



BEST PRACTICES: ADVANCED DATA PERSISTENCE • ENTERPRISE .NET

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The New Era of Business Intelligence

Visualizing your information

We may look back on 2005 as the year that Microsoft changed forever the business intelligence playing field. The integration of SQL Server, SharePoint, Office, and Integration, Analysis and Reporting Services is quietly but dramatically changing the competitive landscape.

This trend is evidenced by findings recently reported by Survey.com, which cite that Microsoft's share of OLAP purchases made in the last two years has more than doubled. And remarkably, in the same period, more Oracle database users have opted for Microsoft's OLAP server than Oracle's. These findings support regional reports of steady and often dramatic sales growth of the aforementioned Microsoft products.

As a result, two distinct camps are emerging: Old BI and New BI:

- Old BI companies have consolidated, integrated and commoditized over the past 3-4 years. Most have not innovated. As a result, prices for their ETL (extract, transform, load), repository and reporting tools are expected to decline. And if their platform is not Microsoft-, Oracle- or SAP-centric they could be in for an even ruder awakening.
- Conversely, New BI companies have focused on real innovation during this same period. These emerging leaders have seen the future and it is bright. As a result, value-add technologies such as visualization are now gaining mainstream acceptance and adoption.

► .NET versus .NOT

The last time this occurred in the BI marketplace was when Microsoft merely announced "Plato," the predecessor to Analysis Services. Buyers paused and their silence was deafening. Prices fell dramatically and software vendors scrambled to higher ground, seeking early adopters of "higher end" offerings such as analytic applications. Most were not successful.

Today, .NET developers are about to experience a perfect storm:

BI platform with significant value for mainstream business users.

This emerging market opportunity includes "business visualization" solutions that enable people to see and understand information in new and ever more powerful ways. Some call it Visual BI. Many call it the next wave of innovation since it completely extends Microsoft's platform. Nearly all recognize the opportunity to differentiate and deliver real value by creating



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What Exactly Is Business Intelligence?

According to Webopedia, the term Business Intelligence (BI) represents the tools and systems that play a key role in the strategic planning process of the corporation. These systems allow a company to gather, store, access and analyze corporate data to aid in decision-making. Generally these systems will illustrate business intelligence in the areas of customer profiling, customer support, market research, market segmentation, product profitability, statistical analysis, and inventory and distribution analysis to name a few.

- Data warehouses are maturing and now contain relatively high quality data.
- Microsoft is offering perhaps the most elegant, and certainly the lowest cost platform upon which to develop BI solutions.
- Major world economies are improving and BI investments such as performance management and Sarbanes-Oxley are again high on corporate wish lists.
- Value-add technologies such as visualization are now available to enhance the Microsoft

cost-effective solutions that help masses of people quickly make accurate, fact-based decisions

► Why Business Visualization?

We are all familiar with graphical ways of showing data. Bar charts, pie charts, scatter plots and other displays are commonly used to understand business data in reports and on web-based dashboards. How does "visualization" differ from these?

The term "visualization" was originally coined to describe efforts to make large volumes



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of scientific data comprehensible by displaying it graphically. Inputs could be from meteorological data, computational fluid dynamics simulations, medical imaging or other sources. Traditionally, this field has been very successful in making scientific data more comprehensible. Key concepts in scientific visualization are graphically displaying large volumes of data and providing ways to interact with the data to make it comprehensible.

Another domain with large quantities of data to understand is of course the world of business. However, there is a crucial difference between business data and scientific data: scientific data typically has a natural representation in the physical world. With scientific data, we are trying to “see” information about real physical objects and phenomenon. Business data tends to be more abstract: buying patterns and trends, financial performance or web site activity do not have obvi-

ous physical representations as fluid flow over an aircraft wing does.


So a key problem for business visualization is to combine ways of graphically depicting abstract data with interaction techniques that make the data comprehensible. To do this effectively, there must be some appreciation of the strengths and weaknesses of human perception so that we can take best advantage of the human perceptual system. Data can be displayed using color, shape, location, size and other techniques. Poor choices in how to use these can result in a graphical display that hides rather than reveals insights about the data.

The familiar ways of displaying data are still valuable, but they can be extended to deal gracefully with large volumes of information. For example, a bar chart is an excellent way of looking at the distribution of values of a data field, but it should be able to usefully show thousands of values, not just tens.

A bar chart that handles a larger volume of data needs a variety of capabilities such as interactive reordering, dynamic labeling, and panning and zooming to enlarge a particular region to be useful.

Another key challenge in dealing with abstract data is that most interesting data is essentially multivariate or multidimensional: the analyst needs to weave together a number of factors to understand the story that the data is telling. The more common displays deal with a single dimension (e.g., a bar chart) or two dimensions (e.g., a scatter plot). More dimensions may be accommodated using novel graphical displays, such as the ADVIZOR Parabox and Data Sheet.

Data may also contain important relationships that are difficult to understand when displayed as a simple list or table. Relationships may be important, such as organization charts, products that are purchased together by customers or web



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site structures. These may be better displayed visually as graphs. Data may also contain hierarchies that summarize lower level details, such as time (e.g., year, month, day) or product hierarchies (e.g., store, area, SKU). Displaying data on a map adds the dimension of geography to your data to create a multivariate display. Displays that show these relationships visually can make your data much easier to understand.

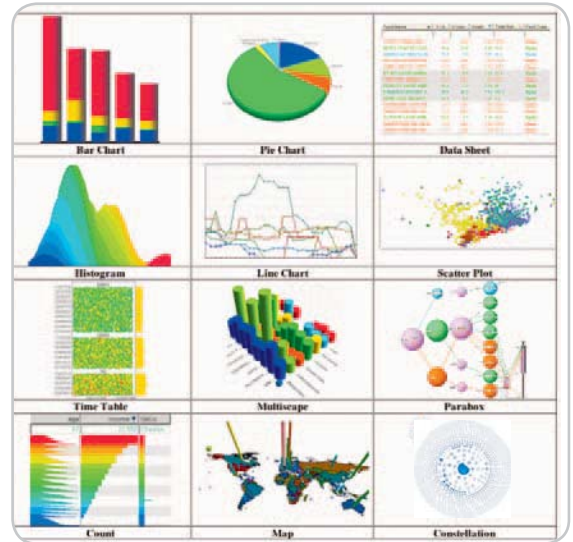
▶ **Dynamic Linking:**
The Essence of Visual Discovery

Another strategy for increasing dimensionality is to link a number of simple displays together so that you can see how the same data appears in different dimensions. Coloring can be used to link the same data subsets in different displays. Interaction can be used to graphically select a subset of a display and highlight the same subset in other views ("linked brushing"). To provide linked brushing for visuals that show the data at different granularities (e.g., a bar chart with data aggregated to categories and a scatter plot with each point representing a data case), data is automatically aggregated by visuals where needed.

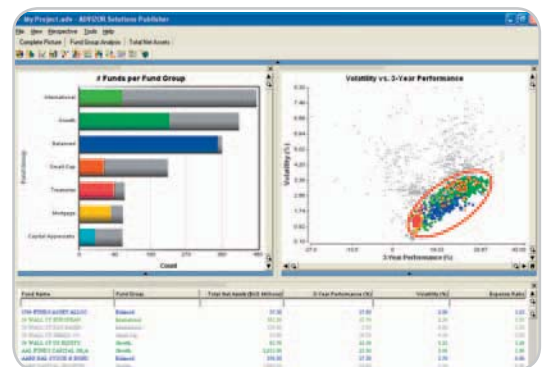
So business visualization goes well beyond conventional charting to help you better understand your data by showing large volumes of data, allowing multidimensional exploration, providing visual displays that let you better understand relationships, hierarchies, and your data on geography and linking multiples visuals to increase the number of dimensions that you can investigate.

▶ **We've Seen the Future, and it's Visual!**

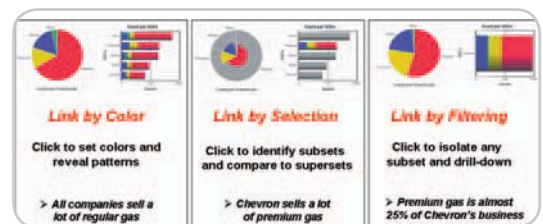
Microsoft's BI Development Studio is an integrated software development environment for BI application solutions. .NET developers have a unique window of opportunity to integrate innovative business visualization technology with this platform, providing customers with truly remarkable, high value systems. And these systems will align nicely with the expectations of emerging business leaders – today's Xbox generation – who will expect more from their business systems than most of us have imagined. ☺



f1 Figure 1: A combination of familiar and novel graphical displays allow multiple dimensions to be displayed and relationships in the data to be made visible.



f2 Figure 2: Linking together multiple visuals into a dashboard increases the dimensionality of the display, allowing the analyst to understand how different aspects in the data interact.



f3 Figure 3: Interaction lets the analyst point directly at an interesting subset and see how it appears in other displays, directly showing interactions between data dimensions.



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