



What is Data Visualization and what can Data Visualization do for your business?



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PCA Business Notes Series

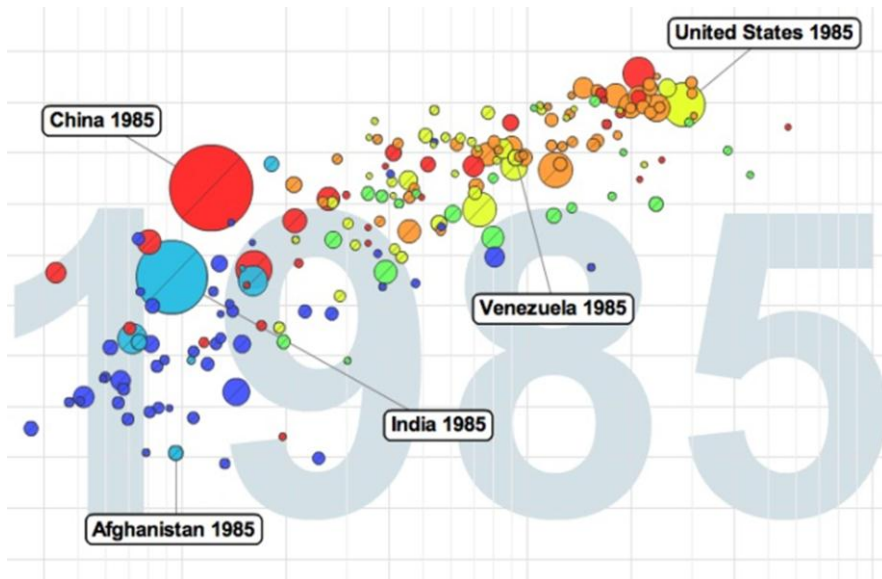
What is Data Visualization?

Data Visualization has at least three parts: the data, the story behind the data, and a graphical Visualization of the data (the Eye Candy).

The Data Visualization allows users to interact, explore, analyze and drilldown through Data to discover actionable information. All databases have a story to tell. Data Visualization (DV) lets management “see, interpret, and understand the story” the data is telling.

Data Visualization is replacing the old “Spreadsheet” paradigm with a new visual paradigm for data, where data is presented to users as a set of synchronized interactive data views, each of which is an interactive chart.

A typical data chart shows a 3-dimensional data set using a line chart. While modern day visualization technology provides a 5 or 6-dimensional view of a multi-dimensional data set using a motion bubble chart. This is Professor Hans Rosling’s (technology which was purchased by Google) original motion chart demo, which shows the type of work PCA produces for clients.





This new visual paradigm enables users to instinctively see previously hidden stories in the data, including: patterns, clusters, trends, outliers, distributions, compositions, comparisons and data relationships. Our clients find information faster and make better decisions. Here are some of the things that data visualization enables our clients to do:

- We can visually discover trends and tendencies among measures, attributes and parameters
- Outliers, anomalies, exceptions, and data errors will be visually presented to us
- We will see clusters, relationships and relative sizes in datasets
- We may visually analyze the composition of totals, comparison and distribution of data points
- We can see special, similar, or unusual data to trigger automatic or visual alerts
- We can find a “Needle in Haystack” by interactively drill-down to specific details

Old fashion Business Intelligence (BI) software originally targeted a narrow audience for its ad-hoc reports and analytics. The size and use of large modern datasets are rapidly increasing in direct contradiction to the static nature of reports. The process of sorting, filtering, moving columns and wading through lists is time consuming and filled with trial-and-error guesses about the data. We are all used to looking at spreadsheet-style tabular reports with thousands of “data cells” from databases (the spreadsheet below has data used in the Line Chart above):

Site	Severity	Category	Status	Cause
Bolton	Near Miss	Equipment	Open	Proced
Hudson	Near Miss	Customer	Open	Trainin
Hudson	Near Miss	Complaint	Closed	Extern
Shirley	Major	Spill	Open	Manag
Hudson	Critical	Customer	Open	Proced
Hudson	Critical	Customer	Open	Trainin
Concord	Critical	Spill	Open	Manag
Concord	Medium	Transport	Open	Manag
Concord	Medium	Customer	Open	Manag
Concord	Critical	Customer	Open	Persor
Maynard	Medium	Customer	Open	Persor
Hudson	Critical	Customer	Open	Equipr
Lincoln	Critical	Equipment	Open	Manag

Learn more about data visualization with dashboards (see [simple Excel-based Demo](#)) and data views (See [Excel 2010-based Demos](#)), and for those who prefer, [Excel 2007 Demos](#)). Best practices for [Choosing Charts](#) which are discussed here. Data Visualization requires a lot of data analytics with technologies like SQL Server Analysis Services and best in-memory Columnar Databases. In many cases the best custom solution is a Smart Client if the customer needs the most advanced Data Visualization.

Data Visualization Productivity Gain

One rarely covered aspect of advanced Data Visualization usage is a huge a productivity gain for application developers. The time required to develop an interactive Data Visualization reporting application is very different for traditional Business Intelligence BI and advanced Data Visualization tools.

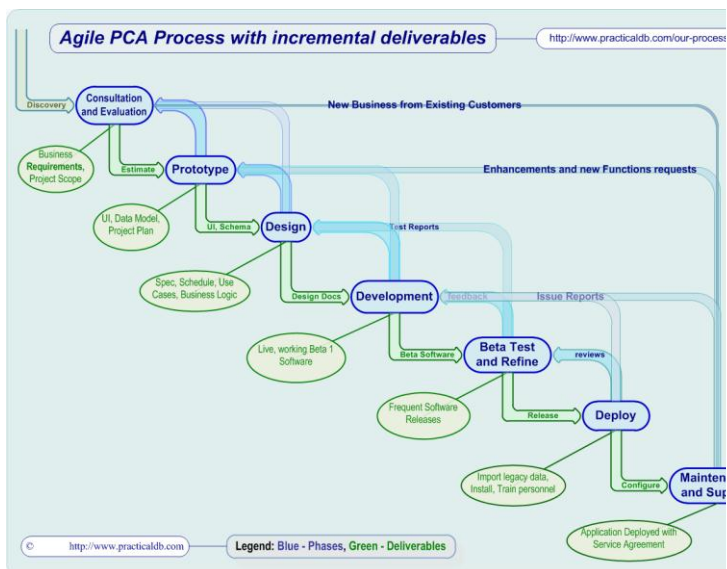
Examples of Traditional BI Platforms are BI toolsets like Oracle OBIEE, IBM Cognos, SAP Business Objects, SAS, Jaspersoft, Infobright, and Microstrategy.

Examples of Advanced Data Visualization tools used here at Practical Computer Applications (PCA) include: Spotfire, Tableau Software, Microsoft and Qlikview.

Modern Data Visualization tools can save a lot of development time in traditional BI environment with rapid prototyping and requirement gathering tools. Our experience is that you can go to development team which is completely committed for historical or other reasons to a traditional BI environment (Oracle OBIEE, IBM Cognos, SAP Business Objects, SAS, Microstrategy etc.) and prototype for such team dozens and hundreds new (or modify existing) reports in a few days or weeks and give it to the team to port it to their traditional environment.

These Data Visualization-based prototypes have completely different behavior from previous generation of (mostly MS-Word and PowerPoint based) BRD (Business Requirement Documents), Functional Specification, Design Documents and Visio-based application Mockups and prototypes: they are living interactive applications with real-time data updates, functionality refreshes in a few hours (in most cases at the same day as new request or requirement is collected) and readiness to be deployed into production anytime!

However, many BI teams, will be impressed by prototyping capabilities of Data Visualization tools (and some will use them for prototyping!), but will stay with their environment for many years due political or other reasons. More teams will seriously consider switching to Tableau, Spotfire or Microsoft’s BI stack, at least for prototyping purposes. As you see from Diagram below, the Prototyping is very important part of our practical process:



PCA Recommendations for Data Visualization

Data Visualization is only as good as the data and analytics behind it. Good Data Visualization will enable timely monitoring of operations, trends and outliers; alert decision makers ahead of deadlines, and enable management to quickly drilldown to actionable data items and simplify enterprise reporting and analytical processes.

The PCA process, business discovery, and expertise in construction of effective Data Warehouses and easy-to-use **Data Visualization** applications for interactive reports, analytical and business dashboards can greatly improve the Return on Investment (ROI) of fast growing corporate databases, help our clients choose and embed appropriate Data Visualization technology into business processes, or effectively apply such technology if it is already in use.

Data Visualization Market and Vendors

The Data Visualization Market recently reached 1 billion dollars in size and is growing faster than any other software market, including traditional Business Intelligence (BI) tools. Among Data Visualization Leaders we mention four important players:

Tableau Software – the fastest growing Data Visualization Vendor (113.5% Year-over-Year growth in 2010), easiest for end users with minimal need for IT support, has best access to OLAP cubes and best Pivot Control among DV vendors. The recent Tableau release has a capable and fast in-memory (64-bit) data engine and ability to perform incremental data updates.

Spotfire – lost (in 2007-11) its Data Visualization focus with TIBCO’s acquisition of Spotfire, but still has the best web client, best Visual Analytics (S-Plus, IronPython) and API; still the best option for large enterprises. Spotfire has an excellent in-memory (64-bit) data engine and unlimited ability to scale-up to disk.

Microsoft PowerPivot, Power View and Excel – Microsoft is clearly the elephant in the room. Microsoft tools are catching up quickly, and may overtake their competitors. Microsoft’s biggest advantage is the integration of Excel into Microsoft’s BI suite, and the ability to effectively program any type of visualization using those tools. Microsoft is clearly the most “Open” approach. With some energy and effort, excellent results can be obtained very flexibly.

Qliktech – fast growing, with good Data Visualization functionality, especially visual drilldown but has limited flexibility for large enterprises. QlikView has a good in-memory columnar database and so called AQL (“Associative Query Language”). QlikView is less flexible than the other products and the company is more rigid.

[See a comparison of Tableau vs. QlikView and Tableau vs. Spotfire](#)

To learn more about our consulting services

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