Dashboards with "Live" Data For
Predictive Visualization

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Computer "dashboards" – the formatted display of business data which allows decision makers and managers to gauge several areas of performance – have been around since the mid 80's when EIS (Executive Information Systems) arrived on the scene. Dashboards have again become fashionable. A primary reason is that users with an "Excel level" of skill can design and develop their own dashboards. That of course is important.

The following is a quote from a leading vendor of dashboard technology: "Every 18 months or so, information technology industry analysts and vendors busily engage in hyping the "Next-Big-Software-Thing™" (N.B.S.T.) for managing businesses. Analysts write all kinds of articles trumpeting the benefits; vendors come to market with new products; the technical press writes thousands of pages on the topic. Tradeshows with knowledgeable speakers, outrageous displays….complete the picture of an up and coming technology……. Today's N.B.S.T. is Corporate Dashboards."

That is an almost amusing statement to call it the N.B.S.T since the concepts of dashboard technology are at least 20 years old.

The same web site goes on to say: "To the uninitiated, a Corporate Dashboard is a comprehensive summary of operational business metrics. That is, it centralizes a business's information systems from Finance, Human Resources, Sales, etc, to give executives and appropriate employees a tactical view of the company's (and individual's) performance".

That simply says that dashboards are still focused on *static* historical (data base) data. They have fancy dials, gauges, sliders, and drop-down menus for different views, but they display only historical data, i.e., what has already happened. Some dashboards have "what if" capabilities about the future that are limited to changing a constant(s) in a single time period(s) in an Excel model.

In contrast to static dashboards, a "living dashboard" has "live data" from a simulation model. When any variables (assumptions) are changed to predict a "new future," the user can see how the changes affect other variables over time. The opposite of live data might be called "dead data" but that is not a pleasant phrase. In his 2006 book entitled "*The Power to Predict,*" Dr. Vivek Ranadive calls it "data at rest" -- and that is more palatable. Even "real time" data, such as that from a stock market ticker, is history. It is from the past regardless of how recent it might be. Of course, very recent data may be more indicative of a trend into the future than older data.

This white paper introduces the Planners Lab© from GRW Studios, Inc. and the concept of living dashboard(s). The software is a combination of simulation and visualization for rehearsing business plans. It is almost entirely in plain English or the users' native speaking language. It is by far the easiest product available for such decision support. To our knowledge, GRW Studios is the first to introduce the concept of *living dashboards for business storytelling*.

Using the Planners Lab with "real" problems has revealed an interesting phenomenon. With the software at the center of a problem-solving process, issues such as team communication and

collaboration, different viewpoints and different assumptions are quickly brought to light and resolved. *The Planners Lab serves as a friendly, non obtrusive and unbiased "facilitator."*

Living Dashboards

The only way to create *a living dashboard* is with data coming from a simulation model (forecasting or prediction model). That can't be done with data in a data warehouse since those static numbers reflect no explicit relationships. The words "simulation model" might be a little scary but it need not be. With the Planners Lab software, simulation model means simple algebraic equations that describe *business assumptions including their interrelationships* (cause and effect relationships). With today's state-of-the-art education, this amounts to elementary school algebra. Thinking in terms of equations, even though perhaps not formal and explicit, is natural for most humans.

A little math is not the issue. The issue is that today's decision makers spend most of their data analysis time dwelling upon historical data – what has already happened - even though it might have little or no resemblance to what will happen in the future. Building models requires *assumptions-oriented thinking, algorithmic thinking* or *process-oriented thinking* vs. numbers-oriented thinking. Assumption thinking focuses on processes and cause-and-effect relationships such as in a simulation model vs. the stand–alone, disconnected numbers in data bases.

The Planners Lab is a new simulation modeling product with state-of-the-art visualization. The software gives *everyone* the ability to build their own models and create living dashboards. It is the only product of its kind. Users build, change and interact with dashboards "in flight." Two drag and drop clicks and users "play the game" of business planning and decision making.

Planners Lab users engage in real time and on-the-fly visual interactions for fast answers to what if and goal seek questions – conceptually much like the visual interactions gamers experience. Regardless of technical skill level, anyone can do this. Knowledge of the problem or business is of course needed, but no technical programming or modeling skills are required.

The Planners Lab living dashboards are fast and easy to create. Build one. If it doesn't do the job you want, simply "drag it off the stage" and it's gone. You have lost almost no time but you have learned in the process.

The play-like or game-like interaction becomes fun and addictive. But the fun is for a serious purpose – decision making for real problems. Users becomes highly engaged in seeing for themselves how the model is behaving, what variables matter, finding out if their assumptions make intuitive sense and generally gaining confidence that they can make wise choices. This becomes a part of the decision maker's *everyday life* whenever it's needed and fits their schedule.

Clearly this is a learning process or event. After all, that is the fundamental purpose of almost all applications software.

Storytelling

Everyone who has ever made a presentation was telling a story. A living dashboard is a support tool for telling stories about the future. Story telling about the future is simply a combination of assumptions about variables (actors) involved in the story, how they interact, how they behave and how they react to various stimuli (what if questions).

Everyone knows the old cliché that a picture is worth a thousand words. In the business world a picture is worth a thousand numbers. *A picture is worth a thousand numbers is because a picture tells a story* when combined with human intuition, experience, judgment, evaluation, pattern recognition, etc.

Learning

The fundamental purpose for all applications software is to support learning and communication. The Planners Lab fits those purposes perfectly.

Consider an environment such as the following. A business has multiple large monitors in their spaces showing living dashboards for various segments of the overall business. For example, their could be living dashboards for human resources, sales, marketing, and whatever "pieces" make up the business. Such living dashboards look conceptually similar to those in the Appendix.

These large monitors are available for employees to (1) visualize their company's plans for the future and (2) play the game of changing assumptions and visualizing the impacts of such changes. Using a mouse or touch screen they can drag and drop assumptions and immediately visualize the impacts. This is an incredible learning and communications tool.

Employees learn how to tell the story about their company's plans and the assumptions behind those plans. All this is completely possible and inexpensive to implement today. This *viewer level* of the Planners Lab would take about 30 minutes of training. That could be a part of the orientation for all new employees and existing employees could attend scheduled training at a time convenient for them. Naturally this also becomes a jump start to using the Planners Lab for planning and problem solving throughout the business.

Statistical Predictive Analytics

Correlation analyses performed on historical data are useful to develop equations to predict what will happen in the future for a single or a few key performance indicators. They are "stand alone" equations and not part of an overall simulation model.

Predictive analytics is a new phrase, but like so many "new things," it is not really new. Predictive analytics uses classical statistical analysis to develop forecast equations from past data relationships.

Take a look at "Mine Data to Predict What Happens Next," *Information Week*, May 29, 2006. (http://www.informationweek.com/showArticle.jhtml;jsessionid=JLFQMJ3K4NCPOQSNDBOCKHSCJUM EKJVN?articleID=188500520&queryText=Rick+Whiting). A sidebar to the article states: "Beyond Fortune Telling. Predictive analytics is moving from a specialty into the business process mainstream. The main ingredients are business data, mathematical algorithms and forecasting models." The market will grow to $8 billion by 2008, according to IDC.

Following are glimpses into the ways in which the Planners Lab supports predictive analytics, i.e., incorporating forecast *equations* into Planners Lab models.

The user can create business simulation models with the Planners Lab that have statistical forecast equations as some of the assumptions. The forecasting algorithms include simple keywords such as TREND for doing trend analysis and MOVAVG for computing moving averages. *All assumptions including those for statistical forecasting are still in plain English, readable and decision-maker led.*

Complex enterprise systems such as SPSS, SAS and Oracle are quickly jumping on the predictive analytics band wagon, i.e., they are building forecast equations based upon historical data in their products' data base(s). By importing the actual equations or resulting data into a Planners Lab model, they simply become another assumption(s) in the overall model. As a result, the cause and effect relationships that such forecast equations (or numbers) might have with any other variables in the model cascade throughout the entire Planners Lab model. You can't do that with data mining or stand alone predictive analyses.

The previously cited *Information Week* article mentions several software and consulting companies rushing into the newly found business territory of predictive analytics. As would be expected, they are complex black boxes. With the Planners Lab, all the assumptions are explicit and understandable by "real people" such as management decision makers. Also, the Planners Lab easily incorporates opinions and other sources of valuable data and insight that don't reside in enterprise data bases and don't accommodate text book statistical forecasting methods. For strategic decision making and planning, those are often the most important sources of data for business planning.

Summary

The concepts of *living dashboards* and *live data* raise the bar for next generation predictive analytics in the business intelligence market place. As decision makers become increasingly awakened about the importance of strategy and planning, decision support tools that embody such concepts will be mandatory. Currently, the Planners Lab is the only product available for *anyone* to construct living dashboards and do it in a few minutes. It is easy to do. It is like a commodity – use it or toss it and the cost is negligible either way. However, either way you have probably learned a lot about how your business behaves.

Appendix

Traditional Dashboards:

Here are a few examples of commercial dashboard products from two leading vendors of dashboard technology. These are representative of state of the art. The first 3 are from the Xcelsius website at http://www.xcelsius.com/Examples/Overview.html. Using terminology introduced above, these displays use historical data at rest in an Excel data file. They are visually attractive at first glance. However, with a little study the lack of presentation standards becomes quite obvious – garish colors, meaningless graphics, confusing layouts, etc.
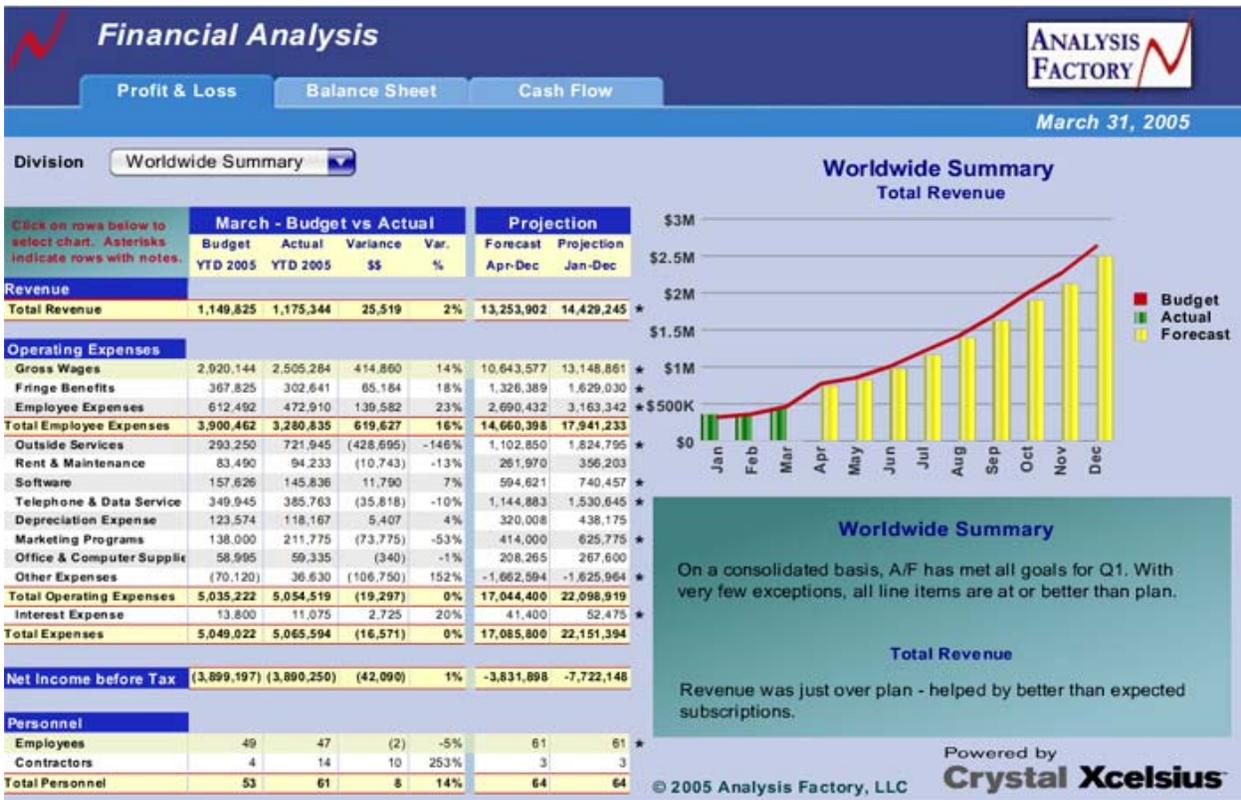
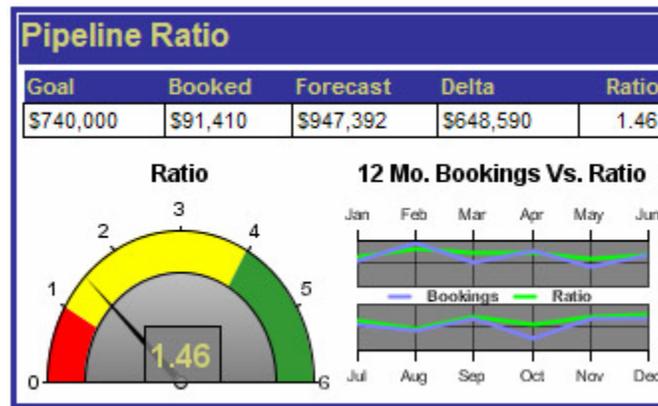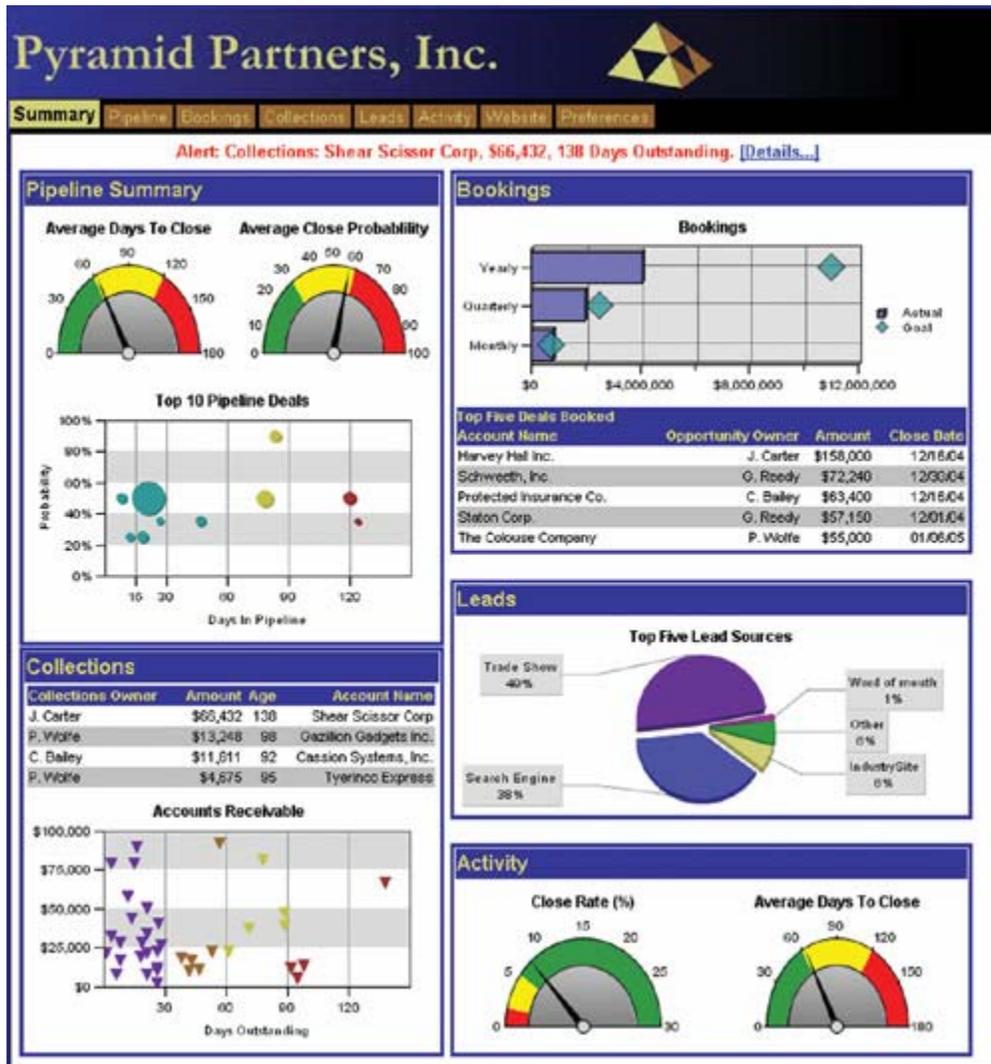**Financial Visual Business Model**

Analysis by Regions

Monthly Sales Analytic

Following are dashboards from Visual Mining, Inc. Again these are showing historical data. These and other examples can be seen at http://www.visualmining.com/products/netcharts-business-solutions.shtml.


Pipeline Ratio Chart

Pyramids Partners Chart

Living Dashboards:

The following is a "living dashboard" using the Planners Lab. Note the simple graphics and artistic style. The charts are simple and based upon sound theory for how to present data in ways that are understandable and simple. Planners Lab design consultants are the leaders in data visualization, graphic design, color, etc.

These charts do not emphasize historical data. Instead these charts are about predicting and forecasting the future, i.e., the stuff that plans and strategy are made of; they are about asking what if questions and doing goal seeking; they are about sensitivity testing of assumptions.
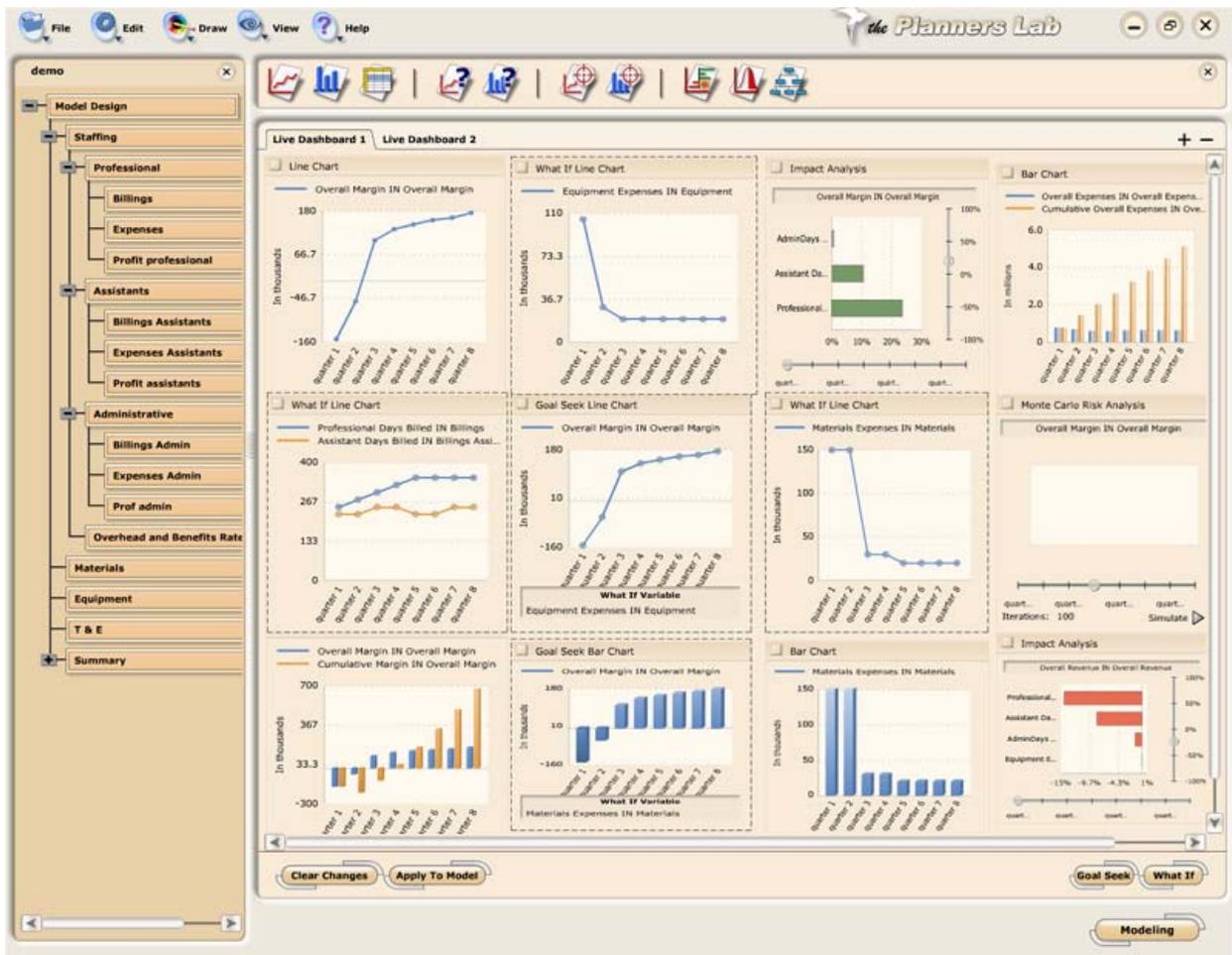
A Planners Lab Dashboard with Live Data

In this static display it is impossible to fully grasp the concept and importance of this capability. Take a look at www.grwstudios.com for animated demos. Or better yet sign up for a live on line demo.

The living dashboards with the Planners Lab are a completely different mindset and purpose than traditional dashboards. It can be predicted that such tools will be the real "N.B.S.T".

Predictive Analytics:

Forecast equations are for predicting a dependent variable(s) as a function of an independent variable(s). A dependent variable might be cost. Independent variables might be salary per hour and number of hours worked. The intent would be to predict cost as a function of salary per hour and number of hours worked. If there are estimated values over a time horizon for salary per hour and number of hours worked, then a predictive equation can forecast cost. The following equation is a conceptual example. The calculated coefficients are computed with historical data using a statistical tool such as regression analysis (correlation analysis) to show the relationship between dependent and independent variables:

Cost = (computed coefficient * salary per hour) + (computed coefficient * hours worked)

This equation looks similar to every other assumption (algebraic equation) in the Planners Lab. It is important to recognize that for this equation to be useful the assumption is made that the future will continue to behave as the past. This fundamental assumption always applies when forecasting the future from historical data.

Planners lab living dashboards