

Defining Dashboards

By Ian Dicker
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Cars and Computers

Business Intelligence, or BI, is a rapidly growing sector of IT development and expenditure budgets. The products range from financial modeling tools, data analysis, data mining, reporting, charting, etc. The large vendors, Oracle, IBM, and Microsoft, all have products in this space and continue to develop new ones and refine the existing ones. These tools generate huge amounts of additional data and charts about the business data. This, in turn, creates a new problem: how do you make all this data readily consumable and, more importantly, actionable. How do you summarize the data? The answer is a Business Intelligence Dashboard, or Dashboard.

What exactly is a Business Intelligence Dashboard? Most of us look at a dashboard in our everyday lives, in the car. When you look at it closely, the car dashboard provides a perfect model for a Business Intelligence Dashboard. Some information is updated in real time, for example, your speed and the engine speed (RPMs). Some information provides warnings, such as low fluids or worn brake pads. Some information reflects the current state of something, for example drive or park. Taken as a whole, the dashboard provides a quick and easily consumed overview of the state of your car. Some cars provide an additional level of detail. For example, some provide a mileage range for the car based on the amount of fuel remaining. Behind this is a real time display of MPG and an average MPG. This feature allows the user to “drill down” to gain more insight into the piece of information, the range. By drilling down and looking at the data behind a number, additional insight can be gained and questions answered. A Business Intelligence Dashboard acts the same way: it provides the user a quick and easy way to see the state of “the business”, and may provide the ability to drill into the information to provide detail. To be successful, the dashboard must present the information in a straightforward fashion. Typically, this takes the form of charts, traffic signals, gauges, dials, and in some situations, spreadsheets.

The BI Dashboard converts numerical information to charts and gauges, or color-coded graphics, which can be efficiently perused and understood. For example, a business may have a key metric that needs to be within a range: between 1 to 10 is good, 11 to 25 is ok, and above 25 is bad. If displayed as a numeric, the range info must also be provided so the user can put the value in context. This takes up screen real estate and takes time to for the user to process the information. In contrast, a Key Performance Indicator in a BI Dashboard for the same metric, a value of 1 – 10 is graphically displayed as a green graphic, 11 – 25 as yellow, and above 25 as red. The user does not need to know the range values, or if less is the desired value – green means that value is where the business has defined it needs to be.

Key Advantages

Allowing a user to process information more efficiently is only one advantage of the Business Intelligence Dashboard. The benefits of this tool can have far-reaching, enterprise-wide effects. There are several reasons for investing in the design and construction of a BI Dashboard. It maximizes the ROI on the BI analysis tools, it reduces decision-making time and increases business agility, it helps the entire organization to focus on what the key metrics are for the business, and finally, can increase quality of information used to make decisions.

Speeding and Increasing the Efficiency of the Enterprise

In the past, the available data analysis tools required human effort to convert the analysis, to charts and graphs. Once formatted, the analysis could be disseminated for decision-maker consumption. This time-consuming process-restricted information flow was generated quarterly, monthly or perhaps bi-weekly. Business performance measurements were therefore restricted to the same timeframes. Consequently, not only were decisions made based on old data, but the reaction time of the business was measured in weeks, at best. By converting the human effort into “coded process” in the BI Dashboard platform, the results of the analysis can be made available on demand, with the data being as up-to-date as the data sampling frequency. This allows the decision maker to benefit from accurate on-demand data analysis.

Focus

A BI Dashboard focuses its users on the key metrics that drive the organization forward to success. A bank, or most other organizations, can monitor the metrics and can react quickly to any changes, reducing the latency between an event and

the appropriate response. The dashboard can then become the central point by which the organization or team can monitor its performance.

Data Quality

The creation of a BI Dashboard can fundamentally change the nature of the information used to create it. If reports were created monthly, then the data was likely collected monthly. By allowing the data to be displayed on demand, users will naturally desire the data to be refreshed more frequently. This will soon reach equilibrium when the collection or sample rate reaches the optimum rate for the data source. By increasing the data-sampling rate, the result of the analysis can be improved by providing more data points for the analysis. For example, when averaging the temperature over the span of a month, versus sampling just one day.

Dashboard Design Variables

Dashboards are designed based on the needs of the end users. The two basic forms of dashboards are Business Reporting and Operational. End user needs then determine how frequently the information is updated. The two modes of operation available in a BI Dashboard are snapshot and real time.

Business Reporting Dashboards are typically used to show how the business is performing, over a specific period of time. A Reporting Dashboard usually contains financial information, such as revenues, forecasts, projections and tracking information. They may break down sales by product or region. In some larger organizations, project rollup information is displayed for major strategic initiatives, therefore providing senior management an enterprise-wide view.

In my consulting work, I have worked with financial services companies that built dashboards to display summary market information for global markets, displaying such things as GDP growth, population trends, employment demographics, and economic data. These dashboards are maintained by analysts and are used by traders and other analysts within the organization. These kinds of dashboard tend to operate in a “snapshot” mode since the data does not change that frequently.

E-commerce companies frequently use “real-time” business reporting dashboards to provide hourly or daily feedback on sales. Such dashboards enable new marketing copy and offers to be posted, and feedback to be quickly gathered and reported. This speed of reporting allows companies to be extremely agile, constantly trying new approaches. The use of real-time reporting is not just limited to e-commerce business; some manufacturing enterprises use them to report on products manufactured and shipped.

The car dashboard is a great example of the operational real-time variety, but there are many scenarios in business that can benefit from a real-time operational dashboard. Real-time dashboards are sometimes not built on top of a traditional Business Intelligence platform; they can be built using standard web technologies such as the Microsoft .Net Platform. Operational Dashboards allow the organization to manage intraday events, and operate at peak performance, by identifying changes in the operating environment. For instance, I built an operational dashboard for an internet company that allowed them to monitor their server farm and load. The dashboard displayed such items as the number of servers running, the request queues per server, network bandwidth use, CPU load, number of active user sessions and average request duration. Now, IT staff quickly scan the dashboard and know that the site is operating within defined limits and that nothing unusual is happening.

Designing the Dashboard

A good practice when starting a dashboard project is to first build a prototype that uses easily obtained data or demo data. This prototype should be used to promote awareness and the benefits of having a dashboard. Once the decision has been made to construct one or more dashboards, the next step is to identify the key metrics that are to be displayed and the manner in which they are to be rendered; this can be a time-consuming process. Some of the information will be displayed as Key Performance Indicators (KPIs) or traffic lights, some information will be gauges, others charts and graphs, some maybe spreadsheet data.

Having identified the metrics and display layout, the next step is to build the data gathering and processing layer. In some cases, the results from the Business Intelligence infrastructure can be used. Other metrics will require new code development. When developing data gathering and processing systems, consideration should be given to modifications that may be required because of changes in the business environment. By designing with changes in mind, companies allow for greater business agility, as the dashboard can be modified quickly to meet new business requirements. Once the data gathering and processing layer has been built the actual dashboard construction can commence. The dashboard should ideally be constructed as just a presentation layer, with minimal business logic.

Constructing the Dashboard

The type and mode of a dashboard will often determine the tool that is used to build it. As discussed earlier, operational dashboards can often be built using standard development technologies such as Java or Microsoft .Net. These tools allow developers to sample data from a wide variety of sources, such as performance counters generated by the underlying operating system, external monitoring devices, etc. The data sources can then be combined with rich graphical display tools such as the Dundas charting and gauge packages to build both snapshot and real-time dashboards.

Business Reporting dashboards are typically built using the dashboard tools from the same vendor as the Business Intelligence tools, although a mix-and-match approach can be used. Some products use proprietary development languages and tools to build the dashboards. Adopting these tools should be considered carefully, since the long-term cost of ownership could be much higher than adopting tools that use development languages that the enterprise has existing expertise in, such as Java.

For enterprises with .Net experience, Microsoft Office SharePoint Server 2007 (MOSS) provides an excellent platform for both business reporting and operational dashboards. MOSS is an open extensible platform, which allows custom code and display tools to be used in conjunction with the out-of-the-box functionality. The platform offers a key differentiator in Excel Services, which allows all or part of an Excel workbook to be integrated into the dashboard. This feature allows non-developers to update and modify the models used to build the dashboard.

Rollup

There are three critical success factors for a dashboard: metrics, sampling rate, and platform. The dashboard must provide the right metrics, sampled at a business appropriate level, and rendered on an agile platform.

ABOUT THE AUTHOR

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