example:
8. Now, select a **1 to 4** customers. The table is now calculated and no error messages are shown. As soon as you choose the 5<sup>th</sup> customer you receive the error message shown in the figure below.

## Solution



## Activity 9.11: The Slider

### Challenge

Create a slider object that will allow the user to decide how many top **n** items to show in the Top 5 Items chart, replacing the 5 items with a variable value dictated by the slider number set by the slider object.

### Step by Step

1. Go to the **Product Details** sheet and copy the **Top 5 Items** Chart by pressing **Ctrl+Alt** and dragging another copy to a blank area on the same sheet.
2. Use **Ctrl+Alt+V** to access the **Variable Overview** dialog box.
3. Create a new variable called **vTop** from the **Variable Overview** dialog box by clicking on the **Add** button.
4. Highlight **vTop** and give it an initial value in the **Definition** box. Give it a value of **4** to start off with. Click **OK**.
5. Right click on the copy of the **Top 5 Items** bar chart, click on **Properties** and go to the **Window Title** and type:  
**=Top ' &\$(vTop) &' Items'**  
**vTop** will get substituted by the value on the slider object. The **Caption** tab will have the same expression in the **Title Text** area.
6. Go to the **Dimension Limits** tab and under **Limits** check off the box for "Restrict which values are displayed using the first expression" and pick the radio button for "Show Only", the Largest and for Values type in **=\$(vTop)**.
7. Now below this bar chart, create a slider.
8. Right click in an empty area of the sheet and click on **New Sheet Object>Slider/Calendar** Object.
9. In the **General** tab, pick *Slider* in the **Input Style** box.
10. Click the radio button for Variable and pick **vTop** from the list.
11. Set the min value to **1**, max value to **10** and static step checked off and showing **1** in the box below.
12. For **Presentation** tab, you can optionally give the slider bar a background color and set the transparency to about 50%.
13. Click **OK** to finish.
14. Move the slider bar to any number and test to see if the bar chart updates with the right number of products shown. Now the **Top 'n' Items** chart has become dynamic through the use of variables.

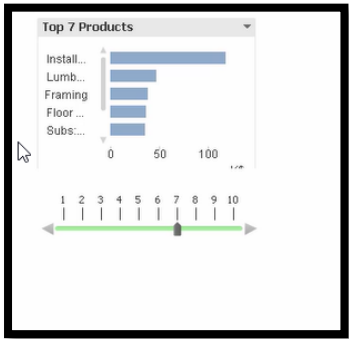


Figure: The Slider

## 10 Bookmarks

### Objectives

Identify when and where to use bookmarks.

In this lesson, you are introduced to **bookmarks**. **Bookmarks** allow you to save a set of selections for later use, and to save or share those selections with others. The reports that have been created are full of information and **bookmarks** make it easier for you to decipher data when you may not know where to start the search or where to initiate the appropriate analysis in the report. **Bookmarks** at a glance will provide information quickly without having to spend much time on detailed level analysis.

### Bookmark object

Bookmarks are a great tool for collaboration. You can easily share your findings with others. With bookmarks, you can work more effectively because you can save standard selections you often use.

The **bookmark object** is a sheet object that you use for displaying bookmarks for selections. Depending on its configuration, you can also use it for adding new bookmarks or deleting old ones.

Sometimes you would like to use **bookmarks** to guide someone along with a starting point for their analysis; **bookmarks** are great for this purpose.

## Activity 10.1: Create a bookmark

### Challenge

You need to create a bookmark that highlights the **Sales**, **Margin%** and **Transactions** for **InventoryItem** (Item Type) in the year **2014** and **Q4** (fourth quarter). Order matters when setting up the bookmark. First create the bookmark object and then add the bookmarks to this.

### Hints

1. Use the bookmark functionality. On the **Dashboard** sheet create a bookmark a generic bookmark sheet object. Choose the following
2. Title this bookmark “Where Do I Start?”
3. From the **Dashboard** now you can use your bookmark object to go to any of the ones that are represented by a particular bookmark selection.

### Step by Step

#### 10.1.1. Create a bookmark object

1. Right Click on the **Dashboard** sheet and select **New Sheet Object>Bookmark object**.
2. Create a list box for *Item.Item Type* if you do not already have one set up.
3. In the **General** tab, under Title type “Where Do You Want to Start?”
4. Click the checkbox for **Show Add Button**.
5. Click the checkbox for **Show Remove Button**.
6. Under **Background**, if you want to choose a background color for the bookmark, you can click on the color swatch and pick a color under **Base Color->Fixed**.
7. Click **OK**.
8. There are no **bookmarks** yet so we now need to go ahead and make selections and create bookmarks that will be shortcuts to those selections.

Where Do You Want to Start?

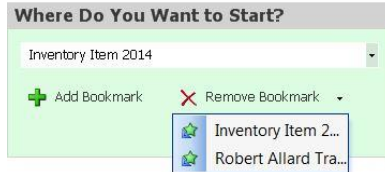
Inventory Item 2014

+ Add Bookmark    X Remove Bookmark

#### 10.1.2. Create the first bookmark – Bookmark 1

1. From the list boxes on the left hand side of the Dashboard, select the following:
  - **InventoryItem** from **Item.Item Type** list box
  - **2014** from **Year** list box at the top

- **Q4** from the **Quarter** calendar list box at the top
- 2. Go to the bookmark object created in the previous exercise and click **Add Bookmark** button.
- 3. A dialog box opens up to **Add Bookmark**.
- 4. Give the bookmark a name.
- 5. Under



**Bookmark Name** type  
"Inventory Item 2014".

this will be added to the  
**bookmark** list in the **book-**  
**object**.

- 6. Now
- mark**

### 10.1.3. Create a Second

#### Bookmark – Bookmark 2

1. Clear all selections with the **Clear All** button under the **Current Selections** box.
2. Go to the **Customer Details** sheet.
3. Select *Allard, Robert: Remodel* from the **Customer Name** list box on the left hand side.
4. Go to the bookmark object (**Dashboard**) and add a bookmark and name it *Robert Allard Transaction*.

#### 10.1.4 Testing the Bookmarks

1. Clear all selections with the **Clear All** button under the **Current Selections** box.
2. Go to the Bookmark object under the **Dashboard** sheet and select *Robert Allard Transaction*.
3. It should take you to the selections you made for **Robert Allard**.
4. Now go to the Bookmark object and select *Inventory Item 2014*. It should display all the selections you chose for **InventoryItem** in the year **2014, Q4**.

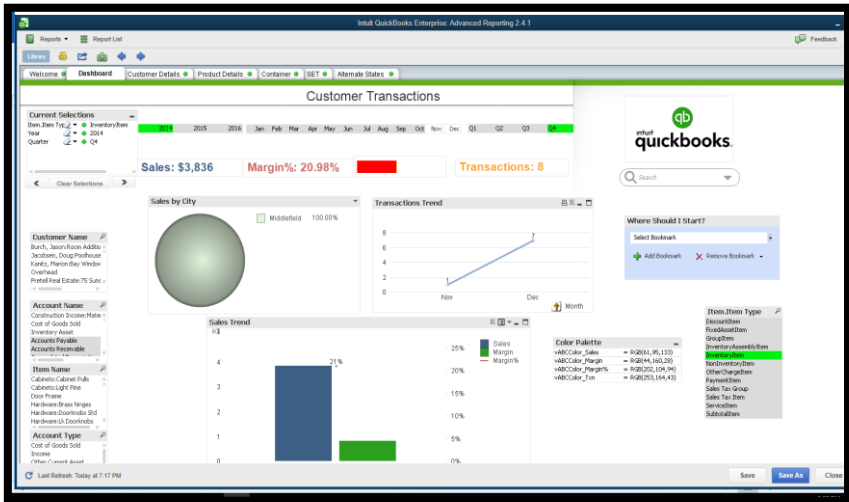
**Note:** While moving from one bookmark to another you do not have to go and manually clear the selections before selecting another bookmark. The bookmark just takes you to the selections made when you created this object.

#### 10.1.5 Removing the Bookmarks

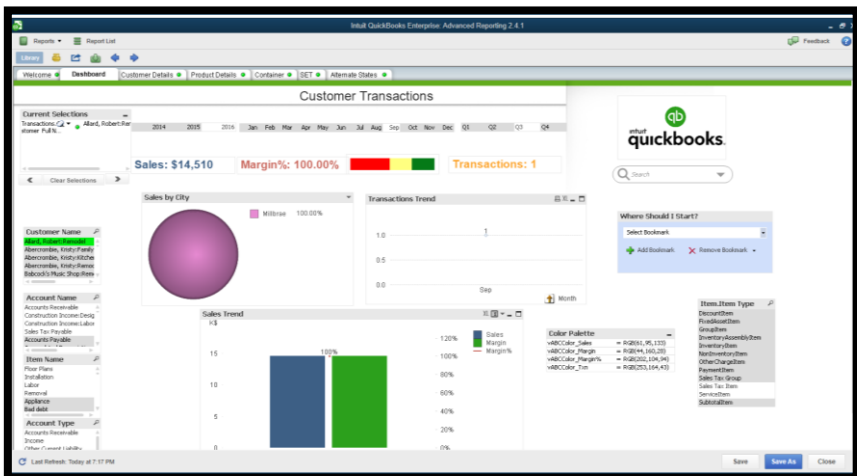
Go to the **Bookmark** object and next to the box for Remove Bookmark, use the vertical arrow. Choose the **bookmark** you want to delete and select it. It will ask for confirmation on whether this **bookmark** should be deleted.

## Solution

### Bookmark 1 – Inventory Item 2014, Q4



## Bookmark 2 – Robert Allard Transactions



## 11 Advanced Calculations in Sheet Objects

### Objectives

- Identify when and where to use Alternate States.
- Use Set Analysis for filtering data and chart comparisons.

#### 11.1 Set Analysis Basics

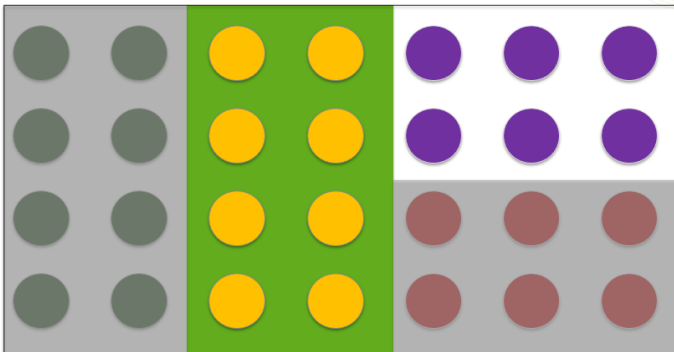
The *Advanced Reporting* tool has always been good at calculating aggregates for the current selection of data. Previously, however, when you wanted to compare results for different selections in the same chart, you needed to either prepare data in the script or resort to rather complicated expressions with If clauses.

**Set analysis** changes all that by making it possible to modify any aggregation function with an arbitrary selection set.

You may define the set as a bookmark, as an on-the-fly selection in one or more fields, as a function of current selections, or as the inverse of current selections, as previous selections, or as all data.

First, take a look at what happens when a selection is made in *Advanced Reporting*.

This illustration represents a full data set in the data—each set of colors is one part of the data. When one part of the data is selected, all the calculations in the report are automatically updated based on the current selection. However, when you want to compare results for different selections in the same chart, you need to either prepare data in the script, resort to rather complicated expressions with if clauses, or use **Set Analysis**.





### 11.1.1 The basic syntax of a set expression

Starting point: **Sum(Sales)**

The **3** basic components of a set expression are **set identifiers**, **set modifiers** and **set operators**.

### 11.1.2 Set Identifiers

Build the expression for **Sales** and enclose the conditions within the curly brackets. Within the curly brackets start with the **Identifier**.

**Sum ({Identifier}Sales)**

Identifier	Expression
<b>{ \$ }=Current Selections</b>	Sum({ \$ }Sales)
<b>{ 1 }=Returns total sales disregarding the selection but not the dimension</b>	Sum({ 1 }Sales)
<b>{ 1-\$ }= takes the inverse of your current selections</b>	Sum({ 1-\$ }Sales)
<b>{ 1 }Total = total sales disregarding the dimension and selections</b>	Sum({ 1 }Total Sales)
<b>{ StateA }-the state created; not inherited or default</b>	Sum({ StateA }Sales)

### 11.1.3 Set modifier

**Sum ({Identifier <Modifier> }Sales)**

**<Field = {NumericValue}>**

**<Field = {'StringValue'}>**

A **set** can be modified by additional or changed selections. Such a modification can be written in the **set expression**. The **modifier** consists of one or several field names, each followed by selection(s) that can be made in the field. A field name can have a numeric value or a string value. **Modifiers** begin and end with angle brackets <>. Field names can be strung together with commas.

*sum( {1<Region= {USA} >} Sales )* Returns the sales for the region USA disregarding the current selection

Field values can be quoted as in the example below:

*sum( {\$<Item.Item Type = {"\*Inventory\*"}>} Sales )* Returns the sales for current selection, but with wildcard selections for Item type with any text Inventory in it e.g. NonInventoryItem, InventoryItem

When wildcard expressions are used using "\*" you must use double quotes.

*sum( {\$<Year = {"2\*"}>} Sales )* Returns the sales for the current selection, but with all years beginning with the number . Since this is a Year field, it is for all years from 2000 onwards.

The most common case, however, is a selection based on a field value list enclosed in curly brackets, the values separated by commas, as in:

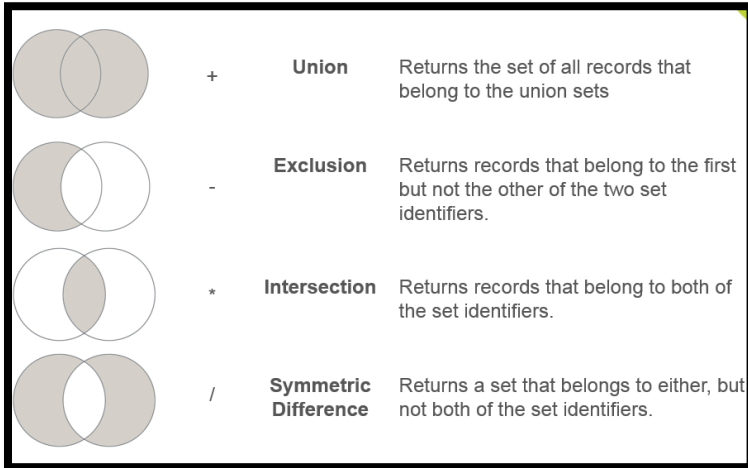
*<Year = {2015, 2016}>*

You can define the selection within a field using set operators and several element sets, for example:

*<Year = {"20\*", 1997} - {2000}>* selects all years beginning with "20" in addition to 1997, except for the year , 2000.

### 11.1.4 Set Operators

Several operators are used in set expressions. All set operators use sets as operands and return a set as a result. The operators are as follows.



For example:

The set expression below selects years greater than 2013 to calculate Sales, but excludes the year 2015 in the calculations(as denoted by the '-').

**Sum ({ \$ <Year={">2013"} - {2015} > } Sales)**

### 11.1.5 Dollar Sign Expansion Using a Variable

When using a variable for text replacement in the script or in an expression, the syntax ***\$*(*variablename*)** is used. This expands to the value in the *variablename*.

### 11.1.6 Dollar Sign Expansion With an Expression

Expressions can be used in dollar sign expansions. The content between the brackets must then start with an equal sign:

***\$*(=expression)**

The expression is evaluated and the value is used in the expansion.

Example: ***\$*(=Year(Today()))** returns the calendar year based on the system date.

## Activity 11.1 Set Analysis 1

In this example we need to determine what the top 5 items will be without any 'Subs' category for the Item Name (Item.Full Name is the field name).

Normally our top 5 chart does not take into account any exclusions, but here we will use 'Subs' as an exclusion using set analysis.

## Step by Step

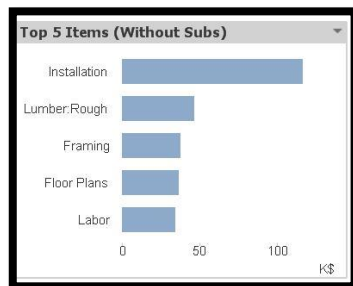
1. Copy any sheet and rename it to **SET**.
2. Delete any sheet objects that were copied and only keep the list boxes for Customer Name, Item Name, Account Type and Account Name.
3. Copy the **Top 5 Items** bar chart from the **Product Details** sheet to the **SET** sheet.
4. You can drag another copy by holding down **Ctrl+Alt** and now you have two **Top 5 Items** bar charts. This is useful for side by side comparisons.
5. Right click on one of the bar charts and go to **Properties>Expressions**.
6. Go to the **Definition** box for the **Sales** expression and click on the ... (ellipse) to bring up a larger dialog box.
7. In here modify the expression to read:

***Sum({\$<\$(vExprSales),[Item.Full Name]={"Sub\*"}>}[Transactions.Amount With Sign])***

Note: Any field names are case sensitive and when they have spaces in the names, the name should be enclosed in [ ] (square brackets). The minus sign before the {"Sub\*"}

**-{"Sub\*"}** excludes any item names that start with the word Sub and the \* reflects any number of characters after the word "Sub". The first \$ is optional and denotes that all your selections will be honored in the calculations for Sales except for any exclusions with the item name starting with Sub.

## Solution



## Activity 11.2 Set Analysis 2

Now you want to show a Line Chart showing the **Sales Trend by Month Year** values over the three year period in our data. The first line chart simply shows the data over a period of 3 years of **Sales**. When you click on a specific month year value, it only shows the specific value. The one that will be created next to that using set expressions will use the following:

Sum({<**Month Year=** ,**Year=** ,**Month=** >}Sales) format for calculating Sales. This in fact shows your selection as part of the whole trend without just drilling down to one value. When your modifier has the form:

“<**Month=** >” without any values in there for Month, it means to disregard any selections for that field.

### Step by Step

1. Add a Line Chart to the **SET** sheet we were working on.
2. Right click on the sheet and select **New Sheet Object->Chart**.
3. Select the *Line Chart* from the **Chart Type** area in the General tab. Put “*Sales by Month Year*” in the **Title** box.
4. Click Next.
5. For *dimension*, choose **Month Year**.
6. For expression type:  
**sum({<\$(vExprSales)>}[Transactions.Amount With Sign])**
7. For the label put “Sales”
8. In the **Expression** dialog click the plus icon next to the expression to expand the underlying properties.
9. Select **Background Color** and type the following expression in the **Definition** field (this means if you pick a year, that year will be highlighted in Light Blue, otherwise the rest of the line chart will be in Light Gray).  
**If(Year=Year,LightBlue(),LightGray())**
10. Now if you click on one month in a year, it pinpoints to a **single value**. If you pick two or more years, the line chart will display a **line**.
11. Create a copy of this chart by holding down **Ctrl+Alt** and dragging it to the right of this line chart.
12. Change the title of this new chart to **Sales by MonthYear (SET)** in the **General** tab so we know we are applying **SET** analysis to this chart.
13. Modify the expression in the Definition box of the Expressions tab to:  
**sum({<\$(vExprSales),Month= , Year= ,Quarter= ,[Month Year]= >}[Transactions.Amount With Sign])**

**NOTE:** A few things to observe. The field *Month Year* field has a space so we need brackets around it. By putting the syntax 'Year= ', the year field is ignored as are the *Month*, *Quarter* and *Month Year* values when you select them from the list boxes. Field names are case sensitive but aggregation functions such as 'Sum', 'Min', 'Avg' are not case sensitive.

## Solution



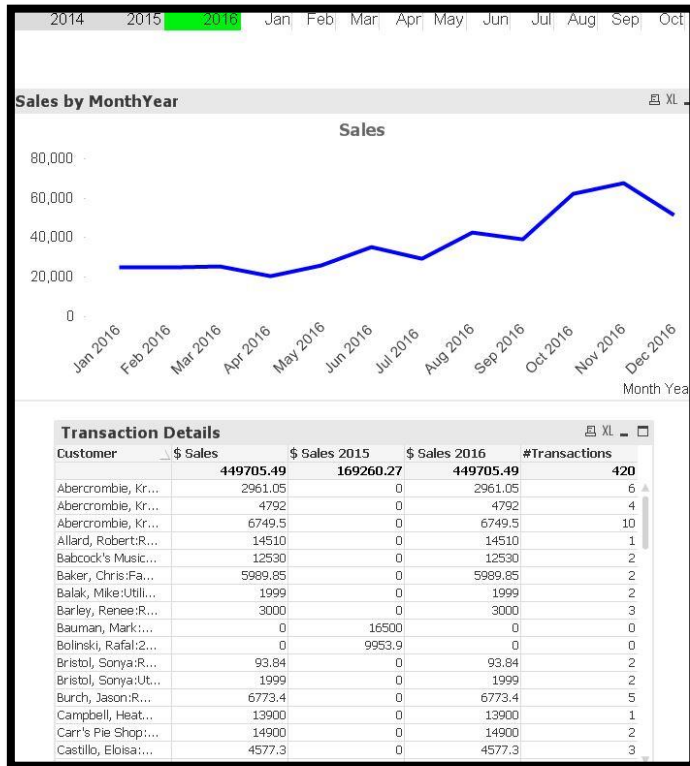
## Activity 11.3 Set Analysis 3 (Optional)

In this exercise we would like to see the **Sales** for the years 2015 and 2016 without our selections having any effect on the columns of a straight table. Taking the Transaction Details table from the Product Details sheet we will modify it using set expressions to make these columns independent of our selections for the years 2015 and 2016.

### Step by Step

1. Copy the *Transaction Details* table from the Product Details sheet to the SET sheet.
2. Disable the expressions for *Sales Trend*, *Margin*, *#Transactions Gauge*, and *Latest Transaction Date*. **HINT:** Go to the *Enable* box and uncheck it.
3. Now you should only have *Sales* and *#Transactions* in this straight table. Change the label for *Sales* to be \$ *Sales*.
4. Modify the expression for \$ *Sales* to be:  
***sum({\$<\$(vExprSales)>}[Transactions.Amount With Sign])***
5. The '\$' before the '<' is not necessary but it is good to be consistent when using set expressions and specifically state that you will honor all user selections.
6. Right click on *Sales*, click on **Copy** and **Paste** it in an empty area.
7. Label this new expression \$ *Sales 2015*.
8. Go to the **Definition** box and modify the expression to :  
***sum({\$<\$(vExprSales), Year={'2015'}>}[Transactions.Amount With Sign])***
9. Right click on *Sales* and make another copy, paste it in an empty area and label this one \$ *Sales 2016*.
10. Go to the Definition box and modify this expression to :  
***sum({\$<\$(vExprSales), Year={'2016'}>}[Transactions.Amount With Sign])***
12. Now you can make selections for year and other list box selections and notice that the straight table updates for other dimensions but for the columns with the year 2015 it will only calculate for 2015. Similarly for the column with 2016, it honors all other selections from list boxes but only calculates for 2016.

### Solution



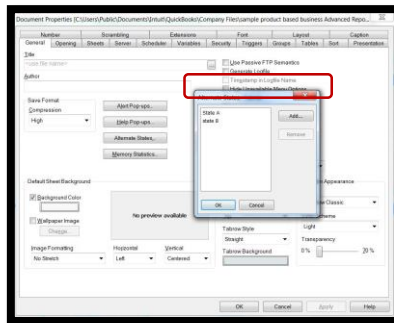


## 11.2 Performing Comparative Analysis Using Alternate States

**Alternate States**, this concept is used to create multiple states that will be in different states of selection. Currently when you make selections, those selections translate across every single chart and table, making calculations based on those selections. Using Alternate States you can set apart a sheet or sheet objects to be in different states that will not be affected by those selections. The user can create copies of objects or sheets and place them into different states.

**Alternate states** are not available in the back end load script. They are a feature of the User Interface (UI). The designer/developer invokes the **Alternate State** button in the **Document Properties** which can be accessed by pressing **Ctrl+Alt+D** and creating any number of states. Once one state is created from **Document Properties**, the Designer/Developer may go into the **Properties** and **General** tab of any object and select the state from the box labeled **Alternate States**. Or other Alternate States can be created from any Chart Object from the dropdown list in the General tab.

### Document Properties Dialog box

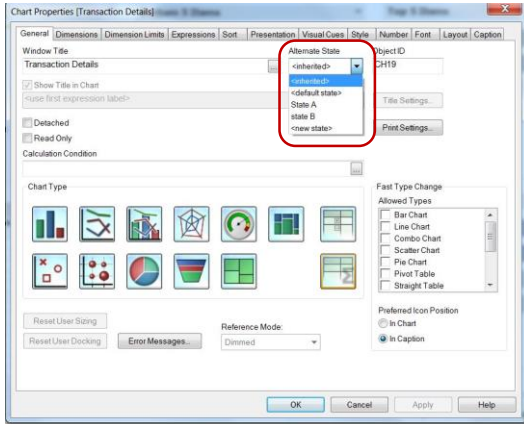


### 11.2.1 State Identifiers

- The state names created by *Advanced Reporting* are known as **State Identifiers**.
- Two states are always available: **default** and **inherited** states
- The *Advanced Reporting* document is always in the **default** state. All objects in the default state inherit this state
- **Alternate States** (once created) can be found in the **General** tab of all sheet objects and the user can select the state of that object from the drop down under **Alternate State** (see figure below).

- If a sheet is placed in another state, all objects within that sheet inherit that state. The states are inherited as shown below:

### Document>Sheet>Sheet Objects



#### 11.1.2 Logical Behavior using Alternate States

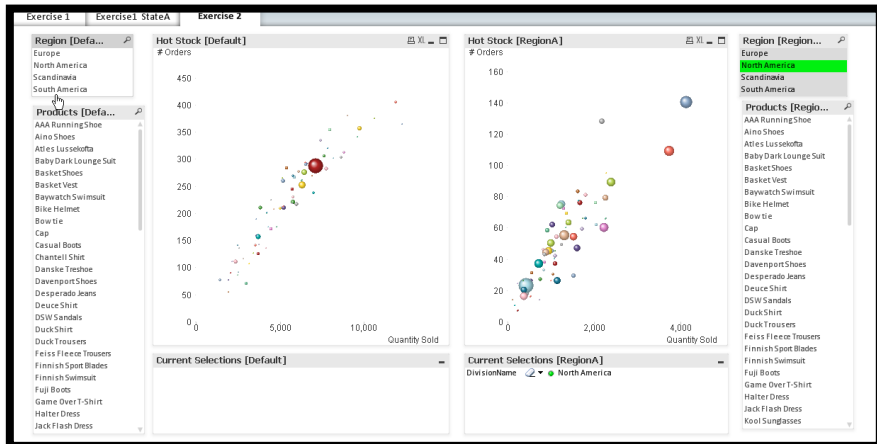
- Pressing the **Clear All** button below the **Current Selections** box will clear selections from ALL states
- Pressing the **Clear** button icon inside of the **Current Selections** box in a specific state only clears it in that specific state
- Pressing the **Back** and **Forward** button affects all states
- No obvious differentiation to show that an object is in an **Alternate State**. It is up to the Designer/Developer to name the chart in such a way that it will reference the state.
- Variables** belong to the default state.
- Actions** can be set to occur in specific states
- If a state is deleted and is missing, that object reverts back to the **default states**

#### 11.1.3 Examples

The figures below show two different ways that **Alternate States** may be used.

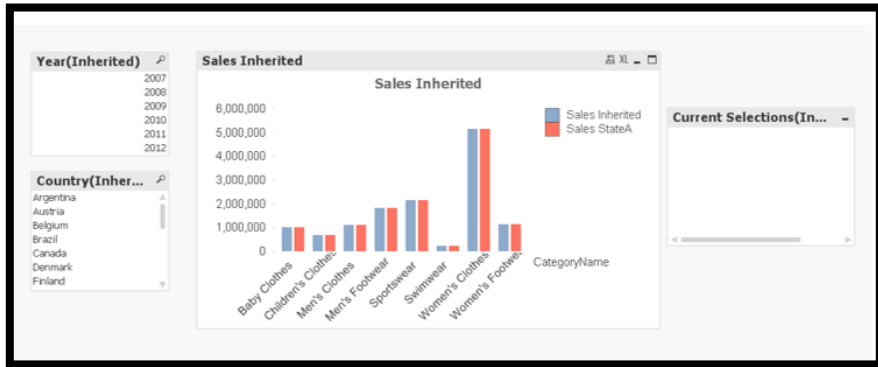
##### Example 1

This example has replicated all the sheet objects twice on one sheet and uses the two scatter plots in two different states for comparative analysis. We have also duplicated the list boxes for Region, Products and the Current Selections Box. One set is in the Default state and the other set of objects (list boxes and Current Selections) is in RegionA (another state).



## Example 2

This example shows two bar charts in the same chart. Each of the bar charts are in different states and is another way of performing comparisons.



Another example of using **Alternate States** is to create two separate sheets in two different states. All objects in each of these sheets will inherit the properties (or the state) of that particular sheet. In this manner when you make selections in one sheet it does not affect the objects in another sheet.

## Activity 11.4: Scatter Plots in Alternate States

### Challenge

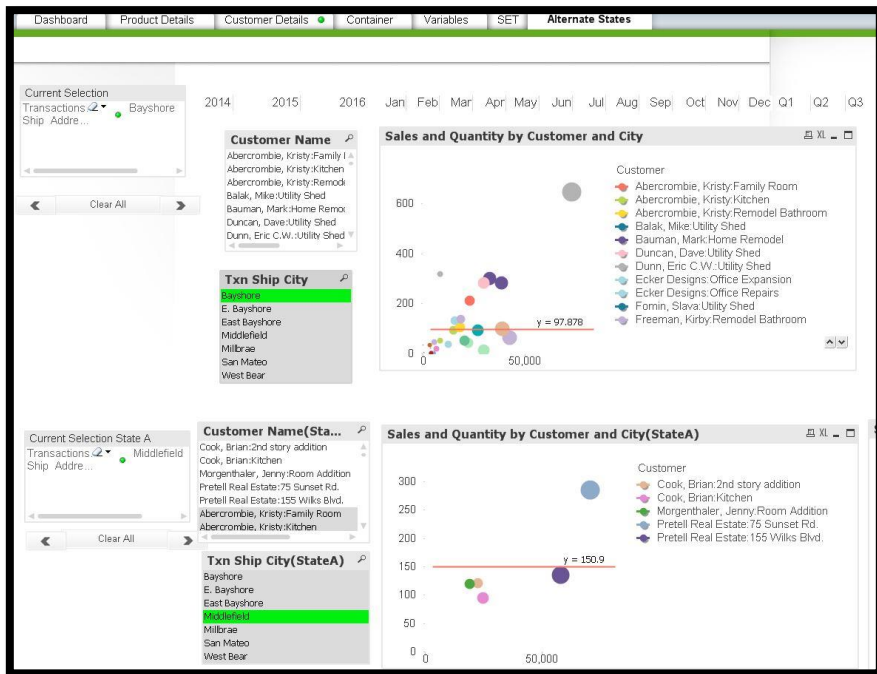
We want to compare the Sales and Quantity by Customer and City in two different states of selection using the concept of Alternate States. Let's see what we need to change in order for this comparison to work properly. We will copy the Scatter plot called "*Sales and Quantity by Customer and City*" from the **Customer Details** sheet into the sheet called Alternate States to perform the comparisons.

### Step by Step

1. Right click on the tab of any sheet that has the fewest number of objects and Copy Sheet. We chose to copy the **Container** sheet. Delete all objects on this sheet except for Current Selections box and the QB logo. Right click on the sheet tab, go to **Sheet Properties>General** and under **Title** put *Alternate States*.
2. Let us go into the Document Properties by clicking in a blank area of the sheet and using **Ctrl+Alt+D** to get **Document Properties**. Go to the **General** tab and click on the **Alternate States** button in the center and create a *StateA*. Click OK twice.
3. Delete any list boxes you do not need such as **Account Name**, **Item Name** and **Account Type**. Keep the **Customer Name (Transactions.Customer Full Name)** list box.
4. Use **Ctrl+Alt** and duplicate the **Transactions.Customer Full Name** list box and go to the General tab and put this into StateA. In the title of this list box you may want to show StateA in the name. So the title may look like "Customer Name (StateA)".
5. Right click on the sheet and **Select Fields** and add a list box for **Transactions.Ship Address City** from the Transactions table. Call it Txn Ship City in the **Title** of the **General** tab.
6. Duplicate this list box and create another one in StateA. Title this **Txn Ship City (StateA)**.
7. Duplicate the **Current Selections** box and call this one Current Selections(StateA). **NOTE:** Place the buttons for this Current Selections box in the StateA as well.
8. Go to the *Customer Details* sheet and click on the scatter plot, *Sales and Quantity by Customer and City*.
9. **Ctrl+C** to copy it and then **Ctrl+V** and paste it into the **Alternate States** sheet.
10. Hold down **Ctrl+Alt** and drag a copy of the above Scatter plot on the same sheet. Go to this one's General tab under Properties and place this into StateA. Reflect it in the title of this scatter plot.

11. So align all the list boxes and Current Selections box in StateA with the scatter plot in StateA. Align all the list boxes and Current Selections box with the scatter plot in the Default state together.
12. Now make selections in the scatter plot in the **StateA** and you will see that it does not affect anything in the scatter plot that is in the default state. Likewise do the opposite. Make selections in the scatter plot in the default state and you will see different selections in the scatter plot in **StateA**.
13. To clear a specific state, click in the current selections box and hit the clear button for a specific selection.
14. Hitting **Clear All** in either the default or **StateA** will clear all states.

## Solution



## Activity 11.5: Bar Chart with Alternate State in Set Analysis (Optional)

### Challenge

Sometimes you may want to observe the behavior of the same bar chart given two different selections in the same space or location without creating parallel charts. This can save space and makes it easier to view the behavior of both charts in one location. For instance, we may want to see the Sales in one city v.s. another in the same chart. We can set one bar chart to be in **StateA** and the other can be in the inherited or default state.

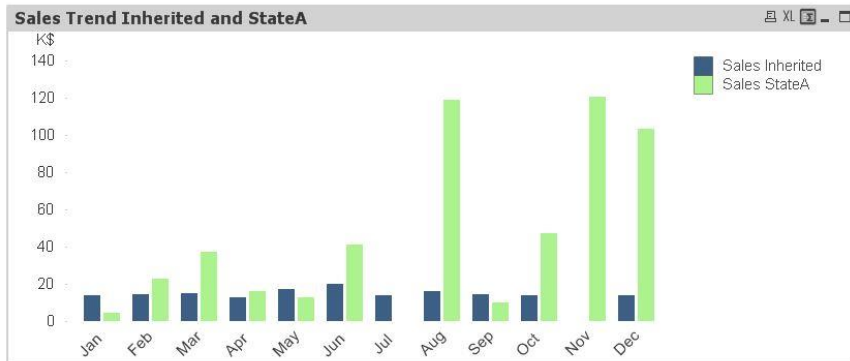
### Step by Step

1. You already have a **StateA** defined from the first exercise so you do not have to create another Alternate State unless you want to keep this separate from the scatter plot selections in **StateA**.
2. Copy the **Sales Trend** bar chart from the **Dashboard** by using **Ctrl+C** and pasting it into the **Alternate States** sheet using **Ctrl+V**.
3. Right click on the bar chart and go to **Properties>General**.
4. In the **Window Title** box label this chart **Sales Trend Inherited** and **StateA**.
5. Go to the **Expressions** tab.
6. Disable the **Margin** and **Margin%** expressions by unchecking the box for Enable, top center.
7. Right click on the **Sales** expression and Copy. Paste it into an empty area of the box. You have another copy of Sales with the same expression.
8. For the first **Sales**, rename and change the label to **Sales Inherited**.
9. The expression for **Sales Inherited** should remain the same as before:  
***Sum(<{\$(vExprSales)>}[Transactions.Amount With Sign])***
10. The other **Sales** expression, label it to **Sales StateA**. In the Definition box, edit the expression as follows:  
***Sum(<{\$(vExprSales)>}{StateA}[Transactions.Amount With Sign])***
11. Now the two bar charts act independently of selections made. The Sales Inherited bar chart reflects selections made in the **Inherited** state of all the sheet objects. The **StateA** bar chart reflects all the **StateA** selections.
12. Additionally change the background color for the bar for StateA to distinguish it from the color of the bar chart in the inherited state. Since we do not have a specific color for StateA, let's just use the color assigned to the Margin value which is an RGB value in the variable,  
***\$(vABCColor\_Margin)***. Later on you can assign an RGB color choice using another variable assigned to **StateA** and perhaps call the variable color : ***vABCColor\_StateA***.

13. So now you can pick different cities from your **Txn Ship City** list boxes in the default and StateA list boxes and observe the behavior of the bars in one chart location. The light green bars reflect StateA and the blue reflects the inherited state.
14. This is a powerful way to perform comparative analysis in one chart!

## Solution

Bar chart comparing sales in the cities Millbrae(blue) and Bayshore(Green)





## 12 Appendix

### Objectives

- Resource Links
- Tips and Tricks
- Glossary of Terms
- Commonly Used Functions and Variables

### 12.1 Resource Links

#### 12.1.1 Advanced Reporting Resource Link

Additional resources to QuickBooks Advanced Reporting may be found in the link below. There are also links to **Advanced Reporting User Guide** which gives you some background information and basics to get you started. The **Data Dictionary** in the Resources section help you to identify the various fields which may be used from the tables in the data model and a description of each of these fields. This will help the user understand all the possible fields he may need to use for visualizations and charts.

<http://qbar.intuit.com/resources.html>

#### 12.1.2 QuickBooks Advanced Reporting FAQs

These are FAQs that may answer many of the questions you may have about Advanced Reporting.

<http://qbar.intuit.com/faqs.html>

#### 12.1.3 Learning Center

There are some wonderful videos to get users started with reporting at this link.

<http://qbar.intuit.com/index.html>

#### 12.1.4 Qlik Community

This is the community at Qlik that provides technical answers on many of features that Advanced Reporting shares with QlikView. QlikView powers the back end engine that is a part of the Advanced Reporting structure of QuickBooks. So many of the functions, properties, options for charts and features share common functionality with QlikView. The answers provided by the Qlik community developers and designers may help the Users who are using QuickBooks Advanced Reporting and require more depth in their answers.

Please see the link below:

<https://community.qlik.com/welcome>

## 12.2 Useful Keyboard Shortcuts

### **Ctrl+Alt+S – Sheet Properties**

Sheet Properties give you the option to change sheet background, the fields to display, the default font and object appearance. It also allows you the opportunity to delete objects on the sheet from the **Objects** tab.

### **Ctrl+Alt+V – Variable Overview**

In this dialog box, you have the flexibility to not only add new variables but add the definition of the variable, modify the definition and to also have the capability to remove the variable if not used anymore.

### **Ctrl+Alt+D – Document Properties**

In this dialog box, you can set many properties for the document which will set it up generically for the entire document. For instance, you may want to set the number formatting for Sales here as Money rather than having to do it for every single chart and table individually. This will globally change the number formatting for Sales. Alternate States may be created within this dialog box as well. Once these properties are set here, it is valid across the whole document.

**WARNING:** Any variables pre-populated into the Variable Overview dialog box must not be deleted. If they are deleted, the data may not be valid or not show entirely in the visualizations. It is advisable to only delete or modify the ones created by the user.

**Ctrl+C** – copying an object using this combination works in Advanced Reporting

**Ctrl+V** - pasting the sheet object also works well in Advanced Reporting

## 12.3 Glossary of Terms

**Dimension** - A chart dimension is the set of values for the chart to iterate over when it calculates the values for its expression(s). In a simple case, dimension is what appears on the x-axis in a standard bar chart.

A chart can have one or more dimensions. The upper limit depends on chart type, data complexity and the amount of memory available. Pie, line and scatter charts can show a maximum of two dimensions, bar charts can show three.

In general a chart dimension gets its values from a field which is specified on the **Dimensions** page of the

**Chart Properties** dialog.

**Measure** – name given to an expression that is defined in a chart. Measures may be created by aggregation functions.

E.g. Measure is Sales, expression describing the measure is Sum(Sales).

**Drill-down group** – a dimension group that displays hierarchy

**Filters** – list boxes that show the field values are used to limit the criteria for analysis and reporting.

**Library** – contains pre-defined objects for reports

**Current Selection** – Shows all of the user's current selections in a small dialog box

## 12.4 Common Functions and Variable List

### 12.4.1 Commonly Used Functions

#### NUM

The **num** function formats the *expression* numerically according to the string given as *format-code*. Decimal

separator and thousands separator can be set as third and fourth parameters.

**Syntax:**

**num**(*expression* [ , *format-code* [ , *decimal-sep* [ , *thousands-sep* ] ] ] )

The examples below assume the two following operating system settings:

**Examples:**

Default setting 1    Default setting 2

**Number format**      # ##0,#              #,##0.#

num( A, '0.0' ) where *A=35648.375* returns:

Setting 1    Setting 2

**String**      35 648 375    35648.375

**Number**    35648375    35648.375

num( A, '#,##0.##', ',', ',' ) where *A=35648* returns:

Setting 1    Setting 2

**String**      35,648.00    35,648.00

**Number**      35648        35648

num( pi( ), '0,00' ) returns:

Setting 1        Setting 2

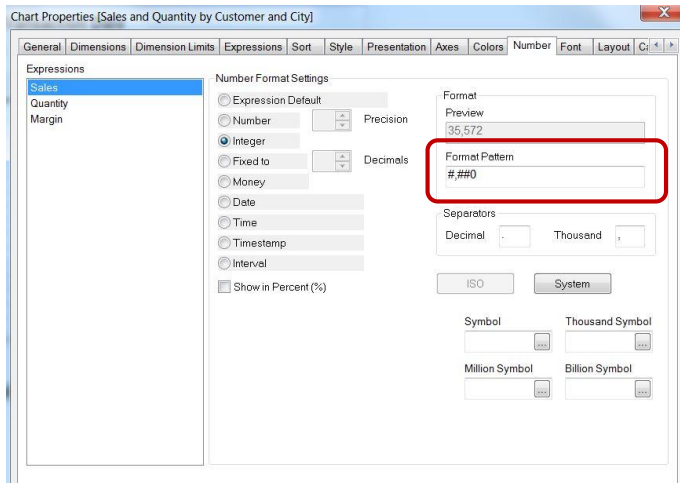
**String**            3,14            003

**Number**    3.141592653    3.141592653

**HINT:** In any of the charts, in the Numbers tab, it shows how the number will be displayed in the Format Pattern box.

In the format pattern, the 0 and # have a significant meaning:

- 0 means the digit has to be shown
- # means the digit is shown only if necessary



## 12.4.2 Date and String Manipulation Functions

### *subfield(s, 'delimiter' [ , index ])*

In its three-parameter version, this script function returns a given substring from a larger string *s* with delimiter 'delimiter'. *index* is an optional integer denoting which of the substrings should be returned. If *index* is omitted when **subfield** is used in a field expression in a **load** statement, the **subfield** function will cause the **load** statement to automatically generate one full record of input data for each substring that can be found in *s*.

In its two-parameter version, the **subfield** function generates one record for each substring that can be taken from a larger string *s* with the delimiter 'delimiter'. If several **subfield** functions are used in the same **load** statement, the Cartesian product of all combinations will be generated.

### Examples:

(For three parameters)

subfield(S, ';', 2) returns 'cde' if S is 'abc;cde;efg'  
 subfield(S, ';', 1) returns NULL if S is an empty string

subfield(S, ',', 1) returns an empty string if S is ','

### ***MakeDate(YYYY [, MM [, DD ] ] )***

Returns a date calculated from the year YYYY, the month MM and the day DD.

If no month is stated, 1(January) is assumed.

If no day is stated, 1 (the 1:st) is assumed.

#### **Examples:**

makedate(1999) returns 1999-01-01

makedate(99) returns 0099-01-01

makedate(1992,12) returns 1992-12-01

makedate(1999,2,14) returns 1999-02-14

### ***AddMonths(startdate, n , [ , mode] )***

Returns the date occurring n months after startdate or, if n is negative, the date occurring n months before startdate.

By specifying a mode (0 if omitted) the date is set to either the unmodified day of the specified month (mode=0) or the calculated day as derived from the end of the month (mode=1).

#### **Examples:**

addmonths ('2003-01-29',3) returns '2003-04-29'

addmonths ('2003-01-29',3,0) returns '2003-04-29'

addmonths ('2003-01-29',3,1) returns '2003-04-28'

addmonths ('2003-01-29',1,0) returns '2003-02-28'

addmonths ('2003-01-29',1,1) returns '2003-02-26'

addmonths ('2003-02-28',1,0) returns '2003-03-28'

### ***index(s1 , s2[ , n])***

Position of a substring. This function gives the starting position of the n:th occurrence of substring s2 in string s1. If n is omitted, the first occurrence is assumed. If n is negative, the search is made starting from the end of string s1. The result is an integer. The positions in the string are numbered from 1 and up.

#### **Examples:**

index( 'abcdefg', 'cd' ) returns 3

index( 'abcdabcd', 'b', 2 ) returns 6

`index( 'abcdabcd', 'b', -2 )` returns 2

`left( Date, index( Date, '-' ) -1 )` where Date = 1997-07-14 returns 1997

`mid( Date, index( Date, '-' ) -2, 2 )` where Date = 1997-07-14 returns 07

### ***ltrim(s )***

Returns the string *s* trimmed of any leading spaces.

#### **Examples:**

`ltrim ( ' abc' )` returns 'abc'.

`ltrim ( 'abc ' )` returns 'abc '

### ***rtrim(s )***

Returns the string *s* trimmed of any trailing spaces.

#### **Examples:**

`rtrim ( ' abc' )` returns ' abc'

`rtrim ( 'abc ' )` returns 'abc'

### ***trim(s )***

Returns the string *s* trimmed of any leading and trailing spaces.

#### **Examples:**

`trim ( ' abc' )` returns 'abc'

`trim ( 'abc ' )` returns 'abc'

`trim ( ' abc ' )` returns 'abc'

## **12.4.3 Color Functions**

These functions can be used in color expressions in sheet object properties supporting calculated color in image charts.

The functions **RGB**, **HSL** and **syscolor** always return a color with the alpha value of 255 (opaque). Optionally, for any of the colors a parameter for alpha factor can be given. An alpha of 0 corresponds to full transparency. An alpha of 255 corresponds to full opacity.

### ***color(n)***

This function returns the color representation of color number *n* in the relevant chart palette.

#### ***RGB(e1, e2, e3)***

This function returns the color representation of a color defined by the red component *e1*, the green component *e2* and the blue component *e3*.

#### ***ARGB(alpha, e1, e2, e3)***

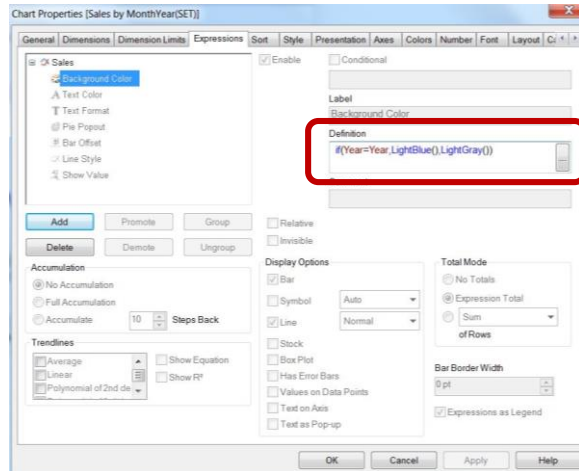
This function returns the color representation of a color defined by the red component  $e1$ , the green component  $e2$  and the blue component  $e3$  with an alpha factor (opacity) of  $alpha$ .

### **HSL (hue, saturation, luminosity)**

This function returns the color representation of a color defined by a hue between 0 and 1, a saturation value between 0 and 1 and a luminosity value between 0 and 1.

The following are predefined color functions and may be used in expressions:

**black()**  
**darkGray()**  
**lightGray()**  
**white()**  
**blue()**  
**lightblue()**  
**green()**  
**lightgreen()**  
**cyan()**  
**lightcyan()**  
**red()**  
**lightred()**  
**magenta()**  
**lightmagenta()**  
**brown()**  
**yellow()**





## 12.5 Variable List

**vExprCogs:** This variable can be used in set analysis when you want to do anything with the cost of goods sold for sales transactions. This is used in the Sales Profitability starter report to calculate the Total Cost of Products and Services.

**vExprDayRangeFilter:** Use this expression as a modifier in set analysis to restrict the calculation between two dates.

**vExprLast12MonthRolling:** Use this expression as modifier in set analysis to calculate amount or quantity for last 12 months. This is used in the Library object Sales -Top 10 item- last 12 months.

**vExprMaxYear :** Use this expressions as a modifier in set analysis to make sure that you always have value for the max year of the current selection.

**vExprMonthRangeFilter:** This is same as vExprDayRangeFilter. It just works on monthly basis. In fact, vExprLast12MonthRolling is just a specific implementation of it.

**vExprPreviousNMonths:** Use this is as a modifier in set analysis. It produces a value for a particular month and takes one parameter. Use 0 for current month, 1 for previous month, and so on. You need to remember that these all work based on the current selection of dates. If you select Q2 of 2013, then the expression \$vExprPreviousNMonths(0) points to the June 2013.

**vExprPreviousNQuarters :** Same as vExprPreviousNMonths.

**vExprPreviousNYears:** Same as vExprPreviousNMonths .

**vExprSales:** Use this as modifier in set analysis to filter your data only for non-pending sales transactions.

**vExprQuarterRangeFilter:** Same as vExprMonthRangeFilter.

**vExprYearRangeFilter:** Same as vExprMonthRangeFilter.

**vSetSalesIncome:** The sum of your sales income (as expressed in vExprSales).

**vSetSoldQuantity:** The total quantity of your sales income (as expressed in vExprSales).

**vTxtMonthYear:** This can be used to label your expressions. It goes hand in hand with vExprPreviousNMonths. If you use \$(vExprPreviousNMonths (0)) in your set analysis, then you should use \$(vTxtMonthYear(0)) as the label of this expression. If you want to have months in your dimension, then you can use [Month Year] in your dimension.

**vTxtQuarterYear:** Same as vTxtMonthYear. In a dimension you can use [Quarter Year].

**vTxtYear:** Same as vTxtMonthYear. In a dimension you can use [Year].

## 12.6 Tips and Tricks

1. **AutoSave not available** – ensure that you hit the Save button periodically, perhaps after adding a new chart, visualization, expression or list box.
2. **Interim Copies** – Using Save As will save interim copies so use this and rename the file in various stages of development.
3. **Ctrl+Alt** - Use Ctrl+Alt buttons to replicate a chart easily by holding these keys down and dragging the chart or visualization to another location in the same sheet. If you copy to another sheet use Ctrl+C and Ctrl+V for copy and paste operations.
4. **Alt** – the Alt button allows you to move a sheet object more easily if you cannot find the handles to move it. A cross appears and using that drag the object to another location. You can also use 1 pt to set a border in the Layout tab and this will also make it easier to move an object on the sheet.
5. **NULL Values** - If you are seeing extraneous values with dashes in the dimension or measure axes, they might be due to NULL values. Suppress any NULL values when possible.
6. **Clear All** - Clear all selections before doing a new search; otherwise it compounds and layers the searches and you may see erroneous data.
7. **Keyboard Shortcuts** - Use the keyboard shortcuts to get to preferences. E.g. Ctrl+Alt+V for the Variable Overview, Ctrl+Alt+S for Sheet Properties.
8. **Name your charts** and visualizations in the Title box even if you do not show the title. When you go to delete a sheet object, naming them uniquely helps you to delete them easily especially if you have several text boxes or input boxes.