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Data Processing and the Envision

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By

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ABSTRACT

Data is being generated very rapidly due to increase in information in everyday life. Huge amount of data gets accumulated from various organizations that is difficult to analyze and exploit. Data created by an expanding number of sensors in the environment such as traffic cameras and satellites, internet activities on social networking sites, healthcare database, government database, sales data etc., are example of huge data. Processing, analyzing and communicating this data are a challenge. Online shopping websites get flooded with voluminous amount of sales data every day. Analyzing and visualizing this data for information retrieval is a difficult task. There are large number of information visualization techniques which have been developed over the last decade to support the exploration of large data sets. With today's data management systems, it is only possible to view quite small portions of the data. If the data is presented textually, the amount of data which can be displayed is in the range of some 100 data items, but this is like a drop in the ocean when dealing with data sets containing millions of data items. Data is being generated very rapidly due to increase in information in everyday life. Huge amount of data gets accumulated from various organizations that is difficult to analyze and exploit. Data created by an expanding number of sensors in the environment such as traffic cameras and satellites, internet activities on social networking sites, healthcare database, government database, sales data etc., are example of huge data. Processing, analyzing and communicating this data are a challenge. Online shopping websites get flooded with voluminous amount of sales data every day. Analyzing and visualizing this data for information retrieval is a difficult task. Therefore, a system is required which will effectively analyze and visualize data. This paper focuses on a system which will visualize sales data which will help users in applying intelligence in business, revenue generation, and decision making, managing business operation and tracking progress of tasks.

Effective and efficient data visualization is the key part of the discovery process. It is the intermediate between the human intuition and quantitative context of the data, thus an essential component of the scientific path from data into knowledge and understanding. Therefore, a system is required which will effectively analyze and visualize data. This paper focuses on a system which will visualize data which will help users in interactive data visualization applying in business, revenue generation, and decision making, managing business operation and tracking progress of tasks.

Table of Contents

1. Introduction

Data visualization is a process which aims to communicate data effectively and clearly to the user through graphical representation. Effective and efficient data visualization is the key part of the discovery process. It is the intermediate between the human intuition and quantitative context Load the data, thus an essential component of the scientific path from data into knowledge and understanding. It is a powerful new technology having a great potential to help researchers as well as companies for building revenue decision. Given the rate of data collection, which grows exponentially, we need enhanced software solutions to analyze this mountain of data. As data visualization becomes critical in analytics, we want to provide engineers and scientists with the ability to explore their datasets interactively, providing state-of-the-art machine learning analysis in a timely fashion. The framework has been developed leveraging the best practices in software engineering standards. For the past two decades we have witnessed tremendous growth in the scale of datasets. Due to advances in hardware and software technology, including smart sensing, multimedia and social networks, it has become easier to collect rich sets of information from a wide range of domains. The complexity of many of these datasets require sophisticated machine learning or data mining algorithms to reveal hidden knowledge or patterns. For example, recommendation systems can be used to link customers to the most appropriate businesses' or clustering algorithms used to identify links between environment and human health. However, the growth in both scale and complexity of the datasets pose challenges, known as the three V's of Big Data: i) volume, ii) velocity and iii) variety. All these factors require major advances in Big Data processing and visualization. Visualizations represent a means to communicate data and analysis results. Our research at the Chair for Data Analysis and Visualization is driven by real-world problems and intends to bring the human capabilities and perception together with computer algorithms, using visualization. Thereby, we face the key challenge of how to visually communicate data to the human. A common assumption of visualization researchers is: the more abstract a representation is, the harder it is to interpret for the human, in particular if not trained in reading visualizations.

As it turned out, these analysts had no prior knowledge in data visualization or machine learning methods at all, however, are highly skilled in manual data analysis. They analyze raw tabular data on a daily basis seeking for patterns and potential suspects. Key analysis tasks include comparative analysis of offenses, where analysts consider multiple attributes, in potentially large data sets, at once. The group of analysts posed the perfect match for us in order to evaluate whether they are able or unable to interpret the visual depiction of their data. They know the data good enough based on their daily work routine but are not used to visual interpretation. To challenge the analysts, we chose to visualize the data using Dimensionality reduction, that is a technique known in advanced statistics, which translates multi-attribute data to a two-dimensional plane. The results are typically depicted using a standard scatterplot with x- and y-coordinates. Normally, one already learns to read a standard scatterplot in early years, right after entering school. Using dimensionality reduction, one needs to consider the proximities between points rather than their exact positions and be aware of the attributes that influence the proximities; the closer points are located, the more similar they can be considered. We performed a qualitative study with three of the domain experts, meaning we confronted them with an abstract data representation using dimensionality reduction and different tasks in such way that we can state whether they are able or unable to interpret it.

We were impressed and equally surprised by the results: Contrary to our beliefs, the group of analysts was able to interpret the very abstract visual depiction of their data given a minimal set of

state-of-the-art interaction techniques. This result is of interest, because visualization researchers, us included, assumed the opposite. We are aware that our results are limited regarding the application and the analysts we studied, yet it is a first step towards proving that we should never underestimate domain experts. We think that there is still a lot of work to do regarding communicating visualizations and integrating domain experts in this process. We should consider collaborations with domain experts at eyelevel rather than trying to find solutions that meet our requirements but not theirs.

1.1 Relationship Between Brininess and Visualization

Data visualization, according to Wikipedia, is the study of the visual representation of data. A closely related term, Information visualization, is defined as: visualization is a process of transforming information into a visual form enabling the viewer to observe, browse, make sense, and understand the information.

In the context of Business Intelligence (BI), data visualization is applied in two ways. First, data visualization is a discipline that covers a complete theory of how to visually represent data. The concepts and systems can be applied in the design of visual interfaces for communicating information.

Secondly, data visualization concepts and guidelines are realized through features in BI software, which makes it easy to apply the concepts. This is similar to the concept of Object Oriented programming. Object Oriented Programming is a concept that could be implemented in any programming language, such as C. But to do it effectively and in large scale, it's best to have a programming language that provides direct support for the concepts, in the form of classes and inheritance.

Likewise, data visualization software provides features to easily create visualizations that effectively communicate information. More importantly, the software should guide and enforce the guidelines for effective visualization, so a casual user can still create satisfactory results.

Additionally, data visualization in the context of BI often implies the interactivities through the software. By enabling users to interact with data, the software opens tremendous opportunities to view data in many different angles. It transforms the data visualization from a presentation technology to an analysis process.

1.2 Data Visualization Concept

Rather than trying to analyze a long list of numbers in rows and columns, Data visualization makes data easy to digest by allowing anyone to crunch large data sets and visualize it with beautiful pictures, graphs, charts, maps and more–all in a single dashboard. There are many Data visualization tools which are built as a self-service BI software solutions, so all data visualization tools are easy to use and allow anyone to create a meaningful dashboards and reports without having to rely on IT for continuous changes or customizations. Get fast and accurate answers to crucial questions such as what is driving growth, where any company is spending its resources and more, whereas coming to the spreadsheets these tools give you all the details you need to understand your data in an interactive, visual environment, enabling you to easily identify trends and developments as they happen. Connect directly to the data source or sources you want to

analyze, tie your data together with easy data preparation features, and then choose from dozens of available charts, graphs, indicators and maps to truly unlock the value of your data.

Using this real-time data visualization lets anyone in your business get the information and insights they need at a glance – rather than waiting for IT to query a database or spending hours crunching the numbers in Excel. When every decisionmaker has data at their fingertip, your company can truly become a data-driven organization.

Not long ago, the ability to create smart data visualizations, or data viz, was a nice-to-have skill. For the most part, it benefited design- and data-minded managers who made a deliberate decision to invest in acquiring it. That's changed. Now visual communication is a must-have skill for all managers, because more and more often, it's the only way to make sense of the work they do.

Data is the primary force behind this shift. Decision making increasingly relies on data, which comes at us with such overwhelming velocity, and in such volume, that we can't comprehend it without some layer of abstraction, such as a visual one. A typical example: At Boeing the managers of the Osprey program need to improve the efficiency of the aircraft's takeoffs and landings. But each time the Osprey gets off the ground or touches back down, its sensors create a terabyte of data. Ten takeoffs and landings produce as much data as is held in the Library of Congress. Without visualization, detecting the inefficiencies hidden in the patterns and anomalies of that data would be an impossible slog.

1.3 Tools Feature

In order to carry out a good data analysis and visualizations, it is essential to know and understand the tools available as well as their correct application in the corresponding fields. There are several tools to turn data into graphics, but some of them may be costly. Below is a selection of the best free tools for data processing and display. They are grouped by target use and application.

The three tools shown below have been designed to assist in the debugging and the transformation of data. They are useful to clean and refine messy data and convert it into appropriate formats. Often, large data sets represented in tabular formats contain typos, inaccuracies –e.g., dates expressed in different formats, cells with abbreviated/expanded names, etc.–, whose manual correction is unfeasible. These tools accelerate the process that enhances the quality of the information and makes the data complete and easy to re-use.

1.4 Data processing staging

Data processing is the conversion of data into usable and desired form. This conversion or "processing" is carried out using a predefined sequence of operations either manually or automatically. Most of the data processing is done by using computers and thus done automatically. The output or "processed" data can be obtained in different forms like image, graph, table, vector file, audio, charts or any other desired format depending on the software or method of data processing used.

Data processing is undertaken by any activity which requires a collection of data. This data collected needs to be stored, sorted, processed, analyzed and presented. This complete process can be divided into 6 simple primary stages which are:

1. Data collection
2. Storage of data
3. Sorting of data
4. Processing of data
5. Data analysis
6. Data presentation and conclusions

Once the data is collected the need for data entry emerges for storage of data. Storage can be done in physical form by use of papers, in notebooks or in any other physical form. With the emergence and growing emphasis on Big Data & Data Mining the data collection is large and a number of operations need to be performed for meaningful analysis and presentation, the data is stored in digital form. Having the data into digital form enables the user to perform a large number of operations in small time and allows conversion into different types. The user can thus select the output which best suits the requirement.

This continuous use and processing of data follow cycle called as data processing cycle and information processing cycle which might provide instant results or take time depending upon the need of processing data. The complexity in the field of data processing is increasing which is creating a need for advanced techniques.

Storage of data is followed by sorting and filtering. This stage is profoundly affected by the format in which data is stored and further depends on the software used. General daily day and noncomplex data can be stored as text files, tables or a combination of both in Microsoft Excel or similar software. As the task becomes complex which requires performing specific and specialized operations they require different data processing tools and software which is meant to cater to the peculiar needs.

Storing, sorting, filtering and processing of data can be done by single software or a combination of software whichever feasible and required. Data processing thus carried out by software is done as per the predefined set of operations. Most of the modern-day software allows users to perform different actions based on the analysis or study to be carried out. Data processing provides the output file in various formats.

- **Plain text file** – These constitute the simplest form or processed data. Most of these files are user readable and easy to comprehend. Very negligible or no further processing is these types of files. These are exported as notepad or WordPad files.
- **Table/ spreadsheet** – This file format is most suitable for numeric data. Having digits in rows and columns allows the user to perform various operations like filtering & sorting in ascending/descending order to make it easy to understand and use. Various mathematical operations can be applied when using this file output.
- **Charts & Graphs** – Option to get the output in the form of charts and graphs is handy and now forms standard features in most of the software. This option is beneficial when dealing with numerical values reflecting trends and growth/decline. Though there are ample charts and graphs are available to match diverse requirements there exists situation when there is a

need to have a user-defined option. In case no inbuilt chart or graph is available then the option to create own charts, i.e., custom charts/graphs come handy.

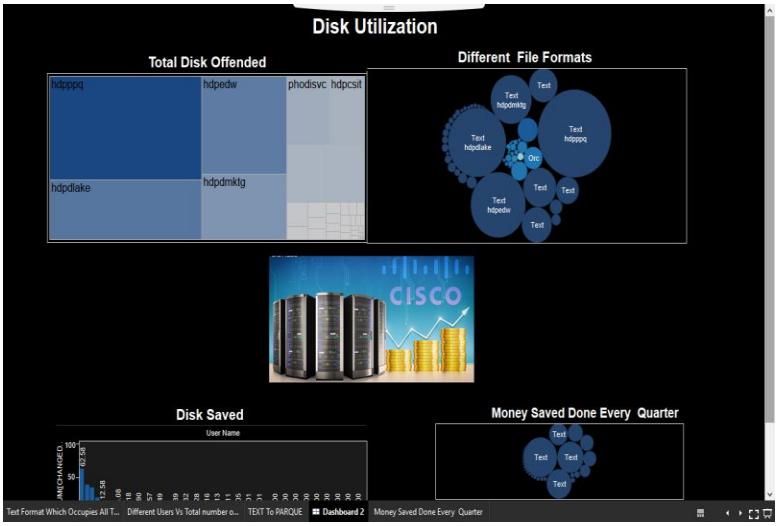
- **Maps/Vector or image file** – When dealing with spatial data the option to export the processed data into maps, vector and image files is of great use. Having the information on maps is of particular use for urban planners who work on different types of maps. Image files are obtained when dealing with graphics and do not constitute any human readable input.
- **Other formats/ raw files** – These are the software specific file formats which can be used and processed by specialized software. These output files may not be a complete product

Nowadays more and more data are collected for academic, scientific research, private & personal use, institutional use, commercial use. This collected data needs to be stored, sorted, filtered, analyzed and presented for it to be of any use. This process can be simple or complex depending on the scale at which data collection is done and the complexity of the results which are required to be obtained. The time consumed in obtaining the desired result depends on the operations which need to be performed on the collected data and on the nature of the output file required to be obtained. This problem becomes starker when dealing with the very large volume of data such as those collected by multinational companies about their users, sales, manufacturing, etc. require further processing. Thus, there will need to perform multiple data processing. The need for data processing becomes more and more critical in such cases. In such cases, data mining and data management come into play without which optimal results cannot be obtained. Each stage starting from data collection to presentation has a direct effect on the output and usefulness of the processed data.

2. Project Technical Description

2.1 Tableau

Tableau is a software which produces interactive data visualization products focused on business intelligence. Tableau has a mapping functionality, and is able to plot latitude and longitude coordinates. It has been criticized for being overly US-centric. They also offer custom geocoding, as well as five ways to access their products: Desktop (both professional and personal editions), Server, Online (which scales to support thousands of users), Reader and Public, with the last two free to use. Visible, a consumer data visualization mobile app, was released in 2015. Tableau Server is a business intelligence application that provides browser-based analytics anyone can use. It's a rapid-fire alternative to the slow pace of traditional business intelligence software. What makes Tableau different? It's designed for everyone. There's no scripting required, so anyone can become an analytics expert. You can grow your deployment, as you need it. Train online for free. Find answers in minutes, not months.



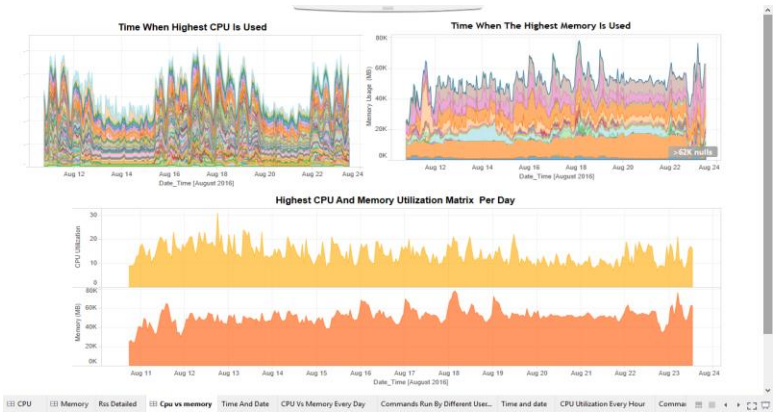
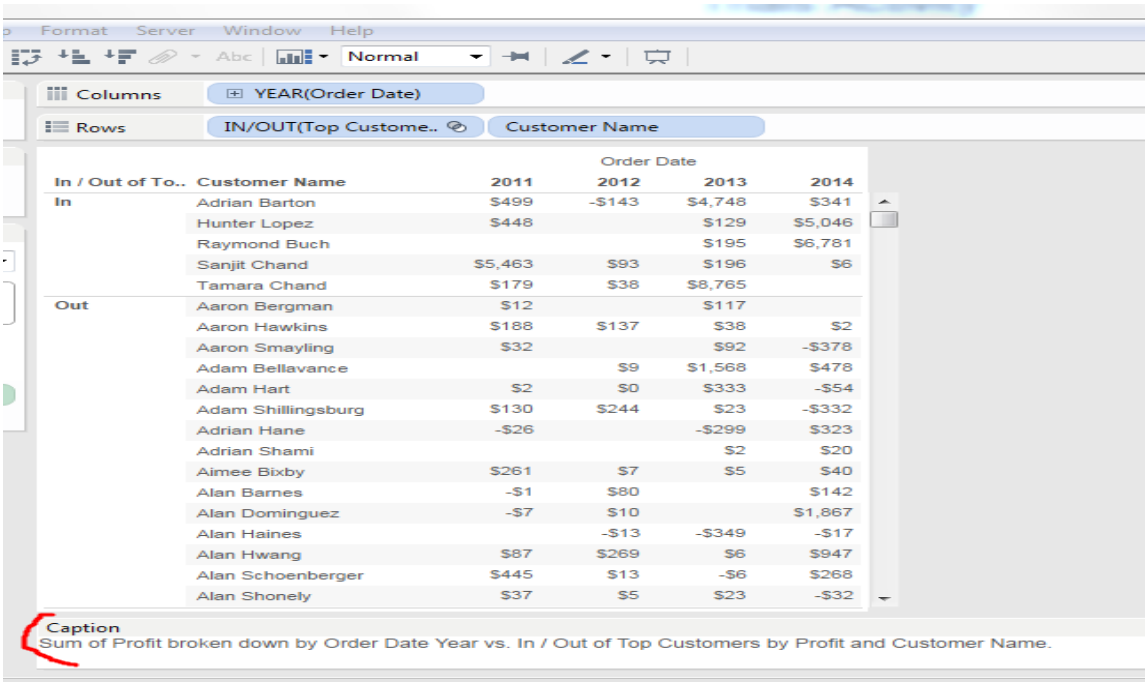


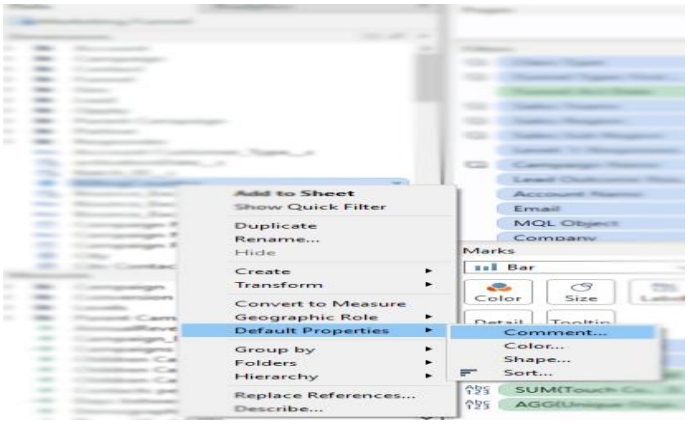
Tableau Public is for anyone who wants to tell stories with interactive data on the web. It's delivered as a service that allows you to be up and running overnight. With Tableau Public you can create amazing interactive visuals and publish them quickly, without the help of programmers or IT. The Premium version of Tableau Public is for organizations that want to enhance their websites with interactive data visualizations. There are higher limits on the size of data you can work with. And among other premium features, you can keep your underlying data hidden. Why tell stories with data? Because interactive content drives more page views and longer dwell time. Industry experts have cited figures showing that the average reading time of a web page with an interactive visual is 4, 5 or 6 times that of a static web page.

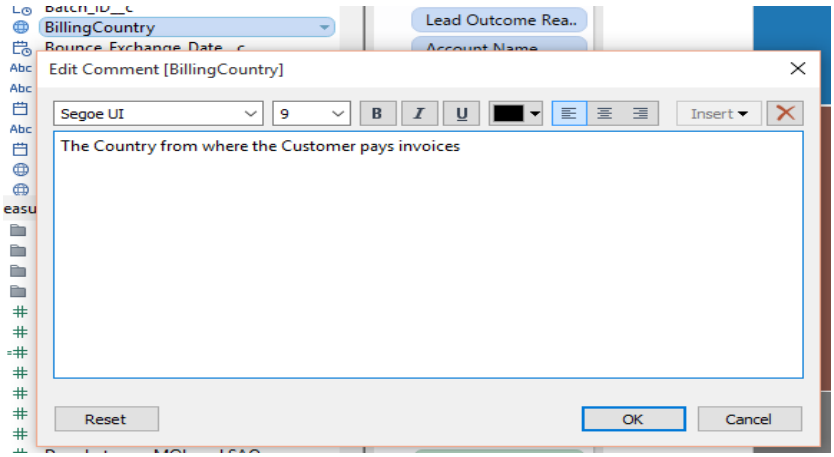
2.2 Technical Details

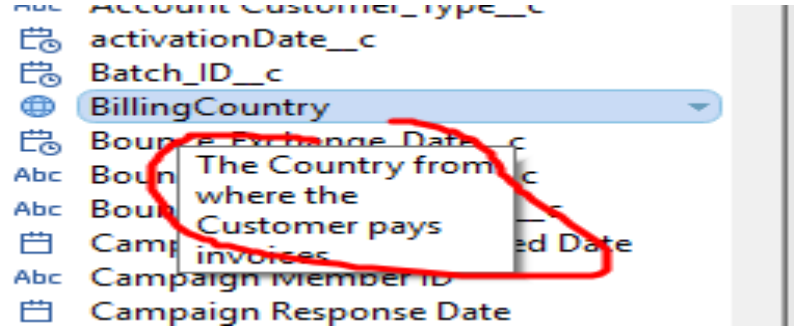
Tableau offers a convenient Caption feature, deactivated by default but easy to activate from the Worksheet Menu. Tableau even pre-populates the description of the viz, leaving you latitude to edit and simplify the description, if needed. For example:



Another handy feature, perhaps less obvious, is the Comment feature for each object, dimension or feature:

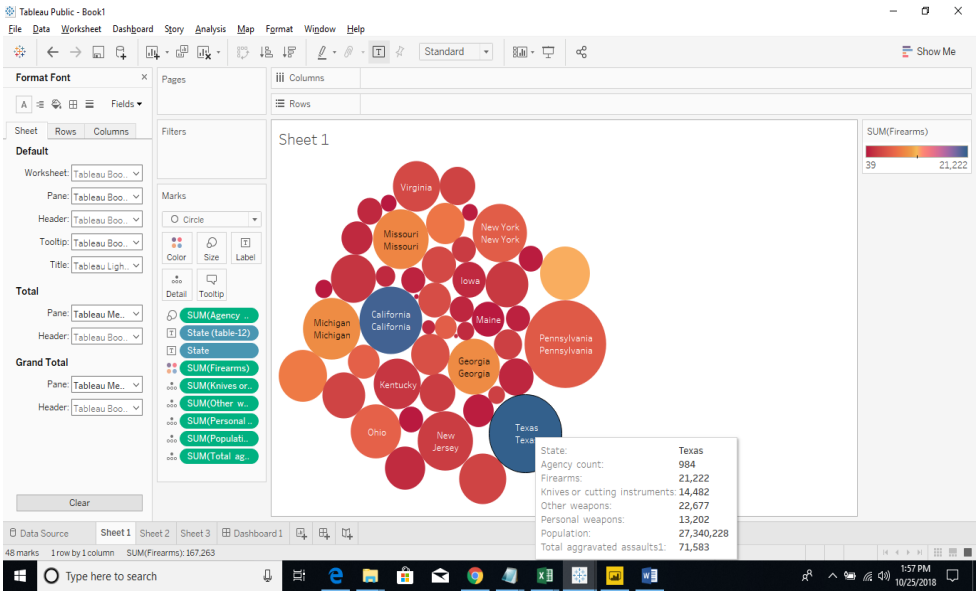


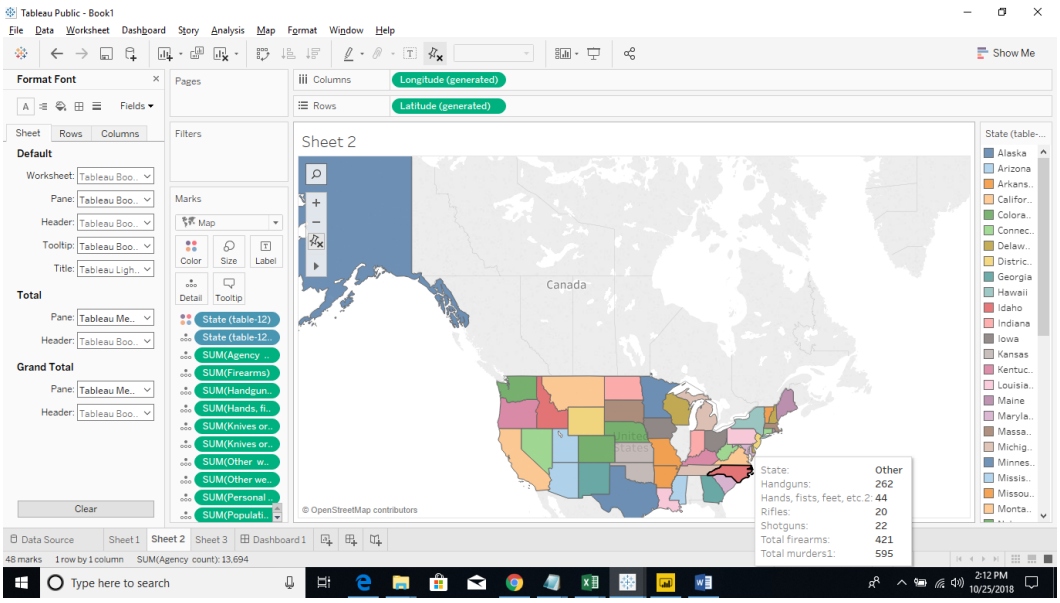




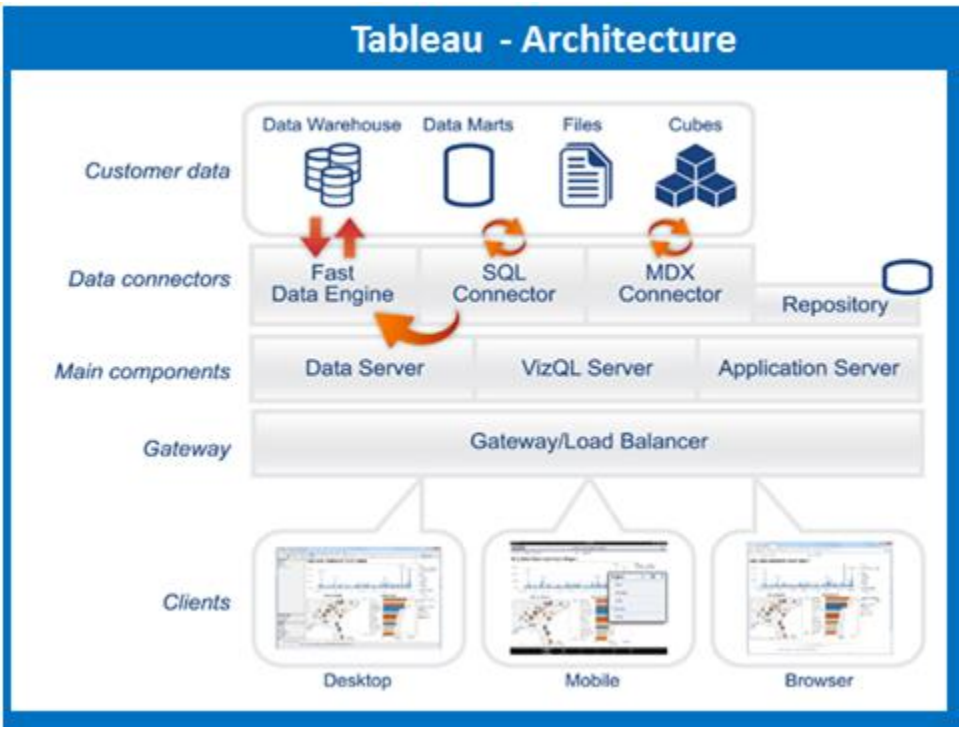
Now a nice popup, with your input description, describes the purpose of the object for users of Tableau Desktop.

2.3 Project done by me on crime study in united states of America.





2.4 Tableau architecture



Data Layer

One of the basic characteristics of Tableau is to supports your choice of data architecture. It does not need your data to be stocked in any single system, proprietary or otherwise. Nearly all organizations have a heterogeneous data environment, data warehouses live alongside databases and Cubes, and flat files like Excel are still very much in use. You do not have to get the entire data in memory until you choose to. If your existing data platforms are fast and scalable, then it permits you to straightly control your investment by utilizing the power of the database to

response problems. If this is not the case, then it provides simple options to improve your data to be fast and responsive with our fast in memory Data Engine.

Data Connectors

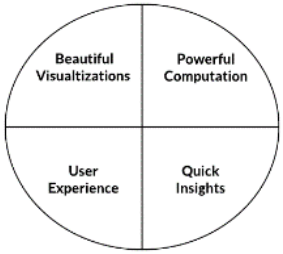
It consists of a amount of optimized data connectors for databases. There are also common ODBC connectors designed for any systems without a native connector. It offers two modes in support of interacting with data: Live connection or In-memory. Clients can switch among a live and in-memory connection as they desire.

Live connection: Data connectors of Tableau control your available data infrastructure by transferring dynamic SQL or MDX statements straightly to the source database except importing every data. If you have provided in a quick and analytics optimized database such as Vertica, then you get the advantages of that investing by connecting live to your data. This leaves the detail data in the source system and sends the aggregate outcomes of query to Tableau. In addition, this means that Tableau can effectively utilize unlimited amounts of data – in fact Tableau is the front-end analytics client to several of the largest databases in the world. It has optimized every connector to receive advantage of the unique characteristics of every data source.

In-memory: It presents a fast, in-memory Data Engine to optimize for analytics. You can connect to your data and after that, with one click, extract your data to get it in-memory in Tableau. Tableau's Data Engine fully consumes your entire system to attain fast queries answers on millions of rows of data on commodity hardware. Since the Data Engine can use disk storage as well as RAM and cache memory, it is not confined with the quantity of memory on a system. This is not essential that an entire data set be loaded into memory to attain its performance objectives.

2.5 Advantages of Tableau

Tableau is the leader in the data viz space. However, there are some limitations that may point you towards another tool. There are a lot of alternatives out there if you compare to Power BI or QlikView.



Data visualization: Tableau is a data visualization tool first and foremost. Therefore, it's technology is there to support complex computations, data blending and dashboarding for the purpose of creating beautiful visualizations that deliver insights that cannot easily be derived from staring at a spreadsheet. It has climbed to the top of the data visualization heap because of its dedication to this purpose

Quickly Create Interactive visualizations: Using drag-n-drop functionalities of Tableau, the user can create a very interactive visual within minutes. The interface can handle endless variations while also limiting you from creating charts that are against data visualization best practices. You can check out some of the amazing visuals created at the Tableau Gallery.

Ease of Implementation: There are many different types of visualization options available in Tableau which enhance the user experience. Also, Tableau is very easy to learn compared to Python, Business Objects and Domo, anyone without having knowledge of coding can easily learn Tableau.

Tableau can handle large amounts of data: Tableau can handle millions of rows of data with ease. Different types of visualization can be created with a large amount of data without impacting the performance of the dashboards. Also, there is an option in Tableau where the user can make "live" to connections to different data sources like SQL etc.

Use of other scripting languages in Tableau: To avoid the performance issues and to do complex table calculations in Tableau, users can incorporate Python or R. Using Python script can take the load off the software by performing data cleansing tasks with packages. However, Python is not a native scripting language accepting by Tableau. So you can import some of the visuals or packages. However, you can see how this is down with Python for Power BI.

Mobile Support and Responsive Dashboard: Tableau Dashboard has a great reporting feature that allows you to customize dashboard specifically for a certain device such as a mobile phone or laptop. Tableau automatically understands which device the user is is viewing the report on and make adjustments to ensure that the right report is served to the right device.

Tableau Company Strategy: Tableau has done a great job climb its way to the top of data visualization tools. So, according to Garner Magic Quadrant. Tableau has spent more than six years as a leader. However, with the increasing interest in data science, artificial intelligence, and machine learning, Tableau may be left behind if it doesn't innovate quickly.

3. Power BI

Microsoft Power BI is a free, self-service business intelligence cloud service that provides non-technical business users with tools for aggregating, analyzing, visualizing and sharing data. Power BI's user interface is fairly intuitive for those users familiar with Excel and its deep integration with other Microsoft products makes it a very versatile tool that requires very little upfront training. Power BI is intended for small to mid-size business owners; a professional version called Power BI. The service is available as a Web-based Software as a Service (SaaS) called Power BI, a downloadable application for Windows 10 called Power BI Desktop and native mobile apps for Windows, Android and iOS devices. Key features of Power BI include:

Hybrid deployment support - This feature provides built-in connectors that allow Power BI tools to connect with a number of different data sources from Microsoft, Salesforce and other vendors.

Quick Insights - This feature allows users to create subsets of data and automatically apply analytics to that information.

Cortana integration - This feature, which is especially popular on mobile devices, allows users to verbally query data using natural language and access results, using Cortana, Microsoft's digital assistant.

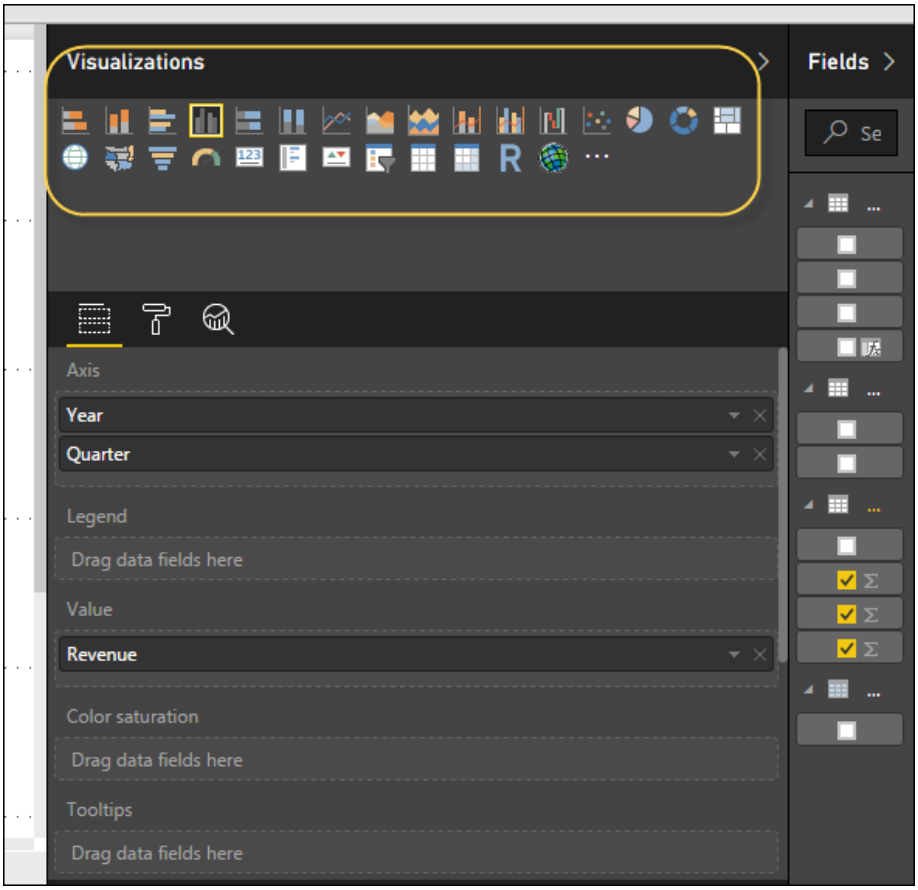
Customization - This feature allows developers to change the appearance of default visualization and reporting tools and import new tools into the platform.

APIs for integration - This feature provides developers with sample code and APIs for embedding the Power BI dashboard in other software products. In this guest blog Rui Romano of DevScope will walk you through an application that he built that allow you to insert PowerBI visualizations into Office documents. Take it away Rui: We built an Office 365 App (now called Add-Ins) called “PowerBI Tiles” to integrate PowerBI tiles/visualizations into office documents (ex: PowerPoint, Excel) in only three simple steps.

3.1 Technical details

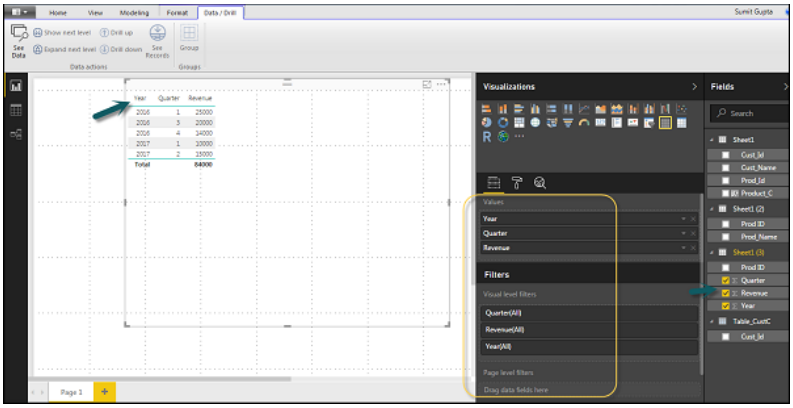
Simple Visualizations

Visualizations are used to effectively present your data and are the basic building blocks of any Business Intelligence tool. Power BI contains various default data visualization components that include simple bar charts to pie charts to maps, and also complex models such as waterfalls, funnels, gauges, and many other components.



In Power BI, you can create visualization in two ways. First is by adding from the right-side pane to Report Canvas. By default, it is the table type visualization, which is selected in Power BI.

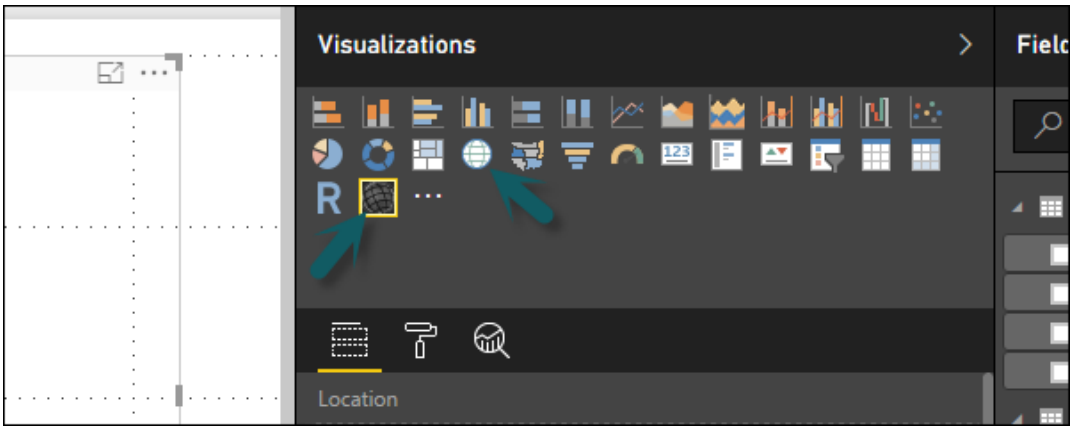
Another way is to drag the fields from right side bar to the axis and value axis under Visualization. You can add multiple fields to each axis as per the requirement.



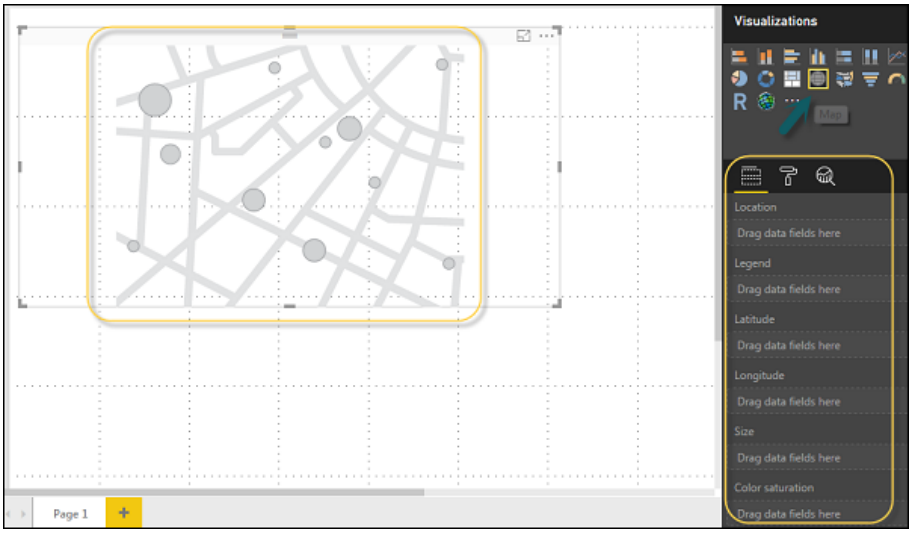
In Power BI, it is also possible to move your visualization on the reporting canvas by clicking and then dragging it. You can also switch between different type of charts and visualizations from the Visualization pane. Power BI attempts to convert your selected fields to the new visual type as closely as possible.

Creating Map Visualizations

In Power BI, we have two types of map visualization - bubble maps and shape maps. If you want to create a bubble map, select the map option from the visualization pane.

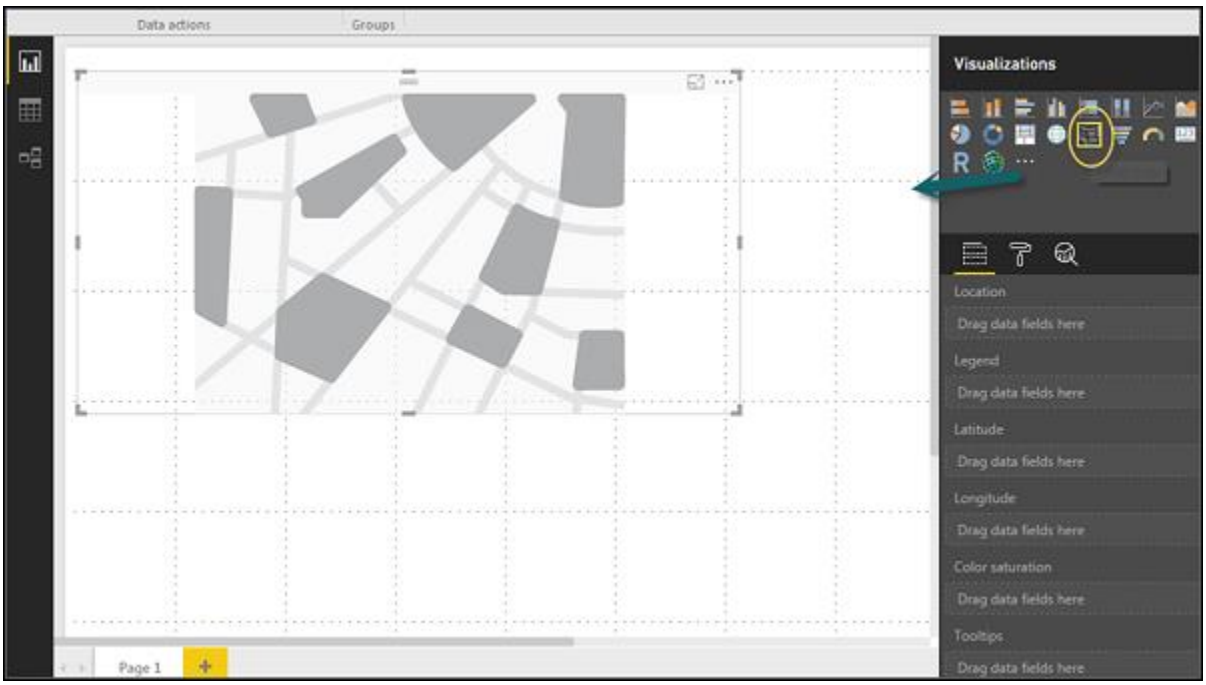


To use a bubble map, drag the map from Visualizations to the Report Canvas. To display values, you have to add any location object to the axis.



In the value fields, you can see that it accepts values axis such as City and State and or you can also add longitude and latitude values. To change the bubble size, you need to add a field to the value axis.

You can also use a filled map in data visualization, just by dragging the filled map to the Report Canvas.

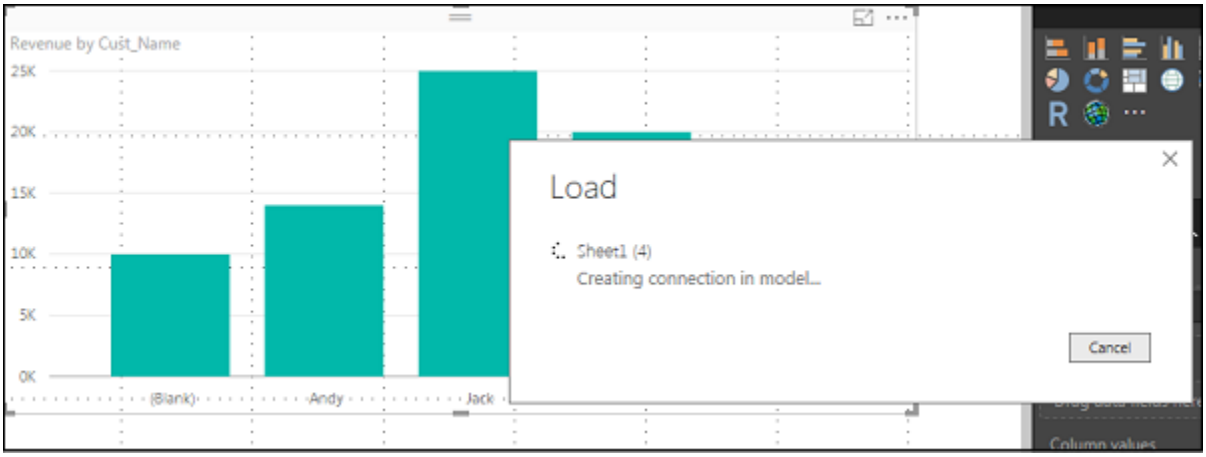


Note − If you see a warning symbol on top of your map visualization, it means that you need to add more locations to your map chart.

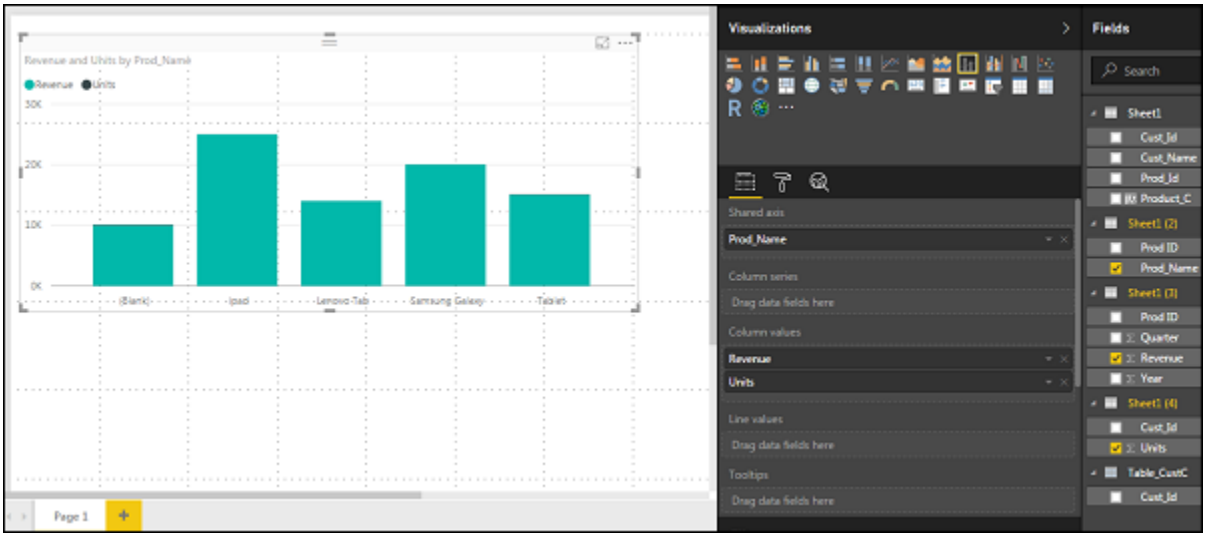
Using Combination Charts

In data visualization, it is also required to plot multiple measures in a single chart. Power BI supports various combination chart types to plot measure values. Let us say you want to plot revenue and unit_solds in one chart. Combination charts are the most suitable option for these kinds of requirement.

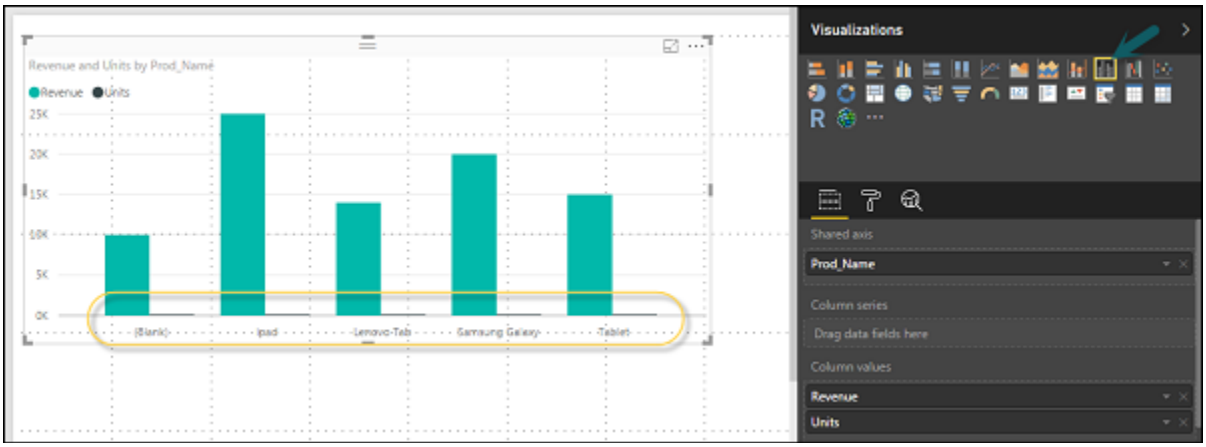
One of the most common Combination chart in Power BI is Line and Stacked column charts. Let us say we have a revenue field and we have added a new data source that contains customer-wise unit quantity and we want to plot this in our visualization.



Once you add a data source, it will be added to the list of fields on the right side. You can add units to the column axis as shown in the following screenshot.



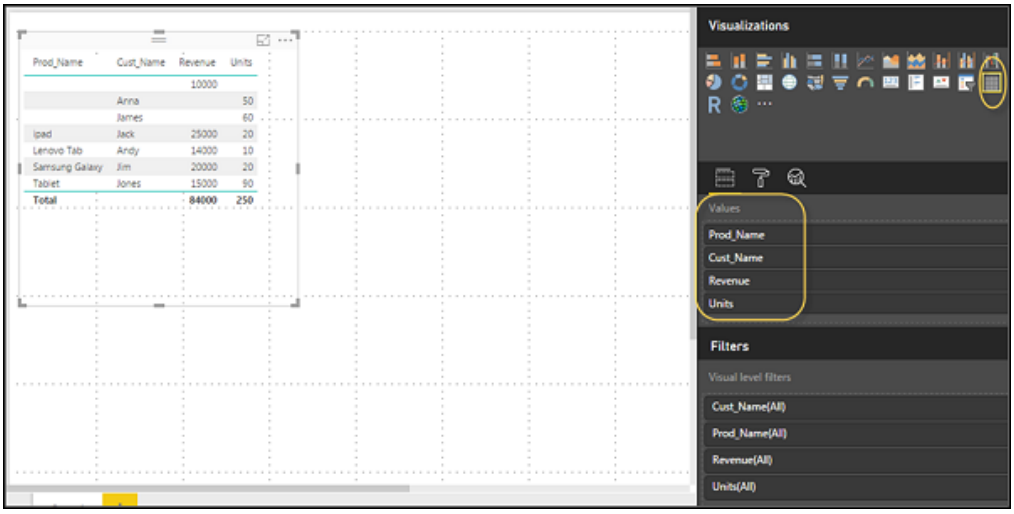
You have other type of combine chart that you can use in Power BI - Line and Clustered Column.



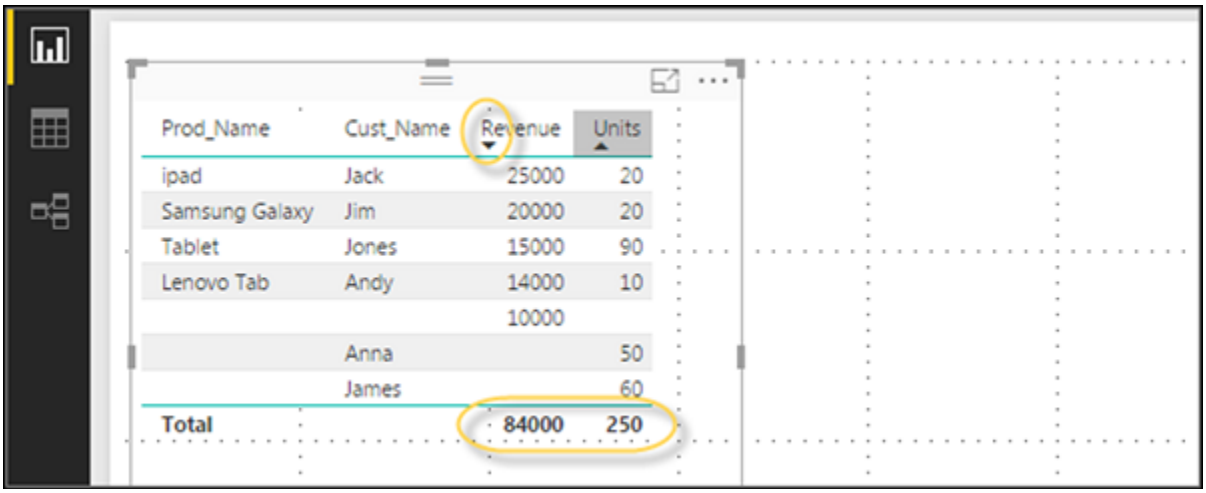
Using Tables

In Power BI, when you add a dataset to your visualization, it adds a table chart to the Report canvas. You can drag the fields that you want to add to the report. You can also select the checkbox in front of each field to add those to the Report area.

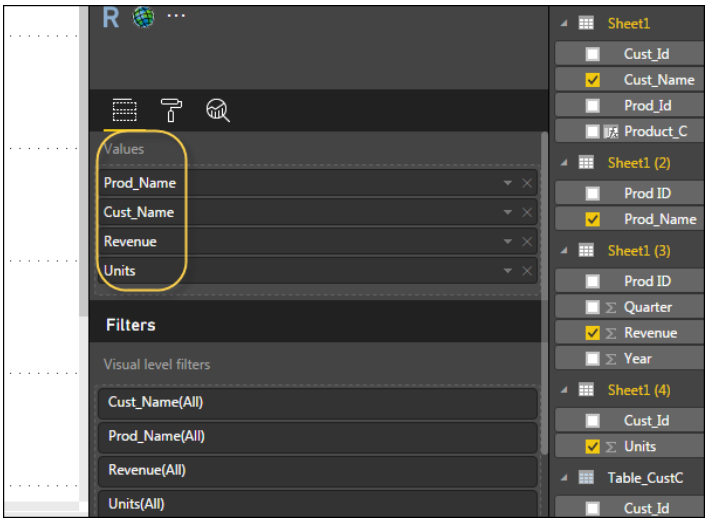
With the numerical values in a table, you can see a sum of values at the bottom.



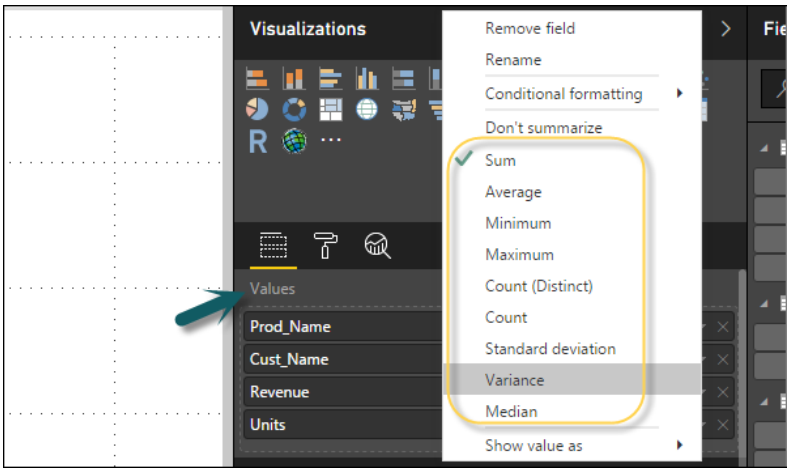
You can also perform a sort in the table using an arrow key at the top of the column. To perform ascending/descending sort, just click the arrow mark, and the values in the column will be sorted.



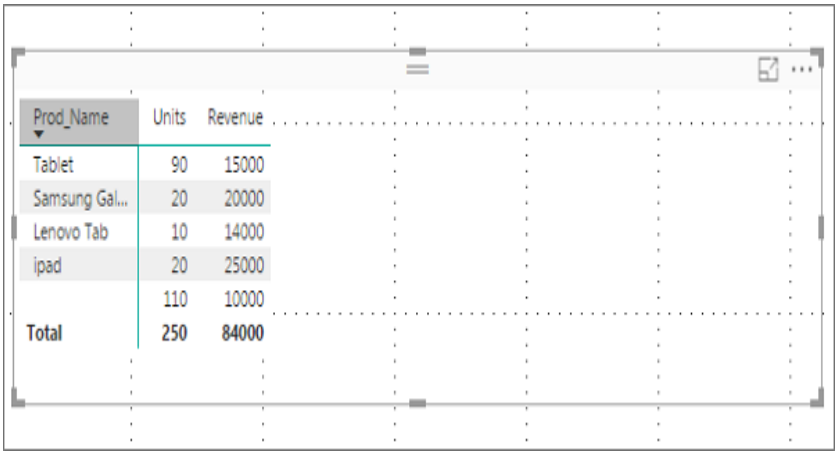
The order of the columns in a table is determined by the order in the value bucket on the right side. If you want to change the order, you can delete any column and add the other one.



You can also undo summarize or apply different aggregate function on numerical values in the table. To change the aggregation type, click the arrow in the value bucket in front of the measure and you will see a list of formulas that can be used.



Another table type in Power BI is the matrix table that provides a lot of features such as auto sizing, column tables, and setting colors, etc.



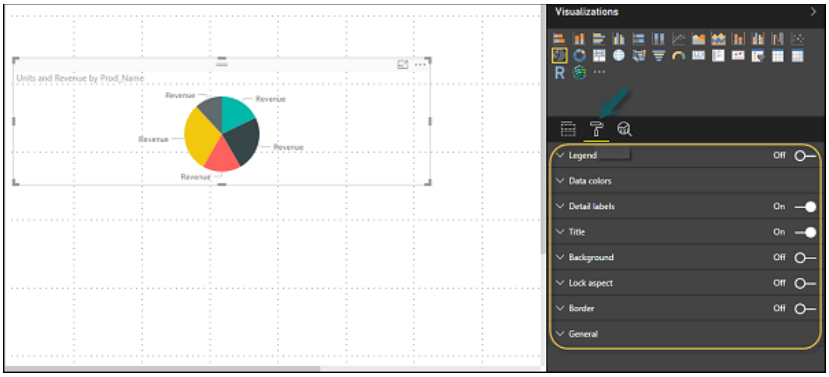
Prod_Name	Units	Revenue
Tablet	90	15000
Samsung Gal...	20	20000
Lenovo Tab	10	14000
ipad	20	25000
	110	10000
Total	**250**	**84000**

Modify Colors in Charts

In Power BI, you can also modify the colors in the chart. When you select any visualization, it has an option to change the color. Following options are available under the Format tab −

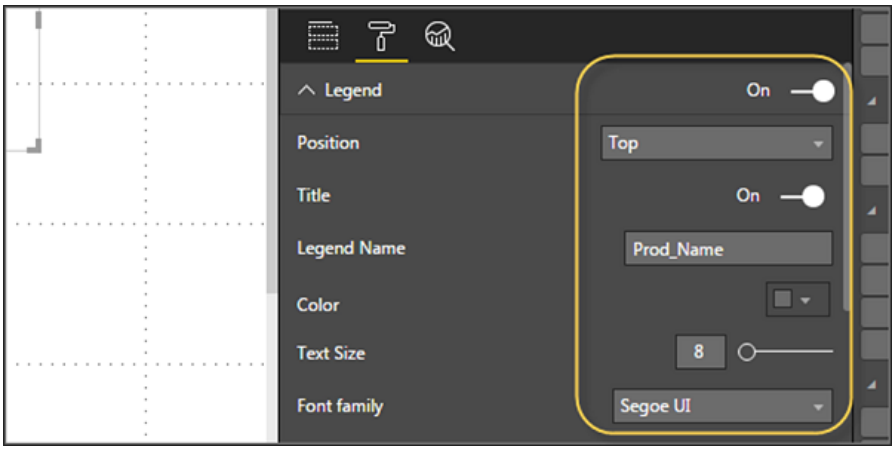
- Legend
- Data Colors
- Detail Label
- Title
- Background
- Lock Aspect
- Border
- General

To open these options, go to the Format tab as shown in the following screenshot. Once you click, you can see all the options available.

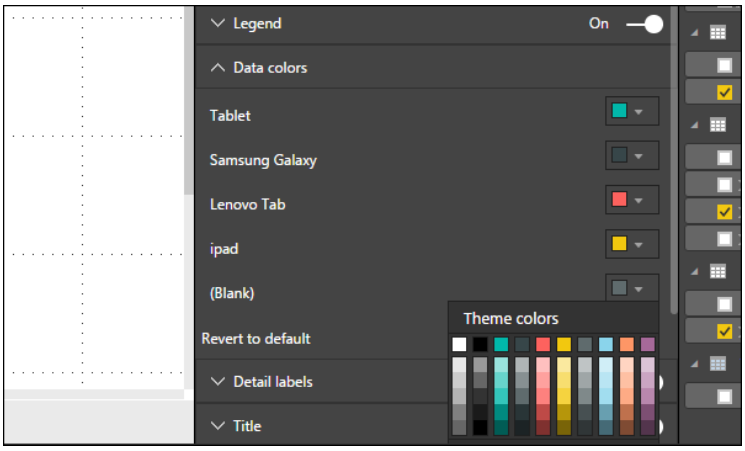


When you expand the Legend field, you have an option where you want to display the legend. You can select

- Position
- Title
- Legend Name
- Color
- Text Size
- Font Family

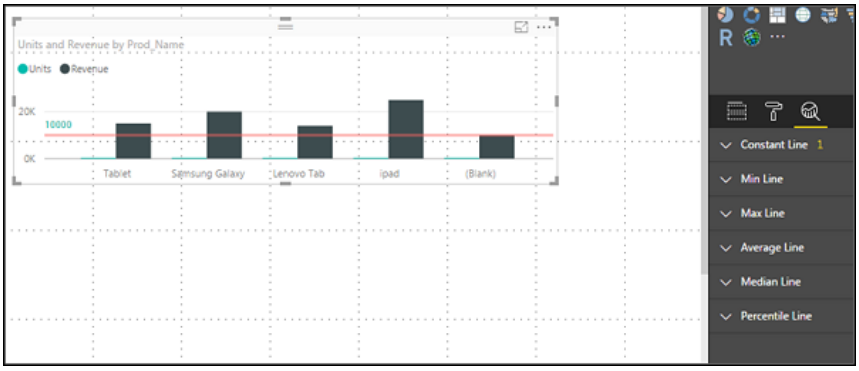


Similarly, you have data colors. In case, you want to change the color of any data field, you can use this option. It shows all objects and their corresponding colors in the chart.

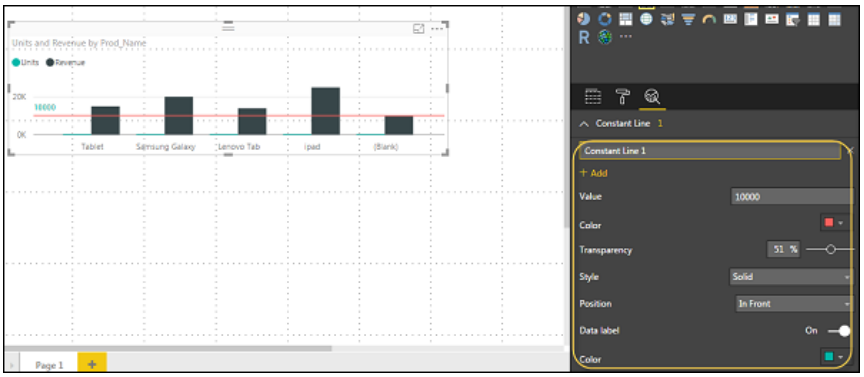


You also have Analytics feature in the tool, where you can draw lines as per requirement in data visualization. You have the following line types in data visualization −

- Constant Line
- Min Line
- Max Line
- Average Line
- Median Line
- Percentile Line



You can opt for a dashed, dotted, or a solid line. You can select Transparency level, color, and position of the line. You can also switch on/off data label for this line.

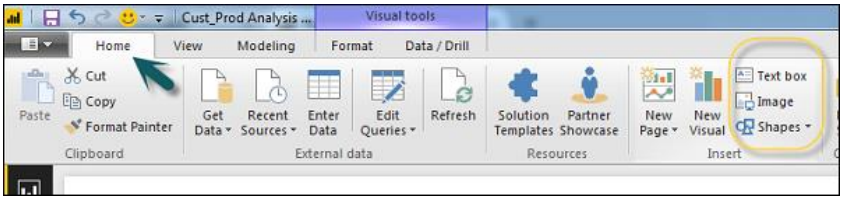


Adding Shapes, Images and Text box

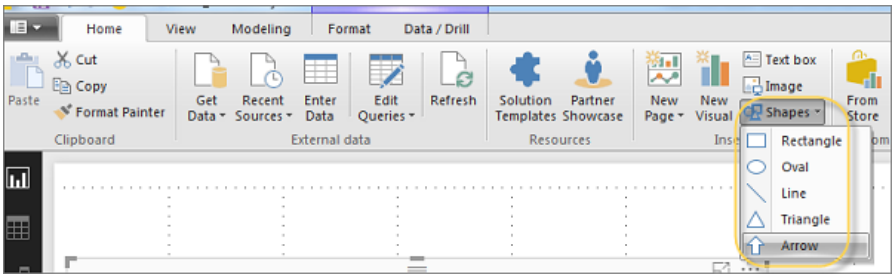
Sometimes it is required that you need to add static text, images, or shapes to your visualization. In case you want to add header/footer or any static signatures, messages to data visualization this option can be used.

You can also add URLs in the text box and Power BI uses those link to make it live.

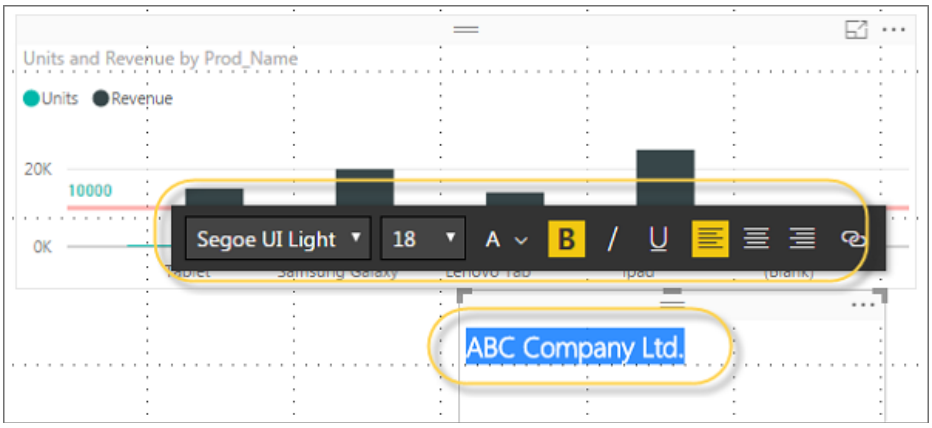
To add shapes, images and text box, navigate to the Home tab and at the top you will find an option to add images.



You can insert different shapes in data visualization. To see the available shapes, click the arrow next to the Shapes button.

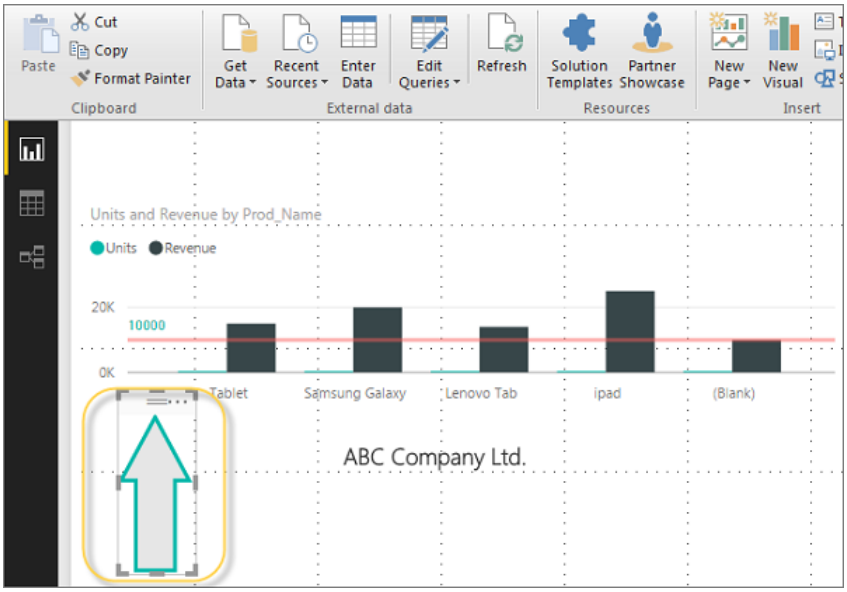


When you click on the text box, it adds a text box in your Report canvas. You can enter any text in the text box and use the rich text editor to make formatting changes.



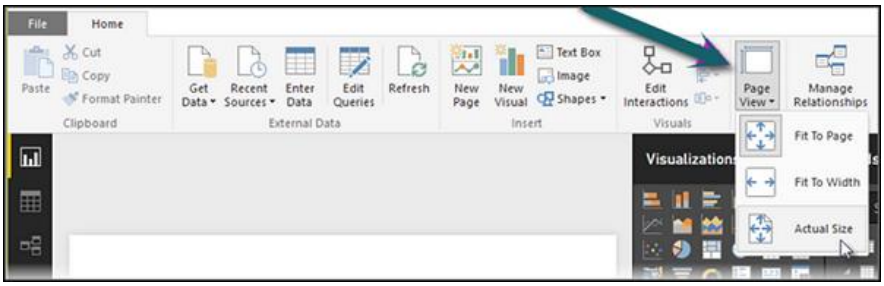
Similarly, images can be added to data visualization to add logos or other images to data visualization. When you click the Image option, it asks for a path to pass the image file.

You can add shapes by selecting any shape from the dropdown list. You can also resize it using different options.



Styling Reports: In Power BI, you have flexible options to adjust the page layout and formatting such as orientation and page size of your report. Navigate to Page View menu from the Home tab and the following options are provided.

- Fit to Page
- Fit to Width
- Actual Size



By default, the page size in a report is 16:9; however, it is also possible to change the page size of the report. To change the page size, navigate to the Visualization pane and select Paint brush.

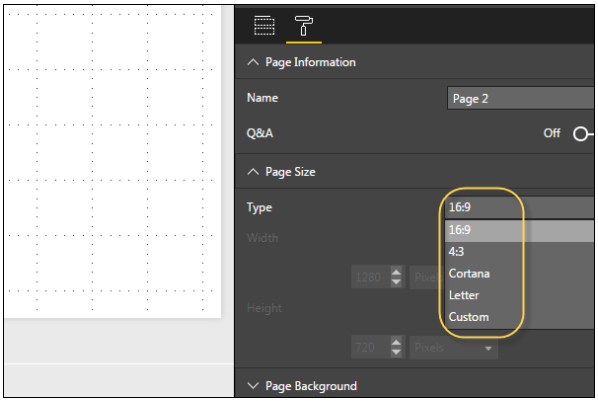
Note − To change page size, no visualization should be added to the Report canvas. You have the following options available under Page layout −

- Page Information
- Page Size
- Page Background

Under Page Information, you have Name and Q&A.

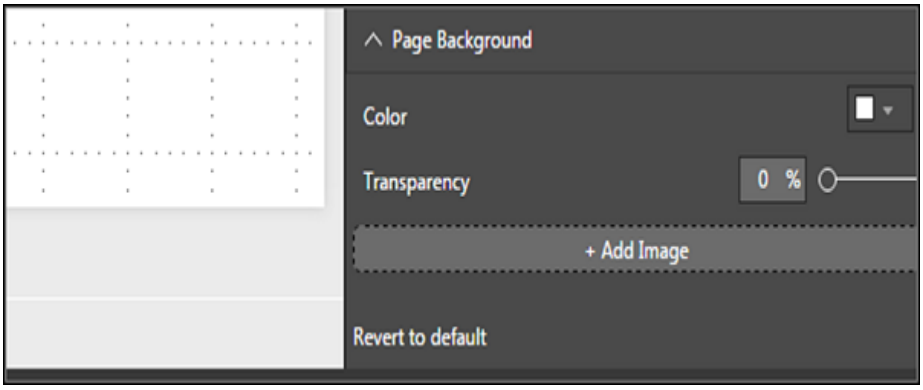
Under Page Size, you can select from the following options −

- Type
- Width
- Height



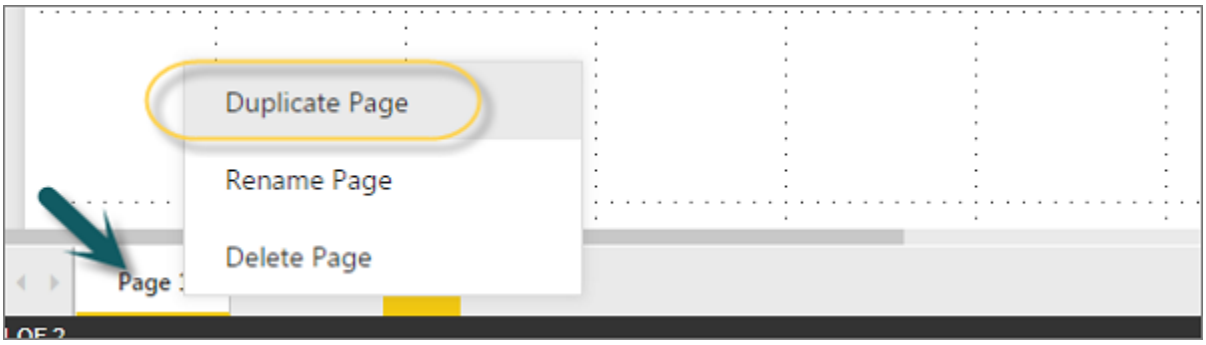
Under Page Background, you can select from the following options:

- Color
- Transparency
- Add Image



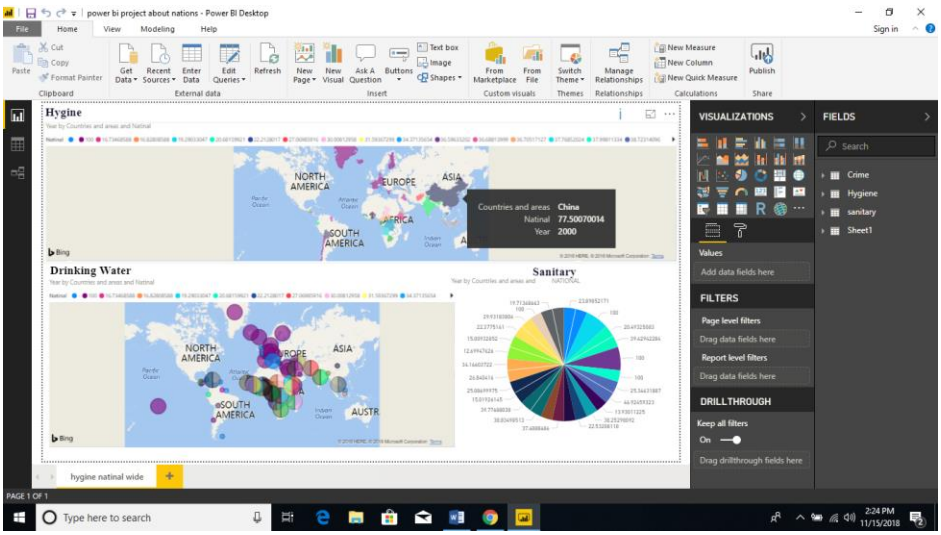
Duplicating Reports: In some scenarios, you may want to use the same layout and visuals for different pages. Power BI provides an option to create a copy of the page. When you use Duplicate Page option, a new page is added with similar layout and visuals.

To duplicate a page, right-click the Page and select Duplicate Page option. This will create a copy of the same page with the name - Duplicate of Page1.



Now, if you want to rename an existing page or delete a page, you can use other options as shown in the above screenshot.

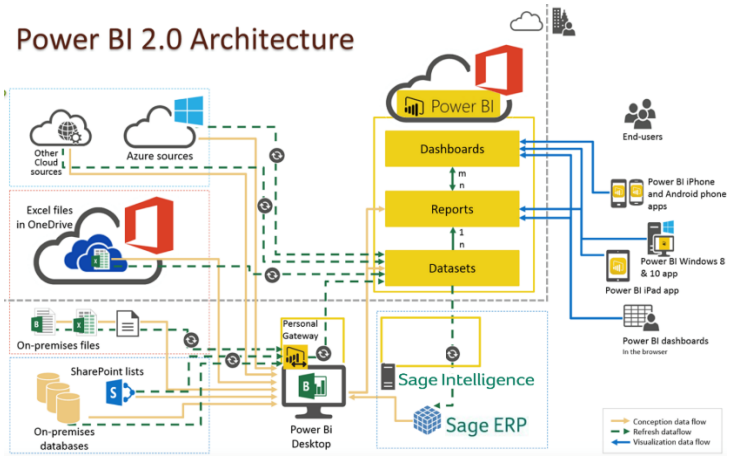
3.2 Visualization report on Drinking water, Hygiene and Sanitary control in entire world.

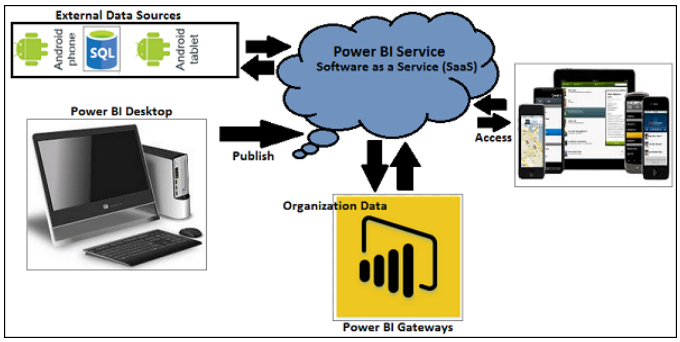


3.3 Power BI Architecture

As a Data Platform Solution Architect for Microsoft, one of my jobs is to help teach my customers what our amazing tools can do and how those tools work. Interest in Power BI is blowing up and I'm seeing most of my customers express huge interest in this awesome tool. To help facilitate the conversation about how Power BI works and how it can help my customers, I put together this diagram.

Also, each text block in the black area to the right includes a link to the documentation on PowerBI.com for the specific component.





Power BI Desktop − This is used to create reports and data visualizations on the dataset.

Power BI Gateway − You can use Power BI on-premises gateway to keep your data fresh by connecting to your on-premises data sources without the need to move the data. It allows you to query large datasets and benefit from the existing investments.

Power BI Mobile Apps − Using Power BI mobile apps, you can stay connected to their data from anywhere. Power BI apps are available for Windows, iOS, and Android platform.

Power BI Service − This is a cloud service and is used to publish Power BI reports and data visualizations.

3.4 Advantages of power BI

This improves your business decision-making at all levels. But simply having more data isn't the only reason to deploy Power BI. Here are 4 Power BI advantages that are more profitable and easier to use than you might think.

Your Data is More Accessible Than Ever Before

Power BI was built to integrate with Microsoft tech, such as SharePoint documents or SQL databases. But it enhances non-Microsoft solutions, too. In fact, Power BI currently connects to 60 common software solutions your business already uses and pulls data into a centralized, easy-to-digest dashboard. Here are just a few:

- Spark
- Hadoop
- Google Analytics
- SAP
- Salesforce
- MailChimp

Since data modeling is a primary Power BI service, users don't have to model data in native systems before integrating it. This means data can be extracted directly from cloud, on premise, and hybrid systems (depending on your software package). There is no need for complicated manual exports and imports!

Ease of Implementation

Very little engineering or IT resources are needed to implement Power BI. In fact, some instances don't require any engineering at all. Managers simply need to create an API key and plug it into the software.

If your organization already uses Microsoft systems (such as Office 365), using Power BI will feel natural. It integrates easily with Office 365 Groups and Microsoft Teams.

Without steep build costs or extensive training, the financial benefits of implementing Power BI are immediate.

Robust Access Control & Security

Power BI sets up access control through Active Directory (AD), the same control panel your organization uses for other Microsoft solutions.

But what makes Power BI different is row level security, which allows your team to grant and rescind access on a very controlled level.

For example, through Power BI automation, you can control which team members have access to specific rows of data on reports. This means you can use the easy-to-implement access controls to set rules like, "Only show Steve from Accounting rows 6-10," while executives could see the entire report.

Not only does this make data more secure, it greatly enhances the usefulness of your reports. You can invest time building one single report, then use access controls to restrict which data users can see. This type of filtering is much easier – and less expensive – than creating and maintaining reports for every team member.

It’s also more efficient for your team members. If your organization is a global sales company, for example, Maryland-based sales managers don’t need to see data from California sales reports.

Another one of Power BI’s security advantages is “content packs” – data users can see without having access to the database. This allows users to see charts and graphs but not manipulate raw data. This protects data from human error but also makes Power BI compliant as a system, since data is encrypted at rest.

A Simple Learning Curve

One of the best Power BI advantages is its simple learning curve. Everyone uses Microsoft products, so the ribbons and other user interface elements will be instantly familiar to your team. This means basic users can explore simple Power BI services right away, and advanced users can jump right into exploring advanced data modeling. The interface also allows users to easily export data to other systems (like Excel), which gives users the flexibility to work with their data in other environments if they choose.

4. Qlik View

QlikView is a business discovery platform that provides self-service BI for all business users in organizations. With QlikView you can analyze data and use your data discoveries to support decision making. QlikView lets you ask and answer your own questions and follow your own paths to insight. QlikView enables you and your colleagues to reach decisions collaboratively. At the core of QlikView is our patented software engine, which generates new views of data on the fly. QlikView compresses data and holds it in memory, where it is available for immediate exploration by multiple users. For data sets too large to fit in memory, QlikView connects directly to the data source. QlikView delivers an associative experience across all the data used for analysis, regardless of where it is stored. You can start anywhere and go anywhere; and are not limited to pre-defined drill paths or pre-configured dashboards.

QlikView is a proven, market-leading data discovery product that offers rapidly developed, highly interactive guided analytics applications and dashboards, purpose built for business challenges. QlikView allows users to rapidly build and deploy analytic apps without the need for professional development skills, driving faster response to changing business requirements, shorter time to value, and more insight across the organization. QlikView takes interactive data discovery to a whole new level by enabling unrestricted exploration and search for users, offering collaboration and mobility for groups and teams, and supporting large deployments with enterprise-class scalability and management tools.

Guided analytics apps and dashboards QlikView offers interactive dashboards and analytics applications, purpose built by developers, which guide the user to discovery. Users can take advantage of a highly polished, customized user experience, specific to business problems. QlikView apps offer a beautiful, pixel- perfect interface, delivered through any browser, which can be customized for complex use cases and solutions while still allowing for an unmatched level of interactivity and discovery. Associative Model QlikView apps are driven by Qlik’s

associative model, which allows unrestricted exploration and discovery for users. People can freely ask questions and probe associations in their data using simple, natural interactions such as selection and search. The QIX engine instantly responds after each click, recalculating all analytics and highlighting data relationships through easy-to-understand color cues. This empowers people to follow their own paths to insight, uncovering blind spots that would have been overlooked in query-based tools.

4.1 Technical Details

A Dashboard is a powerful feature to display values from many fields simultaneously. QlikView's feature of data association in memory can display the dynamic values in all the sheet objects. The above details shows the step by step creation of a dashboard.

Input Data

Let us consider the following input data, which represents the sales figure of different product lines and product categories.

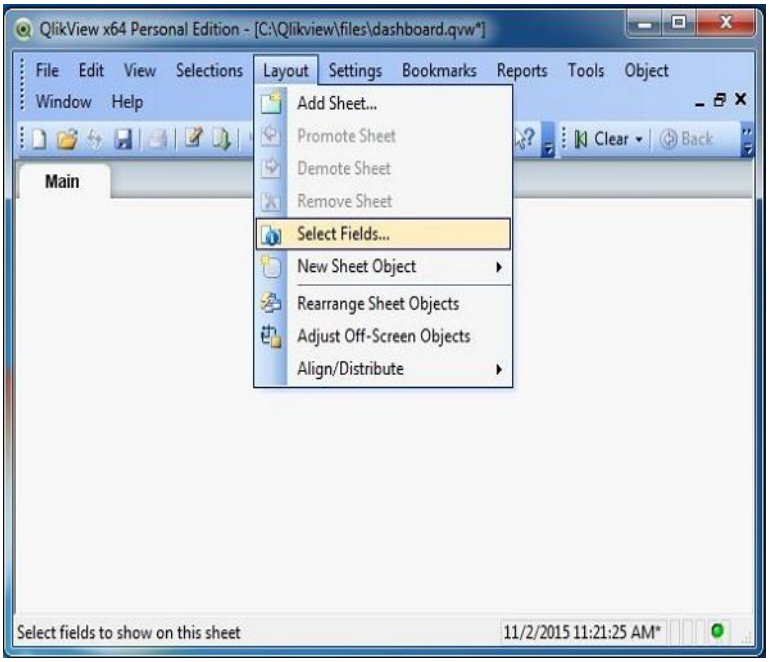
Load Script

The above data is loaded to QlikView memory by using the script editor. Open the Script editor from the File menu or press Control+E. Choose the "Table Files" option from the "Data from Files" tab and browse for the file containing the above data. Edit the load script to add the following code. Click "OK" and press "Control+R" to load the data into the QlikView's memory.

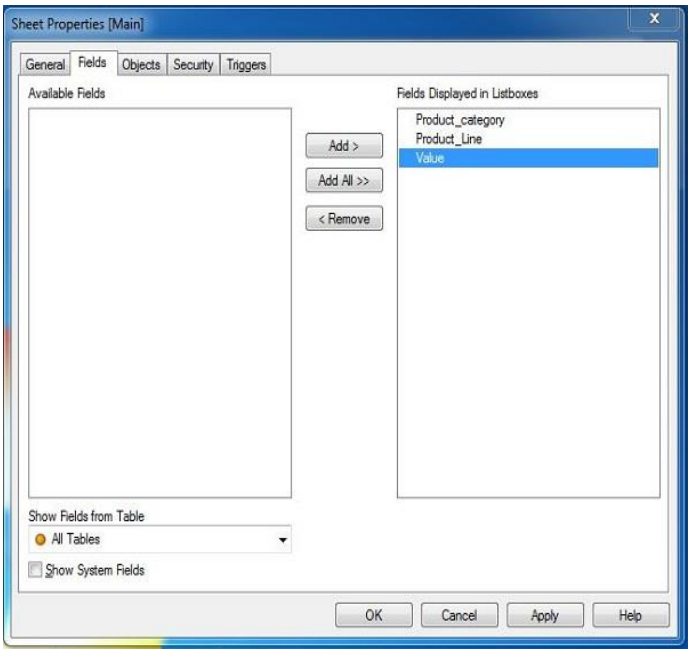
```
LOAD Product_Line,
    Product_category,
    Value
FROM
[C:\Qlikview\data\product_sales.csv]
(txt, codepage is 1252, embedded labels, delimiter is ',', msq);
```

Choose Matrices

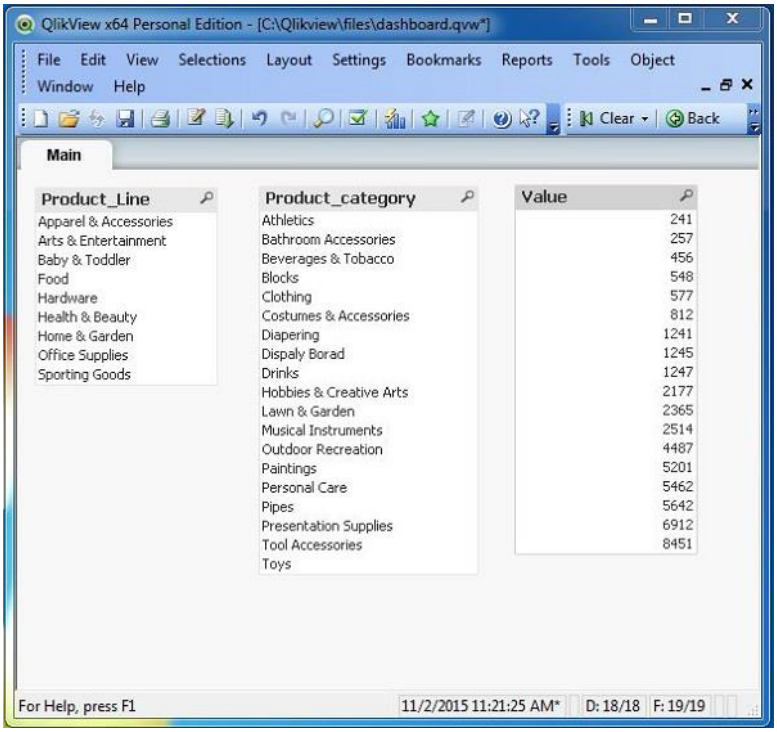
We choose the fields from the above input data as matrices to be displayed in the dashboard. For this, we follow the steps in the menu Layout → Select Fields.



In the next screen, choose the available fields to be displayed in the dashboard. Click "OK".

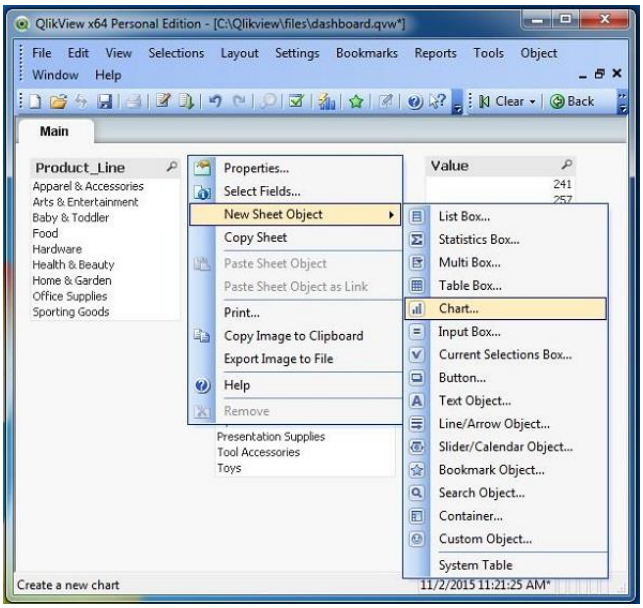


The following screen appears displaying all the fields



Adding Chart to Dashboard

Now we add a chart to the dashboard by right-clicking anywhere in the sheet and choosing New Sheet Object → Chart.



Choose the Chart Type

Let us choose the chart type as a bar chart to display the sales values for various product Lines.

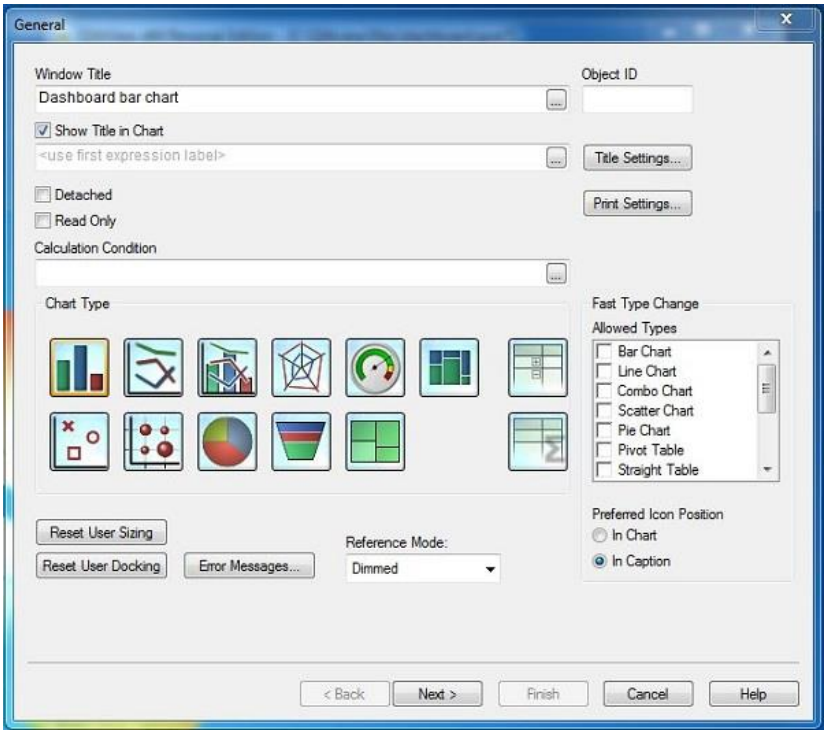


Chart Dimension

Let us select the Product Line as the Chart Dimension.

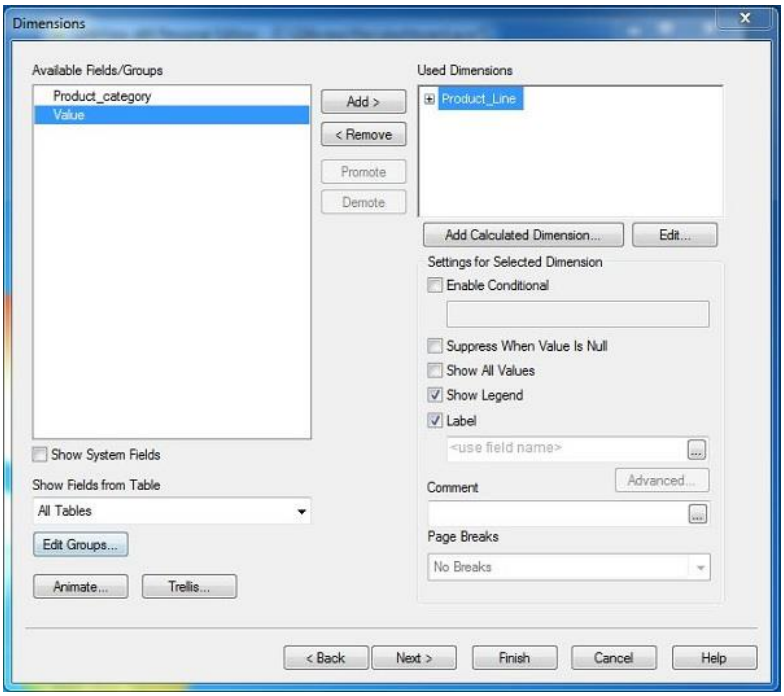
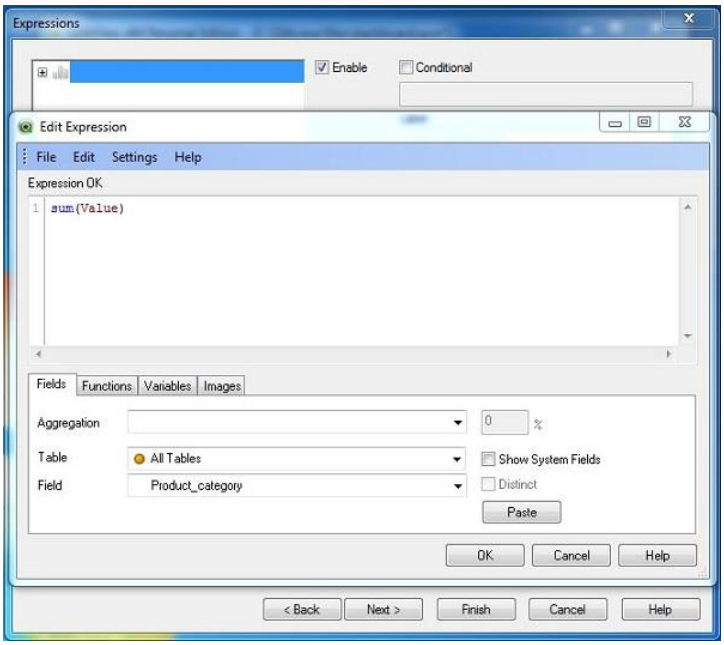


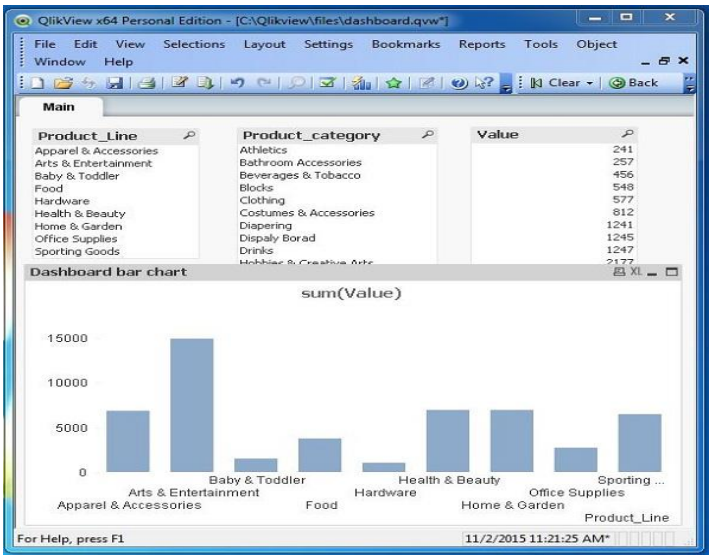
Chart Expression

The expression to display the sales value for the Product Line dimension is written in the expression editor.



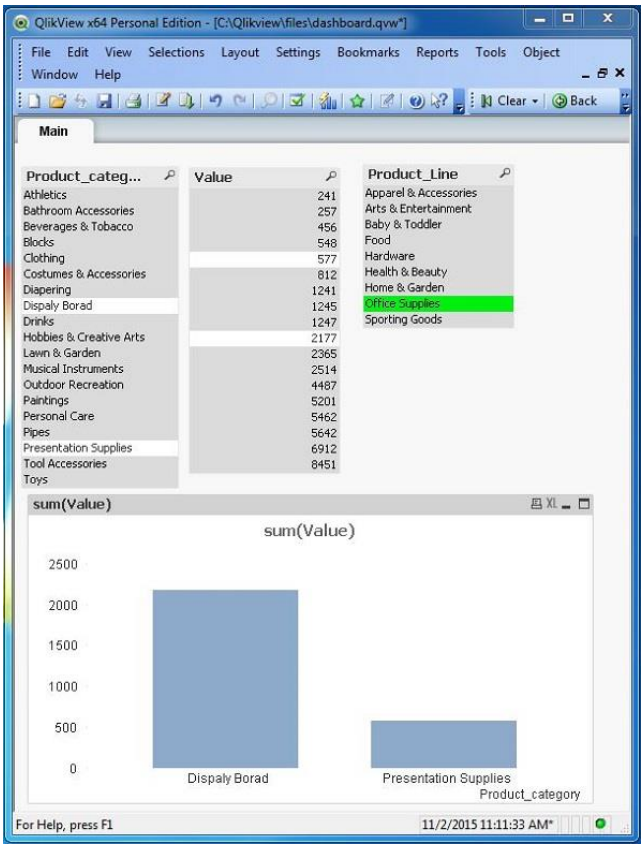
The Dashboard

Given below is the dashboard displayed after finishing the above steps.



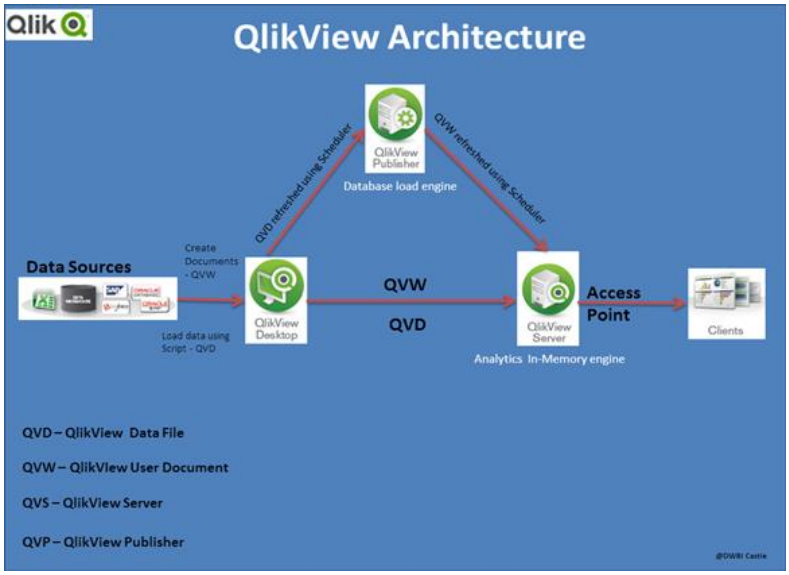
Using the Dashboard

The values in the above Dashboard can be selected for filtering specific products and the chart changes accordingly. In addition, the associated values are highlighted.



4.2 QlikView Architecture

QlikView offers an enterprise-class architecture that meets the management and scalability needs of the most demanding organizations. It offers a highly scalable, secure, and manageable environment for interactive data discovery. QlikView can access, combine, and load data no matter where it is located, whether file based, on premise, in the cloud, or in big data sources. QlikView developers build applications and load data using QlikView Desktop development tool, a Windows based application. QlikView apps are hosted on QlikView Server for consumption by business users, who access them through a standard web browser or a mobile client. QlikView Server offers the power of the QIX engine for unrestricted, highly interactive analysis, scaling linearly to support large numbers of concurrent users and high volumes of data. QlikView Publisher is an optional module that provides enhanced scheduling tasks, administration, and distribution capabilities for large deployments. And QlikView Management Console offers a unified, web-based interface to centrally manage all aspects of a QlikView environment.



The Architecture of QlikView represents how the data is represent in graphical format. All data should be stored in the memory, all data should be analyzed on user request. The main purpose of the QlikView architecture is to improve the problem of a huge amount of data .The architecture creates the timeless, flexible and all other activities in desired results.

The QlikView Architecture was designed for an entire amount of the data in the entire application, the entire application was held in the RAM. The main goal of the QlikView Architecture is to deliver the most flexible and user understandable reporting solution in a quarter amount of time figure shown below.There are the following three main components of QlikView:

- Query Engine

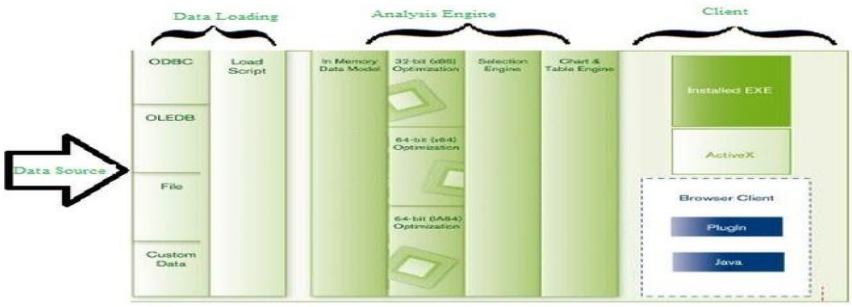
  QlikView queries the data, in other words data is loaded into memory using the query engine, then QlikView shows the desired results.

- Calculation Engine

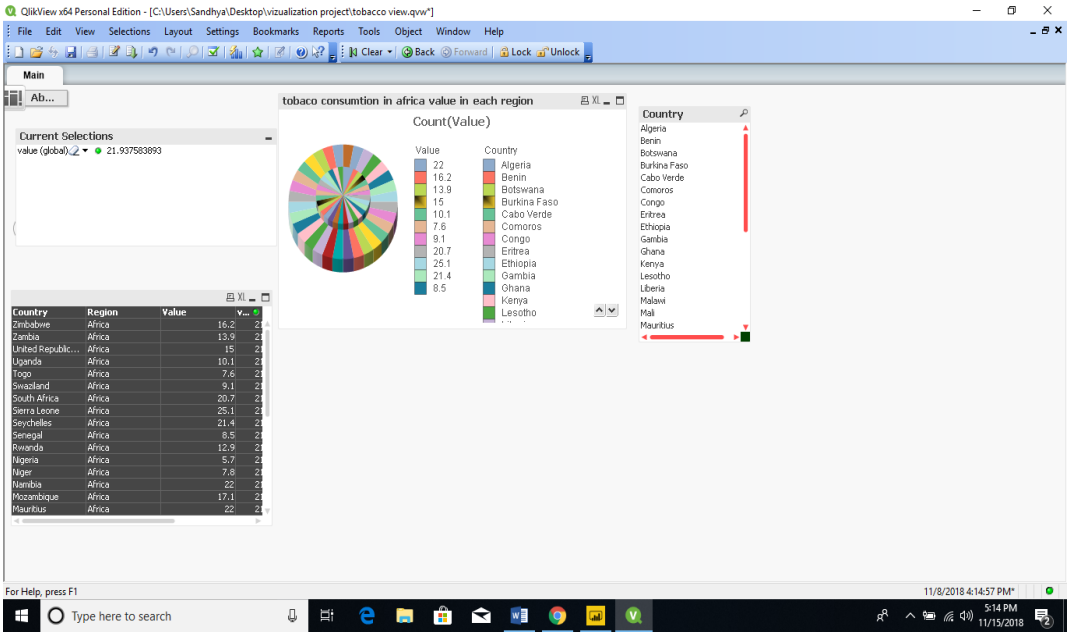
  QlikView calculates the data using charts, graphs and tables.QlikView uses the concept of multidimensional analysis because it shows one or more reports at a time.

- User Interface

  QlikView provides hundreds of user interfaces, like charts and tables, list boxes, statistic boxesand so on. Simply the user can access it by clicking on query.



4.3 QlikView report on tobacco consumption in Africa



4.4 Advantages of QlikView

Dynamic BI Ecosystem

QlikView provides a dynamic Business Intelligence ecosystem for the user.

Data Interpretation & Analysis

It’s visual and dynamic dashboards and applications help in quick and efficient data interpretation and analysis.

Data Sharing

Different teams can collaborate to take crucial decisions on data-driven information and interpretations. This collaboration is facilitated by the social analysis and real-time data sharing capability of QlikView.

Self-Service Tool

QlikView is a self-service BI tool as it enables a user to work adeptly on the tool without relying on the IT department and blocking its workforce. The application scripting and dashboard modifications need no professional expertise and any non-technical employee of an enterprise can work trouble-free with Qlikview.

Low Maintenance

The implementation of the software is very simple and hassle-free. Even in the later years, the software doesn't need much maintenance or technical supervision.

Data Security

The data security provision of the tool is very stringent, and the creators guarantee the safety of critical corporate data. Full assurance of no security breach is given to the customer.

Speed

QlikView speed in data delivery is not hampered even after multiple user requesting data. The in-memory system is so efficient that it can cater to as many clients as possible.

In-Memory Technology

Whenever an aggregation or a calculation is to do on data. The in-memory technology of QlikView does calculations while the data is being transferred from backend to frontend. This saves the memory of the system as no pre-aggregated or pre-calculated data is to be stored beforehand.

Data Compression

In data analysis, the system loads only take the useful bits of data and remove all the unnecessary ones. The QlikView software compresses the entire data to 10% of its original size. After the compression, only the useful junks for data analysis remains.

Data Visualization

QlikView offers many attractive and colorful data visualizations options. The analytical reports generated using different sorts of pie, charts, bar graphs etc. helps the users segregate information easily in their heads. As the users can assign each color to a distinct attribute and not confuse oneself with the overwhelming information.

QIX Engine

The QIX engine of QlikView instantly responds to every click made by the user and changes color hues by highlighting the data related to the selected field. This helps the customer to focus on just those color-highlighted sections in the whole data report and analyze it.

Direct & Indirect Data Searched

In QlikView, you can launch both direct and indirect data searches. While searching for something directly, you can simply input that data and get your information, or you can input something related to your desired data and get as a result all the related data. Although, the results are displayed promptly in both cases.

Cheap Cost

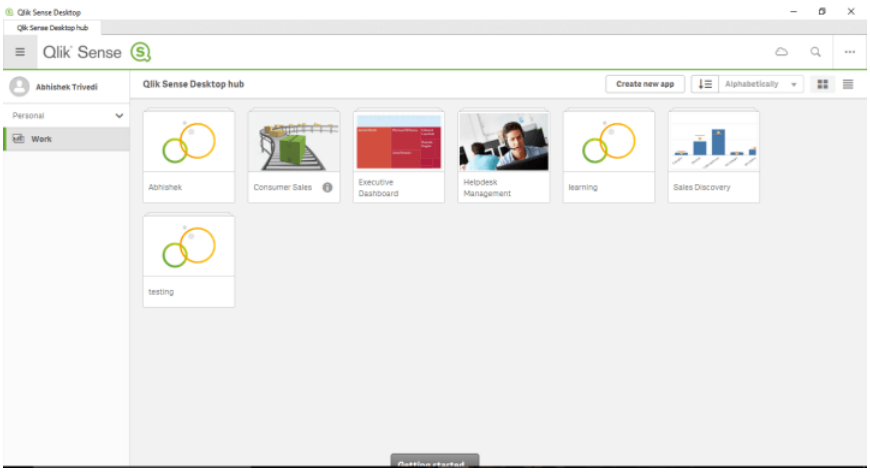
QlikView is very cost effective. A free trial is also available on the official site. The hardware required for QlikView is also in affordable ranges.

5. Qlik Sense

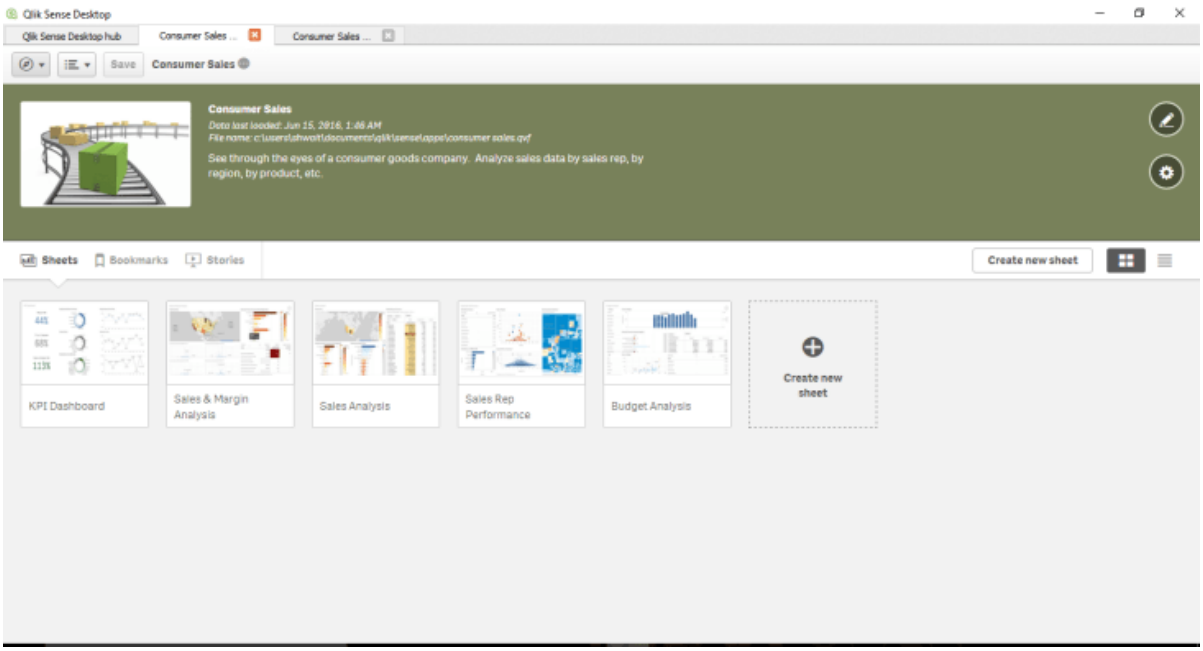
Qlik sense is also one of the best data visualization tool. Data Analyst love Qlik Senses because of its Drag and drop feature. It is designed in the way that user at any level can use this. I mean Manager, Analyst, Developer even an end user can use Qlik Sense to make decisions. If you need to learn Qlik Sense , First thing you have to do is download desktop version of Qlik Sense .When you go for download you have to fill a Registration form and go for email verification . Install the setup of Qlik Sense Desktop. It's simple just like to install a setup of ordinary application. Congratulation on your setup. In this Qlik Sense tutorial, my main focus area is described the flow of visualization end to end. I mean from Qlik server to your portal because you can easily get syntax and general lessons on Qlik Community . Suppose you have a web Portal for school. In the Dash Board of portal under parent's login, you want to show a chart of their child performance status in past three months. Here you can use Qlik Sense, the only thing you have to do is to create chart on Qlik server and make the connection of your web server to Qlik Sense Server. Now using the chart Id in Qlik Sense server, you can directly load the chart where ever you want. Once you launch Qlik sense desktop app you get Qlik Sense Hub as It is shown in below image. It contains all app in Qlik sense. Qlik Sense is a dynamic self-service analytics and visualization tool that simplifies data exploration for a full spectrum of users (from the non-tech savvy to the data expert). With intuitive data prep, drag-and-drop abilities and drill-down features, organizations can easily spot and share data relationships and key insights quickly and efficiently. Most Business Intelligence (BI) products can help you answer questions that are understood in advance. But what about your follow-up questions. The ones that come after someone reads your report or sees your visualization. With the Qlik Sense associative model, you can answer question after question after question, moving along your own path to insight. With Qlik Sense you can explore your data freely, learning at each step along the way and coming up with next steps based on earlier findings. Qlik Sense responds instantly as you work. Qlik Sense does not require predefined and static reports, and you do not need to depend on others. Just click and learn, while Qlik Sense updates every visualization and view in the app with a newly calculated set of data and visualizations specific to your selections. Qlik Sense Desktop is a Windows application that gives individuals the opportunity to use Qlik Sense and create personalized, interactive data visualizations, reports, and dashboards from multiple data sources with drag-and-drop ease. Its use requires Qlik Sense Enterprise server credentials or a Qlik, which requires a Qlik Cloud account.

5.1 Technical Details

How to create a dash board in Qlik sense.



Now you can enter in an existing App or create new using this screen by the above button. One you are Inside an App, you can create or view Qlik Sheets. Just have look in below screen



Here, you can see so many sheets like KPI Dash Board, Sales and Margins Analysis etc. Let's go inside them. Let's zoom in KPI Dashboard. Here you can see so many charts. These are object. They have their separate Ids which can be directly imported into web project specially in java script files.

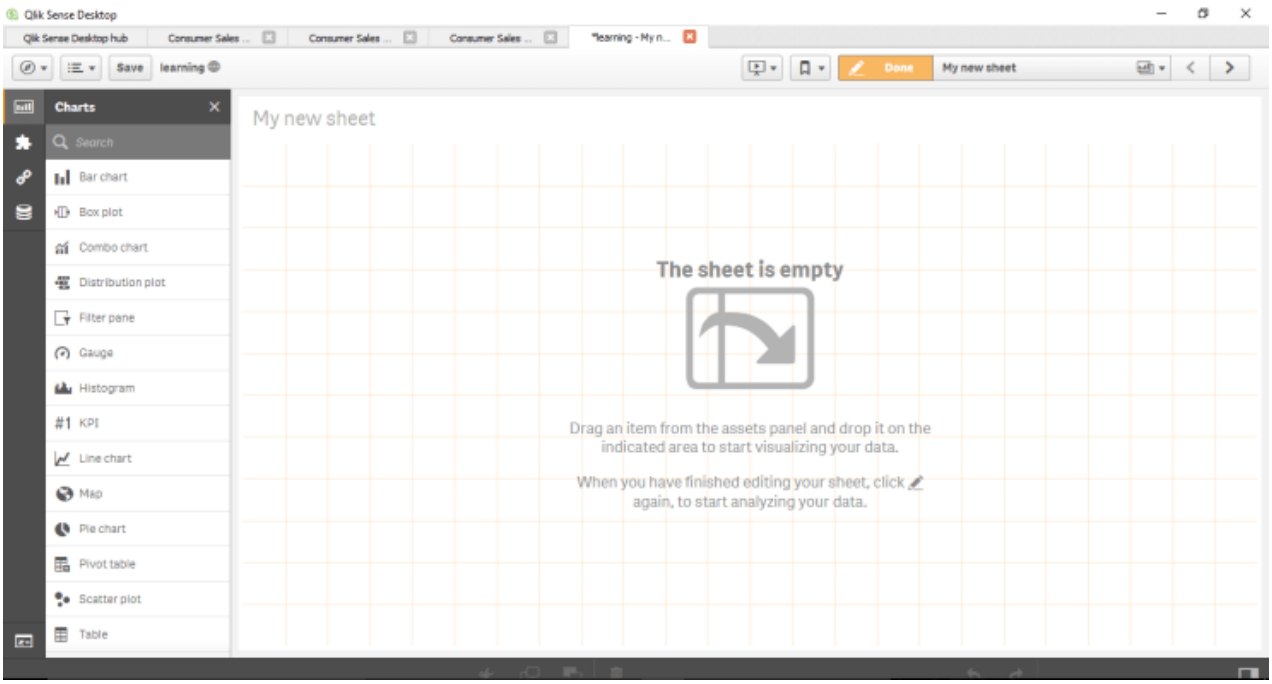
Here, you can see so many sheets like KPI Dash Board, Sales and Margins Analysis etc. Let's go inside them. Let's zoom in KPI Dashboard. Here you can see so many charts. These are object. They have their separate Ids which can be directly imported into web project specially in java script files.

Once are logged into the Hub, Create an app. You may load the data as per your requirement. Here there may be many option for you to load the data. You can load data in many formats like existing databases (SQL based or NoSQL Based), Excel format etc. After loading the data, you can edit or delete the column which you don't need.

1.Create new sheet button

2.Press edit button

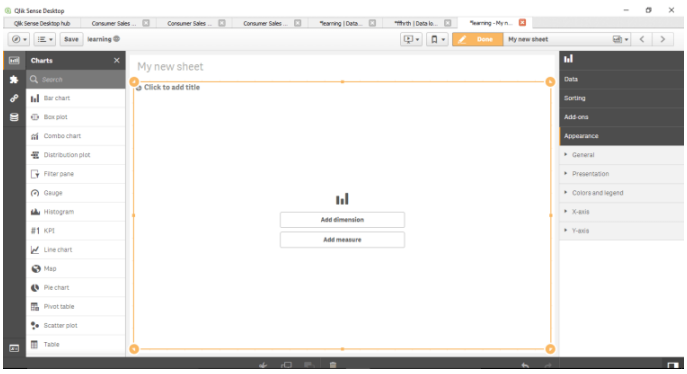
3.Click on the chart Icon. Once you select the Icon the screen will like below screen shot.



Qlik sense tutorial blank sheet

4. Drag and drop the type of chart as per your requirement.

5. Select the dimension and measure from your table. Take the reference from the below attached screen shot –



Qlik sense tutorial add dimension

Your chart object is ready. You may publish it. There is an again a fundamental of stream. Here you can give the privileges to another user. They can only view you chart if you.

5.2 Qlik Sense Architecture

The Qlik Sense architecture consists of one or more nodes. Each node runs some or all of the software services that perform specific roles in a Qlik Sense site. You can distribute services across nodes for better performance and scalability. The architecture is flexible enough to suit the needs of most organizations, and can vary from small, single-server sites to large, multi-server installations.

A multi-node, distributed architecture offers the most flexibility, consisting of multiple nodes that together form a scalable and high-performance site. You define a central node as the main point of control.

Sites

A Qlik Sense site is a collection of one or more nodes (servers) connected to a single repository database and sharing a single license. Each site also contains a common set of data in the form of apps and configuration data.

Single-node sites

A single node site is the smallest site possible and consists of a single node (single server), which is also the central node of the site. It contains the Qlik Sense services, the repository database, and the file share all on a one server computer.

Multi-node sites

Multi-node sites offer more scalability options for larger organizations. In a multi-node environment, the Qlik Sense site is distributed across two or more nodes that share the same set of data and the same license key. In larger sites, you can configure one or more rim nodes to improve scalability, capacity, and resilience. All rim nodes connect to a central node.

Benefits of multi-node sites include:

- Better scalability, making it easier to increase capacity
- Improved resilience and reliability
- Ability to move apps or roles to specific nodes
- Flexibility to suit customer network deployments

Nodes

A node is a computer that performs a specific role in your Qlik Sense site. You can configure each node to run or combine a different set of Qlik Sense services, so that each node performs a specific role.

Typical node roles:

- Consumer or user node - delivers apps to end users
- Scheduler node - handles all app reloads
- Proxy node - manages authentication, session handling, and load balancing

You can also configure your site for failover so that it is not dependent on the central node. In this case, if there is a failure, then one of the rim nodes in the site becomes the central node. For more information on how to configure fail over, see Creating a node and Service cluster.

A typical multi-server Qlik Sense site consists of two main types of nodes:

- Central node - the minimum configuration. Every site includes a central node.
- Rim node - you can configure rim nodes to perform different roles in your site.

Each node in a Qlik Sense site can:

- Perform different roles
- Deploy a set of Qlik Sense services
- Operate independently

You assign a purpose to each node depending on what you think it will be used for:

- Production
- Development
- Both

For more information on node purpose, see: Creating a node.

Configuring Qlik Sense nodes correctly increases system resilience, reduces the need for maintenance, and increases deployment flexibility.

Storage

Qlik Sense uses the following default storage.

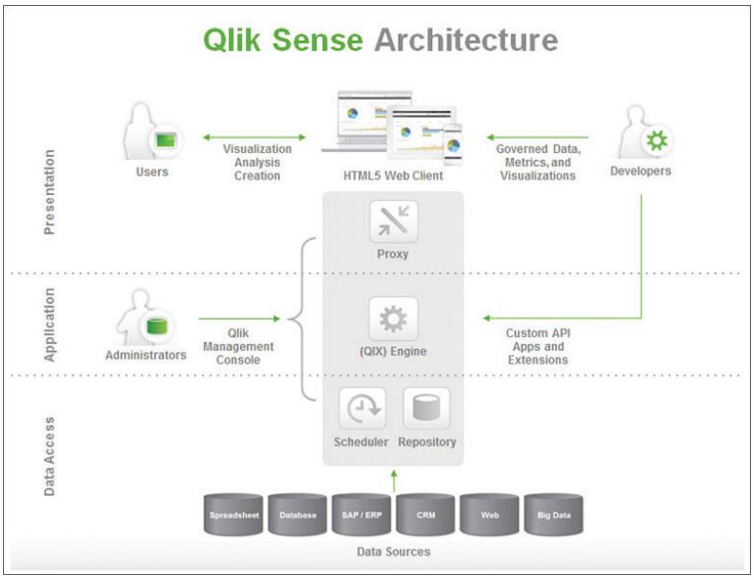
Repository database

A PostgreSQL database that contains the Qlik Sense app metadata, including the paths to the binary files in the file share. This data is referred to as entity data and is usually small in size. The PostgreSQL database can be installed locally or on a remote server and must be accessible to the central node.

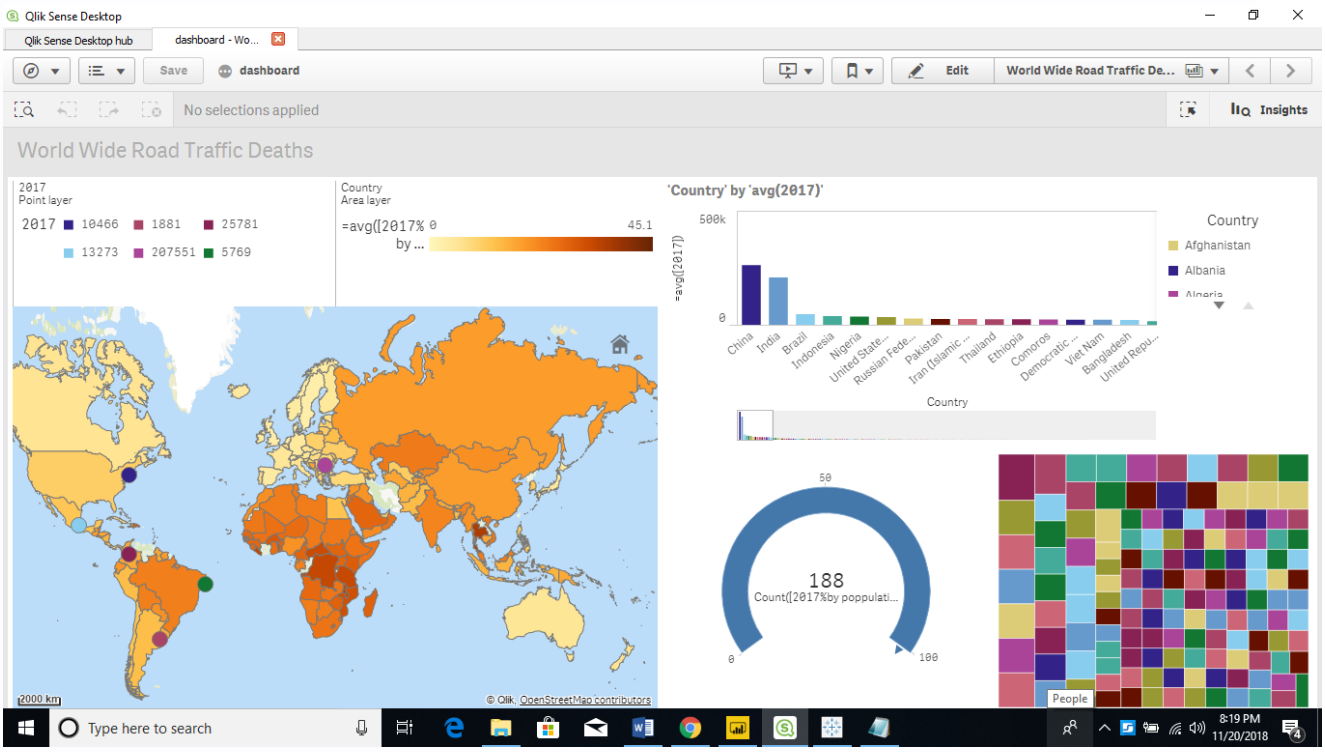
File share

A file share is used to store app data as binary files and must be accessible to all nodes in your Qlik Sense site. The file share stores application objects, such as visualizations, and dimensions and measures. Apps are stored in the proprietary QVF portable format, for example <App name>.qvf. These files are referred to as binary data and the data model element of the files can be large in size.

You can create a file share either on the same server as the central node or on another server.



5.3 Project which shows the world-wide road traffic accidents.



5.4 Advantages of Qlik Sense

Qlik Sense is a new and cutting-edge self-service data visualization and discovery product developed by Qlik, which helps managers organize and present their data in clear, concise fashion, based on their evolving needs. Qlik Sense's next-generation Self-BI helps make the advantages of BI more accessible to business users and create shared business communities.

Qlik has recently introduced a revolutionary new BI product named Qlik Sense, which includes advanced sharing and presentation features. Qlik Sense complements QlikView, Qlik's advanced

BI system, in ideal fashion. Together, both products create a holistic, breakthrough BI solution for multi-sector organizations.

Qlik Sense has many dynamic features that are flexible enough for all types of users. Some of its best features are listed below:

- **Smart search** – The search bar function allows you to type in keywords and phrases to quickly locate data sets, graphs/charts, reports and more.
- **Self-service creation** – Drag-and-drop capabilities offer easy dashboard and report creation without the need for scripting, complex queries or joins.
- **Centralized management** – Qlik Sense acts as one central location for users to develop and share apps, data stories and insights quickly and efficiently.
- **Data integration** – Unify disparate data sources on a single platform. Also, Qlik Sense doesn't "hide" any data. When manipulating views and dimensions, irrelevant data is "grayed out" instead of disregarded, so you're still able to discover hidden trends.
- **Interactive visualizations** – Qlik Sense offers users simple visualization creation that instantly responds to changes in dimensions and data context.
- **Data storytelling** – Easily share multiple viewpoints at once while assigning context to data. Storytelling features can also access the original analysis, so users can quickly drill down into data to answer questions and change viewpoints.
- **Responsive design** – Whether on desktop, tablet or smartphone (or if you're simply changing the size of your browser window), Qlik Sense automatically adjusts to give you the best view of its apps.

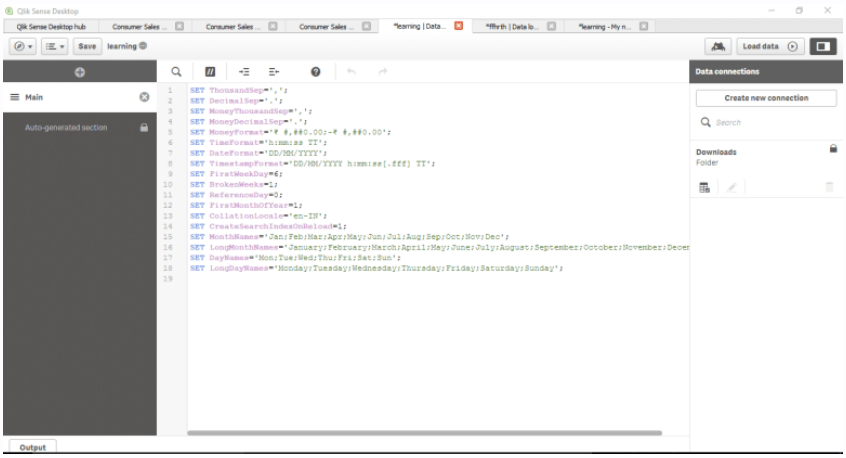
6. Comparison between all the visualizing tools .

6.1 Qlik Sense vs QlikView

QlikView is built for guided analytics. It offers skilled developers a development environment for building highly interactive guided analytics apps. QlikView appeals more to power users who want to build custom applications and play with data but have to have a considerable amount of skills to take full advantage of the software.

Qlik Sense application, on the other hand, is built more for self-service BI and serves both power and business users. It's incredibly user-friendly interface and responsive design is often what makes Sense more attractive to new users because it allows anyone to create data visualizations without any technical knowledge. When combined with advanced extensions like the ones we build at Vizlib and Qlik Sense Enterprise, the application becomes even more powerful and can be easily used for guided analytics as well.

Qlik sense is based on self-mode analytics. In the opposite, we have to guide QlikView for Analytics. See in Qlik Sense it can automatically create synthetic keys which can make relationship. Along with-it user also has the right to alter them. You can go to the Tab Data Load Editor. Here you will find the script. I found it similar with SQL. The below screen has an outlook for it. have a look.



I hope, This Qlik sense tutorial may help you to build your first app with Qlik sense. In case you want to certify yourself with Qlik sense. There is something positive for you , go for Qlik sense certification.

Along with this , you should explore more on other skills required for a complete data scientist . If you are looking for machine learning , go for Introduction to Machine Learning .

Performance Difference between Qlik Sense vs QlikView

Qlik Sense vs QlikView: The real differences. The two applications are built on the same technical core: the Qlik associative engine. Qlik Sense has a responsive design, enableling users to develop

reports and visualizations that are optimized for either desktop or mobile viewing, while QlikView does not.

6.2 Tableau vs Qlik Sense

I know you are waiting for it. One of the most popular question is Analytics world. Its open ended in most data science communities. In my view, As I have experienced Tableau is good to use specially it's quite easy. Where I found Qlik sense more powerful BI Tool. If you investigate Qlik sense features, Features are more in numbers as well as it can be easily go for customization. In the End, I will simply say, I love Qlik sense. If you find this content, please do not forget to be our subscriber. In case, if you have any query, Please write us. You can also comment us.

Performance difference between Tableau vs Qlik Sense

Tableau is slower than QlikView when it comes to in-memory processing. It employs cubing. Cubes can give out results quickly, they are faster than RDBMS, and however, they fall short when it comes to QlikView's patented analytical engine.

Qlik Sense comes with far better performance thanks to its Associative model. Qlik Sense can combine datasets of all the sizes effortlessly. Additionally, it has fine-tuned its in-memory processing to such an extent that no other Data Visualization tool can match its speed.

6.3 Power BI vs Qlik Sense

Power BI is great at dynamically reflecting real time data. It has wonderful views of data and can narrate a story that is powerful and impressive. Decisions can be made on the overall visuals shown. BI can show you where your sales are picking up while showing you areas to focus on. The quality of your BI dashboard tremendously improves with the overall quality of your incoming data. BI has great capability to share results across the organization in a secure and safe way in almost any computer platform.

Qlik Sense is an excellent product for analyzing and especially viewing your data on a variety of devices thanks to its responsive design. Qlik Sense also has many excellent features for managing and preparing your data. A scenario where you might want to consider using QlikView instead of Qlik Sense would be where you have a large number of reports that users require. At the present time in this scenario you might be better off using the container object within QlikView or deciding whether or not you can reduce the number of reports and still use Qlik Sense.

Performance difference between Power BI vs Qlik Sense

Space utilization and compression. QlikView uses many clever optimizations and tricks to keep the size of data down since it, for them, has to fit in-memory. It is still unclear how close Power BI is in this aspect; the semi-magical .pbix files tend to get considerably larger though they are compressed (using simple Zip compression). Showstopper? No, but good to keep in mind.

Maximum data set size. While QlikView has not set data limitations, it is common knowledge that there are clear issues with performance somewhere between 20 and 50 million rows or

500MB - 1GB. Showstopper? Currently, Power BI has a hard 1Gb limit which is hard to translate into real terms as, mentioned in the previous bullet, their data sets tend to be larger.

7. Conclusion

As a general conclusion, a large number and diversity of free visualization tools is available on the market. Thus, it can be stated that this is a period of great proliferation of raw data and there is a growing interest in finding the most appropriate way to present this information in an attractive, clear, concise and understandable way for the end user. Although there are many information and data visualization tools, below are listed the most recommended, based on the capabilities provided and the level of experience required to use them. Visualizing your data can be both fun and challenging. It is much easier to understand information in a visual compared to a large table with lots of rows and columns. However, with the many visually exciting choices available, it is possible that the visual creator may end up presenting the information using the wrong visualization. In some cases, there are specific visuals you should use for certain data. In other instances, your audience may dictate which visualization you present. In the latter scenario, showing an alternative visual that conveys information more clearly may provide just what's needed to easily grasp the most relevant factors affecting important decisions.

You can choose the most appropriate visualization by understanding the data and its composition, what information you are trying to convey to your audience, and how viewers process visual information. Ease of use is key to getting the most from data visualization tools, which in turn can help you realize value from your other BI and analytics investments.

WE have arrived at the end of our incursion into the field of data visualization. In the previous eleven chapters, we have presented a number of the most important theoretical and practical ingredients involved in the design of visualization methods and applications. As we have seen, designing an efficient and effective data visualization application is a complex process. This process involves representing the data of interest, processing the data to extract relevant information for the problem at hand, designing a mapping of this information to a visual representation, rendering this representation, and combining all this functionality in an easy-to-use application.

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