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From the Editor

IT and business users often seem to be miles apart when it comes to understanding how to achieve a successful business intelligence project. In this issue we examine ways that these diverse groups can build a bridge over very troubled waters.

Jeff Reagan suggests one way to bridge the IT/user gap: virtual prototyping. Reagan explains how this approach can help the project team better align business users and IT while guarding against cost overruns. Prototypes provide a means to validate requirements and design decisions and spot data quality issues, and can do so at a fraction of the time and cost of the traditional physical prototype.

Mark Kromer and Daniel Yu describe another approach that helps a BI team get and keep projects on track. The authors examine how using a proof-of-concept can drive home BI’s business value and win attention and adoption for your BI project from executives and management. The proof of concept will also help solidify requirements and set proper expectations, reducing project delays and rework.

When it comes to BI’s business value, don’t think just of your own enterprise. Alan Eisman suggests that by sharing information with partners in your supply chain—using everything from balanced scorecards to KPIs—you can improve efficiency, reduce inventories, and improve customer delivery. Now that’s value.

Of course, once BI projects take off and return that superior value, business users may begin to take them for granted. Our Experts’ Perspective column suggests how you can install enthusiasm and revitalize interest in BI in just such circumstances.

There are many elements that IT needs to align, including investments, resources, business values, and imperatives. As Julianna DeLuca discusses, a common data foundation is the only viable way to make this alignment a reality in today’s competitive business environment. Alex Chaves-Sanz and Ihsan Al-Awamy look at another decision for IT and BI users to examine together: whether a BI business suite or a collection of best-of-breed applications is the best approach to satisfying a company’s BI needs.

Also in this issue, senior editor Hugh J. Watson looks at where BI software is headed; our Q&A with TDWI Research analyst Philip Russom digs into his latest report on data governance best practices; and our case study shows how a familiar auto club drove up data quality.

We’re always interested in your comments about our publication and specific articles you’ve enjoyed. Please send me your comments and feedback: jpowell@1105media.com.

James E. Powell
The last two years have seen spectacular changes in the BI industry with many of the major, independent BI tool vendors being “gobbled up” by “bigger fish.” The most significant acquisitions include Business Objects by SAP, Hyperion by Oracle, and Cognos by IBM.

There are multiple ways you can view these developments. A positive spin on this market consolidation is that vendors will be able to offer a more comprehensive BI stack, it will be possible to deal with a smaller number of vendors, and the time and cost of integrating products will be reduced. A potential downside, however, is that the “big fish” may not significantly invest and innovate in further developing the acquired products. For them, the revenue associated with BI software is only a small percentage of their total revenue; in comparison, for independent BI vendors, it is the basis for their business. Only time will tell how and to what extent the large vendors will push the decision support envelope.

Even if BI products are not enhanced as much as they might otherwise be, there is another possible, positive outcome. Consolidation may create a vacuum that encourages new companies to enter the marketplace. Entrepreneurs may see the opportunity to “think outside the box” and develop products that are different from those available today. In fact, this is already happening.

I don’t think that you have to look far to see what some of these new products might be like. You are probably already using their predecessors, such as Google Search, iGoogle, and Web 2.0 technologies and applications.

**Google Search**

I’m still amazed at how Google seemingly came out of nowhere and has so dramatically changed the computing landscape through its focus on the Internet and an
ever-expanding set of applications. The first application, of course, was the Google search engine. Like most people, I find information on the Internet by entering terms and phrases into Google. In an incredibly short period of time, Google generates a list of sites that contain information related to my search, all sorted in descending order of their probable usefulness.

Contrast this to the usual BI approach, where information is located through carefully designed menus or Windows-style folder systems. The traditional BI approach is typically slower, especially when the location of needed information is uncertain. Unless the menu or folder systems are exceptionally well designed, the user is less likely to be aware of the totality of information available, unlike Google searches, where all possible related information is displayed. In fairness, however, Google can return a large number of links to information unrelated to your interests, and this can be frustrating.

It seems likely that future BI products will be more Google-like, providing a user-friendly approach for accessing structured and unstructured data. While BI professionals recognize that comprehensive decision support often requires access to both kinds of data, the reality in most organizations is that numerical data is organized in data warehouses and documents are maintained in content management systems, and there is little integration between the two.

iGoogle

If you have not already built an iGoogle page, you should. Without any instructions or training, in an hour or two you can create pages of information that are laid out and customized to your interests and preferences. Let me briefly describe the key parts of the process.

First, you will need to go to Google and set up an account. After this is done, click on iGoogle. You indicate (through radio buttons) what content categories are of interest to you, such as news, humor, and sports. When you select a category, you are presented with a large selection of information resources. You also select how you want the information displayed (such as one, two, three, or four columns). In addition to the tabs for content categories, you can create a home page that displays information selected from all categories. For example, my home page displays the weather for Athens, Georgia, the weather for cities that I plan to visit, the date and time, my Gmail account, University of Georgia sports information, YouTube, stock market information, and so on—anything that I want to see or access on a regular basis.

Each information display is provided by a gadget; pages are comprised of sets of gadgets. To find the gadgets you want to use, you click on Add Stuff, enter a word or phrase that describes what you are interested in (such as local weather), and iGoogle returns a long list of possible gadgets to choose from. After you find one that you like (they are even rated 1 to 5 stars by other users), you click on Add It Now and iGoogle places the gadget on your home page or one of the content category pages. Once it is there, you can drag and drop it wherever you like and edit it to your specifications (such as your city for weather information). [Editor's note: Yahoo! and MSN both offer similar functionality.]

When I first created my iGoogle pages, I was struck with the feeling that this is exactly how users should be able to identify, organize, and select BI and other information resources. Everything is Internet-based. The user selects the desired information, customizes it, and decides how it should be organized and displayed. There is no software installation or training required.

This approach might be used in BI to create a home page containing an overall balanced scorecard for each user, with tabs to direct the user to more detailed information about the scorecard’s component parts (e.g., financial or customer). The home page might also provide e-mail access and news. The user would select the component parts of each page, whether they are performance metrics, an OLAP application, a report, or a document. Each of these types of information is provided by a gadget that users can select and customize.

This approach is also consistent with the services-oriented architecture concept. Each gadget (representing some kind of information or capability) is a service that is
shared among users. The role of IT is to provide the infrastructure and the services, and users select the services they want to use.

Web 2.0

“Web 2.0” refers to a variety of technologies, applications, and ways for creating and sharing information. Think of social-networking sites such as Facebook and MySpace, YouTube, wikis, and blogs. These sites and applications have an “architecture of participation” that encourages users to add value through content and/or additional applications. This is very much in contrast to traditional Web sites (Web 1.0), where content is created and managed by the site’s owner.

The potential importance of adding Web 2.0 to traditional BI capabilities is great. Decision making (and thus the requirements for decision support) are more typically conducted in groups rather than individually. Multiple users often participate in decision making and the decisions must be shared with others.

In the old western movies there was often a shootout between the hero and the villain. It was one against one. Comparing this scenario to decision making, it’s the lonely decision maker facing the decision (the “John Wayne” model). While some decisions are made this way, many are not.

The current generation of BI products (including Excel) provides only limited support for collaborative decision making. This is likely to change, both as current BI tools evolve, and as new BI products emerge that better support collaborative decision making. Users will be able to contribute thoughts and content to the decision-making process.

These Web 2.0–oriented tools are likely to be especially appealing to younger workers because the tools are similar to what they use when communicating with friends. My students tell me that they access Facebook more often than their e-mail. I’d expect them to respond especially well to BI products that provide social networking capabilities.

Conclusion

The emergence of Web 2.0–oriented products is already taking place. BI tools expert Cindi Howson pointed me to a couple of interesting products that illustrate some of the future BI capabilities.

Swivel (www.swivel.com) is a startup company whose goal is to be the “YouTube for data.” Users upload data to Swivel and the data is available for the public to analyze. For example, there are data sets that vary from the national public debt to Tony Romo’s fantasy football points. Companies can also upload and privately analyze their data on a fee basis. In addition to analyzing data, users can analyze the data against other data sets to find correlations, blog about their findings, and join groups with similar interests (such as data visualizations and mashups). While Swivel is not a BI tool per se, its functionality is applicable to BI. In a company, imagine data sets being available through the Internet to a select group of users (such as marketing analysts) who analyze the data, compare it to other data, and blog about their findings.

Antivia (www.antivia.com) is a business partner of Business Objects and its software (Antivia Desktop) runs on top of Business Objects’ BI platform. Here’s how it can be used. A user views an information resource, such as a report, and wants other people to participate in thinking though the significance of the information. The user creates and names a community and drags and drops people’s names to include them in the community. She then sends a message to the community members providing the report and her initial comments.

Through a threaded discussion, members of the community make comments and suggest other information resources that should be considered. The resources are rated by users, who give them 1 to 5 stars. It’s also possible to conduct real-time polls and surveys. The net effect is an integration of traditional BI and social networking capabilities.

BI software certainly has an exciting future.
Adopting BI in an Organization Using Proof-of-Concept Techniques

Mark Kromer and Daniel Yu

Abstract

Implementing a proof of concept for your business intelligence (BI) project proposal can drive home the business value of BI to your executives to shore up that all-important executive sponsorship. Without such sponsorship, you will likely find yourself fighting an uphill internal battle that can force cost overruns and deployment delays, and possibly doom your BI project altogether. In this article, we examine how a proof-of-concept technique can help you win the attention and adoption of your BI project from executives and management.

In our conversations with customers regarding implementing business intelligence solutions, we often meet with talented technical professionals from the data warehouse group. We discuss the ways they may have gone about collecting data from numerous, disparate data sources, cleansed the data, and provided single-source models for customer records, among other tasks. These are enormous efforts that take considerable time and specialists from many groups, including database administrators, developers, business analysts, and data warehouse experts.

However, when we ask the business units responsible for driving business performance and lines of business about the value they receive from these data warehouses, we find that in most instances the value is not being realized by the business.

Let’s examine one mechanism we have found useful for describing the benefits and value of business intelligence to business units. We utilize a pre-implementation business-value tool that is essentially a pared-down business productivity tool in the form of Excel spreadsheets.
A pre-implementation phase of such projects can be scoped for gathering sample data from data sources required for a customer segmentation solution. A small-scale data mart and analysis cube can be created based on this data. We often refer to this project phase as a proof of concept or a pilot. This phase leads to an effort (usually taking a couple of weeks) of data gathering, data modeling, and producing the results through an OLAP engine into an Excel spreadsheet. The resulting spreadsheet serves as the catalyst to present the business value to the project sponsors and executives.

Though the technology and software that make business intelligence possible have existed for decades, the enterprisewide adoption (and benefit) of business intelligence has yet to materialize for many IT shops.

In one example, through this simplified BI proof-of-concept technique, we showed that the top 1 percent of a customer’s base subscribers accounted for 43 percent of all revenue. By implementing a segmentation business intelligence solution for their marketing organization, the company could achieve a return on its marketing investment of 110 percent.

The results of this proof of concept were presented in the simplest of BI forms: Excel spreadsheets. We conducted a four-week business-productivity study for this customer; we took their campaign results database (a fairly unstructured Oracle data warehouse) and modeled a star schema data mart from the extracted data. A single OLAP cube was built on that data mart to provide summaries, aggregations, hierarchies, and drill-down capabilities without requiring direct access to the operational transactional systems.

We presented this information to the customer in spreadsheets and in a formal, executive-summary-style presentation. Needless to say, the audience of executives and upper management was amazed by the results. However, at the same time, worried looks came from around the room. The executive members seemed to glance toward their direct reports as if to say, “Why don’t we have this knowledge for our campaigns today?” and “How have we been conducting business without this data in hand?”

Though the technology and software that make business intelligence possible have existed for decades, the enterprisewide adoption (and benefit) of business intelligence has yet to materialize for many IT shops. Indeed, we often see that in a typical organization, only selected users have access to the knowledge mined from business data that BI brings to a business. Meanwhile, the vast majority of knowledge workers must rely on discrete sources of data (commonly spreadsheets stored at local PCs), experience, or gut feeling to make key business decisions.

The problem is compounded when different departments make conflicting financial or marketing decisions that may be confusing to customers. Even though a pilot or proof of concept is an important step when you need to show empirical evidence of business value and ROI for your proposed project, it’s vital to keep in mind the larger perspective of BI for the masses (or pervasive BI) in your deployment strategy. A deeper discussion on the topic of pervasive BI is beyond the scope of this article, but although Excel spreadsheets with data results are useful at this phase, leveraging portals (for instance) is critical to enable workers across your organization to make excellent decisions based on good intelligence.

Once we identified the needed resources and key stakeholders for this customer segmentation project, we spent four weeks gathering and analyzing their campaign data and purchase logs. In addition to finding that the top 1 percent of data customers brought in 43 percent of all...
We often find that the distribution curve of customer revenue—when segmented properly—is not a normal one, but rather very skewed toward a few selected segments. These can be referred to as revenue champions because they are instrumental to a service provider’s profitability. Nevertheless, many carriers have no targeted services or benefits to add value to these customers directly. It’s worth mentioning, however, that these customers are often very savvy technology users, so it is unlikely that they will interact directly with the provider (whether via call center or other channels).

These customers will also have a higher propensity to churn (that is, move to another service provider). Therefore, as part of the initial engagement, we recommended a series of initiatives to retain and better serve revenue champions within the organization. These project directives were fleshed out during the proof-of-concept phase to demonstrate the ROI and business value of a customer segmentation BI solution.

Another problem with a skewed distribution curve is that the lifecycle value of the products is misleading unless you compare it to a curve that does not include revenue contribution from high-value customers. For instance, lifecycle value might indicate the total cumulative value of a product, its profitability, and any impact of market timing. Figure 1 is a typical lifecycle of product A. Compare that to the same graph, but without the contribution of high-value customers (Figure 2).

Revenue, we found that the company lacked the tools for campaigns to target this “VIP” customer cluster. In addition, the purchasing patterns of these top-line customers were different from regular users: they bought products and services at different times during the day and were influential to the overall product’s success among regular users. We set out to prove that our hypothesis was correct by conducting a live SMS (Short Message Service) campaign, rolling out and advertising new mobile games.

**Figures 1 and 2:** The impact of segmenting customers is shown in that 1 percent of the customer base here is accounting for a sufficiently large part of the overall revenue to skew the graph; without segmenting the top-line customers from the rest of the customer base, this would never be recognized.
Notice that the second curve is almost completely flat and shows that without the revenue champions, product A would have certainly had a low ROI. Consider the ramifications if you could actually conduct a targeted campaign to the right set of customers at the right time. The impact to an organization’s earnings per share would be significant.

First, we sent the same product offering to two sample groups (one from their previous sample and the other from a targeted set of customers) of 20,000 customers each. For two weeks, we measured their response hour by hour. We then analyzed the initial results and were quite surprised. Due to the smart campaign (the appropriate offering to the right customer at the right time), the marketing ROI (customers who actually bought the products/services) was up over 110 percent.

To further improve these numbers, we ran mathematical models as an instrument of optimization for a future campaign. After setting specific goals for the campaign, we separated the expected contribution from the overall marketing campaign (to whom and for what offerings) and the specific programs (when and how). Using standard data mining techniques, we ran hundreds of Monte Carlo simulations and simulation optimizations and produced a set of actionable marketing activities that would help the service provider target the right customer at the right time through the most effective channel.

To implement this campaign and customer segmentation solution, we utilized the following BI products from the Microsoft BI suite: SQL Server 2005, ProClarity 6.3, PerformancePoint Server 2007, Excel Web Services, and Microsoft Office SharePoint Server 2007. As the data flow diagram in Figure 3 shows, we built a customer-segmentation solution proof of concept rather quickly by connecting to several preexisting data sources, including an Oracle data warehouse that contained marketing campaign and sales results and a database of customer records. The third source was survey results from Excel and other non-structured data source types.

We extracted, cleansed, and loaded the data into a SQL Server 2005 data mart via SQL Server Integration Services (SSIS). Then, several cubes were defined.
using SQL Server Analysis Services (SSAS). Finally, we presented the results to the entire organization based upon security settings leveraged through PerformancePoint Server 2007 and SharePoint Server 2007. This enabled a test group from several different departments to provide feedback and feel empowered by the broad use of such segmentation analysis. For the purposes of the pre-implementation proof of concept, we exported the analysis results from the cube directly into Excel from the Microsoft Excel Data Mining add-in, available in Microsoft Office 2007. This allowed us to demonstrate the business value of such an undertaking directly in printouts or presentations to the executive steering committee.

We encountered similar symptoms at a leading global telecommunication company. Because of the company’s strong base subscriber growth, the enterprise did not put a priority on discovering insights into which customer accounts were most profitable, or which accounts were too expensive to maintain based on service plans and handsets used by subscribers. Furthermore, lack of planning (and these customer insights) resulted in lost revenue because some customers had more operating costs than revenue due to factors including roaming and old handsets.

To demonstrate the need to change their business practices, we made an executive presentation to the vice president of marketing. By implementing a customer profitability analysis solution, the company would be able to:

- Better serve their customers and focus attention on revenue champions—a segment that generates significant revenue compared to an average customer segment
- Showcase improvement on marketing ROI of at least 10 percent
- Gain new insights into lifecycle value of products and the opportunity to bundle products
- Improve customer retention rates by moving customers to more appropriate equipment and service plans

We ran a two-month pilot with a small sampling of data extracted from their Teradata data warehouse, representing just 1 percent of their overall subscriber base. Again, we kept the pilot or proof of concept to an easily manageable and small size so we could complete a development cycle in a short time frame. The objective was to get empirical data in front of the executive sponsors in order to receive buy-in for the project.

Consider the ramifications if you could actually conduct a targeted campaign to the right set of customers at the right time. The impact to an organization’s earnings per share would be significant.

In this instance, we utilized the capabilities of the BI presentation software to export the results of the trial directly from SharePoint graphs in ProClarity to PowerPoint presentations. For some executive summaries, presenting the entire business case in PowerPoint may be a necessity (an Excel spreadsheet sometimes obfuscates the objectives in complex workbooks). The ability to export directly to a presentation was very helpful here.

By extracting the data from the existing data warehouse, we were able to cleanse and format the data into a small data mart and single cube which we used for processing aggregations, dimensional hierarchies, and data summaries of customer profitability metrics including average revenue per user (ARPU), average revenue by handset, revenue by geography, profit margin by service plan, and
average margin per user (AMPU). Figure 4 is a high-level look at the system architecture we used for this pilot.

**Conclusion**

These examples demonstrate that proof points are very important in most organizations that require business unit buy-in or sponsorship for a business intelligence project. Although in this case we happened to utilize the Microsoft SQL Server and Office BI stack to implement a customer segmentation solution, this same approach is applicable to any scenario where you are looking to kick off a BI project with a technology vendor stack. The sequence would break down this way:

1. Ask for buy-in to perform a proof of concept around a single scenario that impacts the business users
2. Configure minimal cubes in SQL Server Analysis Services with a dashboard in PerformancePoint Server and make the knowledge available to all users through SharePoint
3. Utilize Microsoft’s ability to export reports to Excel or PowerPoint, or as PDF files
4. Following the proof of concept, bring copies of the spreadsheets of your results to demonstrate tangible business results to the executive sponsors

We have repeatedly found that a quick implementation of a BI solution idea on a small scale—a well-bounded pilot or proof of concept—enabled us to show results in tangible business value that could be easily explained and demonstrated, particularly where Excel spreadsheets or PowerPoint presentations were exported from an OLAP cube and presented to executives for buy-in and approval. This is a very productive way to obtain authorization for your BI project ideas. An additional benefit is that you will now have a substantive baseline system from which you can scale out and build the production version of your BI vision.
Data Governance Strategies

Philip Russom

Any time data crosses an organizational boundary—either internally or to outside parties such as customers or regulatory bodies—it should be governed. In today's "age of accountability," demands are ever higher for strict oversight for data usage, quality, privacy, and security. In addition, there are compliance and accountability requirements that organizations must worry about.

Many organizations are turning to data governance (DG) to address these concerns. Data governance establishes policies and procedures for sharing data, as well as improving data’s quality, structure, and auditability. Data governance can also enable an organization to treat data as an organizational asset.

We spoke with Philip Russom, senior manager of TDWI Research, about his research and findings into best practices for data governance.

In the report you give a rather lengthy definition of data governance, but you also have a short rule of thumb that's easy to remember: “DG usually boils down to some form of control for data and its usage.” Control is a rather broad term. What does it encompass in relation to data governance?

Control usually takes one or more of three forms: limitation, expansion, or state. For example, the policies and procedures created by the average data governance board control—in the sense of limit—users' access to sensitive data. This is driven by compliance, security, and privacy concerns relative to data.

The ironic flip side is that the same DG board may also cede control to organizational segments that had none. For instance, data warehouse professionals are mostly happy with DG because it gives them a process for requesting access to data that's been denied to them. Likewise, a data warehouse team can suggest improvements to the quality of data owned by other organizational units and the board may compel them to make the improvements.

Another mnemonic you offer is that data governance is mostly about the “four Ps.” What are they and how do they interact?

With annoying alliteration, the four Ps state that people create policies for data access and usage, plus procedures for proposing and managing changes to data’s use, ownership, and quality. The people, policies, and procedures constitute the larger DG process. The point is that DG is very much about interpersonal skills applied to cross-functional collaborations within the structure of an organizational structure, such as a DG board or equivalent.
How pervasive are data governance programs?
Cross-functional practices that are similar to DG have been around for years in the form of data stewardship, BI teams, and steering committees for data management initiatives, yet the current, modern form of data governance is still rather new. TDWI Research’s survey reveals that only 15 percent of organizations have deployed a DG program. Even so, more DG programs are coming soon, since a third of surveyed organizations are in the design or implementation phase.

What’s driving data governance? Why are so many organizations initiating or expanding their DG programs at this time?
The report goes into gory detail about why firms should care about DG, but here’s a shortlist. Compliance is a pressing problem, and DG is a prominent part of the solution. Solving data quality problems on an enterprise scale demands a lot of cross-business unit changes, and DG enables change management. Similarly, DG reduces risk for large-scale business integration and transformation events, such as system consolidations, reorganizations, and mergers and acquisitions.

In the Best Practices Report, you mention that 60 percent of survey respondents selected data quality as the leading perceived benefit of data governance. Unfortunately, you note that DG success is mediocre at best. What’s getting in the way of realizing the data quality benefits of a DG program?
The perception that DG yields mediocre success isn’t surprising, given that it’s too new for its best practices to be fully understood and disseminated. In addition, DG programs today are so young that they’ve barely touched the numerous business initiatives and technology implementations that DG can potentially contribute to. I personally believe that as time passes and DG programs address more of their mandates, the perceived success level will rise.

You discuss a key component of data governance: the data governance committee or board. What is the role of this group, who sits on it (what are their job titles), and for how long?
Referring back to the four Ps, it’s the DG board (sometimes called a committee) that brings together people to create policies and procedures for controlling data access and use. Without this board, there is no DG process. You mentioned staffing, which is critical, because you need a mix of business and technology people who represent key business units across the enterprise. Otherwise, the full range of enterprise requirements for data control is not addressed with consensus. Plus, finding an attentive sponsor who can wield a big stick and be the board’s chairperson is fundamental to giving the board a mandate that the enterprise will follow.

How should an enterprise get started with data governance, especially given that an organization may already have other governance projects under way?
As with many new programs, DG needs to achieve an early success by addressing a specific, well-bounded problem. Later, it can grow its scope to address other pain points. Common starting points are subsets of compliance, business transformation, and business integration—which I call the three pillars of DG. Note that data quality is a subset of all three, and hence is probably the most common starting point.

Can you give us one or two best-practice recommendations you found in researching how organizations use data governance?
One that you and I haven’t mentioned today is: Don’t practice data governance in a vacuum. First, you have to coordinate with IT governance, corporate governance, BI governance, and so on. Second, the DG board itself must coordinate with multiple business initiatives and data management implementations.

Were any of the results of your survey surprising?
The most pleasant surprise is that CxOs chair DG boards more often (16 percent) than I anticipated. This is surprising given the tight schedules of chief officers and the fact that many delegate responsibility readily. Yet, given the technical side of DG, it’s not surprising that most of these are CIOs or CTOs (9 percent) compared to a few CFOs (4 percent) and CEOs (3 percent).
BI Solutions Strategy: Business Suite or Best-of-Breed?

Alex Chaves-Sanz and Ihsan Al-Awamy

Abstract
A best-of-breed approach to deploying business intelligence (BI) capabilities in today’s enterprise provides the opportunity to exploit tools and applications to support highly differentiated business processes through advanced and industry-specific functionality. This advantage comes at the price of increased total cost of ownership (TCO) over time for maintenance and support when compared with a single-vendor platform in which there are normally no point-to-point interfaces to maintain. Best-of-breed tools should be limited to only a few that may provide strategic advantage while using an integrated platform for most business requirements.

The greatest value of BI comes from being increasingly embedded within the business processes themselves. Integrated platforms can provide BI capabilities throughout a company’s enterprise applications, such as enterprise resource planning (ERP) and customer relationship management (CRM), as well as within a data warehouse, thereby making the use of BI more widespread and pervasive. As the BI market consolidates, many innovative best-of-breed vendors will be acquired by large business suite players for their unique capabilities, making their competitive stability a major consideration.

Introduction
Business intelligence systems merge transactional data with analytical tools, enabling the delivery and presentation of complex corporate and competitive information to planners and decision makers as well as other information consumers. BI is becoming more strategic, helping businesses improve the timeliness and quality of data to the decision-making process (Negash, 2004). Most businesses have opted for multiple vendors to source their BI capabilities in what is known as a best-of-breed approach.
This term refers to applications from small, independent vendors that offer innovative functional capabilities to a specific industry or a single business area (Rao, 2006).

A TDWI survey determined that the top three reasons for adopting a best-of-breed BI strategy were 1) users having different requirements, 2) purchasing autonomy among departments, and 3) a reported lack of functionality from single-vendor solutions (Eckerson and Howson, 2005).

Gartner advises against the extremes of uncontrollably proliferating BI tools and applications on the one hand, and becoming locked in by a single vendor as the BI vendor market consolidates on the other. They recommend a balanced approach to standardization through business intelligence competency centers.

As end users realize the increasing costs and performance risks associated with integrating and maintaining multiple interfaces among applications, there is a growing trend toward standardization and consolidation. This trend is being imposed in large part by the increasing market presence of large enterprise application megavendors, such as SAP and Oracle, which are gaining momentum by developing or acquiring specialized skills that allow them to offer a more complete portfolio of integrated BI tools (or so they claim).

This article explores the benefits and drawbacks of adopting a best-of-breed approach to implementing BI solutions in contrast to acquiring an integrated business suite from a single, large vendor. The pros and cons are examined from four perspectives or selection factors to be considered when choosing a solution:

- The specific needs of the business
- The pervasiveness of BI within the organization
- An infrastructure-based value proposition
- The competitive stability of BI vendors

Selection Factor 1: Specific Needs of the Business

There is no single BI tool or integrated platform complex enough that it can fully satisfy all of the possible needs of the end users in any given business context (Rao, 2006; Burton and Schlegel, 2006). Research by Gartner suggests that a best-of-breed approach is still needed. However, Gartner also advises against the extremes of uncontrollably proliferating BI tools and applications on the one hand, and becoming locked in by a single vendor as the BI vendor market consolidates on the other. Rather, they recommend a balanced approach to standardization through business intelligence competency centers (BICCs), which lead the evaluation, balancing, and prioritization of business requirements.

When user requirements for a BI solution are highly specialized, the best way to realistically meet the wish list of features is to select a few best-of-breed technologies available for highly specialized, business-critical processes, as long as redundancy in data and functionality can be avoided (Burton and Schlegel, 2006).

If specialized functionality is required to operate in a particular industry sector, consider vendors that offer point solutions. According to Gartner research, a significant proportion of financial services, healthcare, retail, and business services firms prefer to source BI solutions from best-of-breed vendors and pure-play BI vendors (Sommer and Graham, 2007). Best-of-breed vendors are the numerous, relatively smaller niche companies that offer innovative tools for specific BI market technology segments, including advanced visualization, data mining and predictive modeling, text mining functionality,
metadata, business process management, and business activity monitoring.

In fact, some of these vendors such as SeaTab Software and Celequest (acquired by Cognos) offer outsourcing of BI capabilities and data warehousing needs through software-as-a-service (SaaS) hosted delivery. SaaS is a viable option for a business with limited IT resources that need high-performance analysis and reporting on large data volumes. Pure-play vendors are those that offer BI-only integrated platforms with a strong focus on corporate performance management (CPM) in addition to a portfolio of specialized and industry-specific analytic tools. Leading pure-play vendors include Business Objects, Cognos, Hyperion, MicroStrategy, Panorama, and SAS Institute (Sommer and Graham, 2007).

In general, businesses with a decentralized corporate culture, departmental autonomy, and highly complex business processes will implement BI solutions that best fit the specific user needs of each business unit, favoring the advanced functionality that only a best-of-breed system can provide. An integrated approach is preferred where the business has benefited from integration efficiencies by using enterprise applications such as SAP or Oracle. In this situation, the highly specialized best-of-breed functionality is the exception only where it supports business-critical processes.

Best-of-breed vendors are likely to provide more frequent or regular upgrades or enhancements than integrated suite vendors, and their shorter development cycles could make them more up-to-date technologically.

**Selection Factor 2: Pervasiveness of BI within the Organization**

The risks of choosing a best-of-breed approach include focusing on the technology per se, following the trends in the industry, and falling prey to the excessive marketing buzz (and hype) promoted by BI technology vendors. Over the next several years, businesses will have to shift their focus from the technologies that deliver user-centric information access, query, and report capabilities to process-driven capabilities that make BI less tactical and more strategic (Schlegel, 2006).

Gartner’s analysis predicts BI vendors must be able to provide calculation engines and scenario modeling, predictive analysis and data mining, real-time event data capture, scorecards, Web services integration, search capabilities, and collaboration and workflow features to the already mature online analytical processing (OLAP) and dashboard solutions currently offered (Burton and Rayner, 2006).

This greater focus on business process and performance management is necessary to align operations with corporate strategy and to guide the selection of BI application architectures that are business process specific.
Pure-play BI vendors such as Hyperion have developed performance management capabilities to differentiate themselves from the business suite vendors that offer basic BI capabilities. Even though larger vendors such as SAP have not yet reached the same level of sophistication in process-oriented capabilities (such as CPM applications) as that of pure-play and best-of-breed BI vendors, they have a strategic advantage: They can deliver analytics functionality embedded within their widely used enterprise applications, such as statistical analysis in CRM, financial planning in ERP, and business planning and simulation in NetWeaver BI.

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Offering BI and CPM functionality integrated into applications at the business-process level makes BI more pervasive, reaching more users throughout the organization and hastening user acceptance and adoption as BI becomes more relevant to users’ roles. According to a report by TDWI, Enterprise Business Intelligence: Strategies and Technologies for Deploying BI on an Enterprise Scale, the top challenge for BI-tool standardization efforts is individual resistance to change (Eckerson and Howson, 2005).

SAP intends to offer advanced analytics as an integral part of everyday process workflows, with access to metrics and calculations providing insight on transactional data. This offering will merge BI and CPM into a single platform, in keeping with the standardization, consolidation, and integration trend, which could make best-of-breed applications redundant.

The “pervasiveness” factor favors larger vendors in the long run if advanced process-driven analytics are not immediately required (Chandler, 2007). If, however, it is not feasible to wait for a vendor to improve its offering—either by development or (more likely) by acquiring specialist competitors—then a viable solution would be a single-vendor, pure-play BI platform that fully integrates with the enterprise transactional systems and/or a data warehouse (such as MicroStrategy or Cognos).

Selection Factor 3: Infrastructure-based Value Proposition

Many larger companies often depend on an IT infrastructure running many applications that integrate data across the enterprise. Gartner’s research shows that more than half of manufacturing firms have a preference for BI vendors that also offer enterprise applications and infrastructure (such as servers and databases). Larger enterprises are more likely to choose the vendor of their current business applications (Sommer and Graham, 2007).

Market Trends

IDC’s competitive analysis found that BI tools remain an attractive market for software vendors. IDC says that database-embedded (as in data warehouses) BI solutions have been gaining market share, growing at almost twice the rate of standalone BI tools (Vesset and McDonough, 2006). This finding further confirms the trend toward standardization, consolidation, and integration.

Seamless Integration

Inevitably, as they extend their presence in the BI market, large vendors are acquiring best-of-breed vendors to gain the functionality lacking in their own solutions. The challenge for these large business suite vendors is to seamlessly integrate their standard OLAP and reporting data warehouse applications with the segment-specific tools they purchased.

The resulting architecture-design and platform approach to BI has no unified user interface: users must switch to
separate applications to work with data, request reports, view dashboards or scorecards, or use other BI tools. The problem here is that “all those environments might connect to the same cube, but all have separate metadata and require separate configuration” (Cyr, 2006).

Connectivity
Although access to common data using standard interfaces may be an advantage of BI-inclusive enterprise business suites, integration with a transactional systems infrastructure is not an obstacle for best-of-breed or pure-play BI vendors. Most of these vendors’ solutions already support built-in custom interfaces to major enterprise systems from SAP, Oracle, Microsoft, and others, providing at least data-level connectivity using standards such as eXtensible Markup Language (XML) and Web services, open database connectivity (ODBC), and COM²-based interfaces (Hall, 2002). Furthermore, best-of-breed analytics tools tend to incorporate Web technologies, a feature that eases implementation.

Flexibility
Holtz (2005) argues that best-of-breed applications offer greater flexibility in connecting with best-in-class point solutions such as e-commerce. This could be due to a more technically advanced plug-in architecture of best-of-breed systems. In addition, they are more customizable than business suite applications. In contrast, the emphasis on standardization makes business suite products easier to configure and faster to implement within an enterprisewide platform, but the depth of integration between modules and business applications may make customization more difficult.

Measuring Return on Investment
According to TDWI research, only 9 percent of organizations have performed a return on investment (ROI) assessment of their BI standardization efforts (Eckerson and Howson, 2005). Some general guidelines can be applied to measuring ROI when comparing a single-vendor architecture with a best-of-breed environment.

ROI must consider the benefits realized in proportion to the delivery costs over time (that is, the TCO). The ROI assessment should evaluate the expected quantifiable benefits and all the cost categories below, as outlined by Raden (2004):

- **Acquisition costs.** The initial purchase price of individual best-of-breed applications is lower than that of an integrated platform. However, as best-of-breed products are added over time (to address the growing user needs for new functionality), the cost of the overall BI solution increases, but these additional costs may not be accounted for as part of the initial acquisition investment. If these cost calculations are overlooked in the initial ROI assessment, ROI may be unrealistically high for a BI best-of-breed solution.

- **Infrastructure costs.** A best-of-breed solution may incur incremental costs as a result of network or hardware upgrades required to attach each new application to the existing infrastructure. In the case of a BI-only platform solution (e.g., Business Objects or Cognos) interfacing with an integrated business suite (e.g., SAP or Oracle), these incremental costs can be avoided, as most major BI applications already include adapters for most major ERP systems.

In the case of an integrated business suite, it is possible to incur only marginal costs by sharing infrastructure components (such as Web servers, network bandwidth, and storage/disaster recovery facilities) among multiple systems.

- **Implementation and deployment costs.** These costs, including consulting, training, and internal project staff expenses, can be significant for both best-of-breed and single-platform approaches. For best-of-breed solutions, having multiple implementation cycles as new components are added may be a disadvantage. A one-time deployment (for a single-platform solution) would require only release upgrades. In addition, in a single-platform approach, a familiar user interface could expedite training.

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²COM is a communication component or simply a class used in C/C++ programming language.
Support and lifetime maintenance costs. Expenses for direct training in multiple applications (to ensure a wide set of staff skills for maintaining the greater number of interfaces), plus opportunity costs and reduced benefits from multiple integration cycles (each with an associated learning curve and possible downtime) must be tallied in the best-of-breed scenario. In addition, incompatibilities arising among heterogeneous applications must be resolved; a homogeneous single-platform environment, where components are standard, avoids this problem. Nonetheless, in a business suite, license fees and maintenance are a significant ongoing cost.

In the case of an integrated business suite, it is possible to incur only marginal costs by sharing infrastructure components (such as Web servers, network bandwidth, and storage/disaster recovery facilities) among multiple systems.

Other factors that can affect ROI include the reliability, performance, and availability (or uptime) of a given application. There are more potential failure points at the interfaces, and more performance tuning may be required between the BI tools and the enterprise systems or data warehouse in a best-of-breed scenario. In a single-platform environment, the enterprise works with a single vendor to resolve issues.

Proper valuation of a BI investment, however, is more complex than the calculation of traditional ROI. Williams and Williams (2003), for example, argue that the assessment of the business value of BI in organizations is a strategic necessity in order to improve results. They recommend a broader analytical view than just ROI, which is undoubtedly an integral component of the overall business value analysis.

As with any asset, the business value of an investment should be measured in economic terms as the net present value of future after-tax cash flows from the investment, rather than on the basis of net profit or savings. However, these cash flows can be difficult to determine and to link directly to the BI investment, especially to less tangible factors such as reliability and performance.

Selection Factor 4: Vendor Stability
Whether small, innovative companies will survive in the long run is the biggest uncertainty surrounding best-of-breed vendors. Those that do survive may still end up being taken over by larger vendors looking for specialized capabilities. Vendor consolidation in the BI industry poses the biggest challenge for customers who have or are considering best-of-breed solutions.

In contrast, the challenge for businesses opting for an integrated single-vendor solution is to avoid losing leverage and negotiating power where they are dependent on that vendor for their entire applications portfolio. As they continue to acquire smaller vendors, large vendors (which are supposed to offer integrated platforms) are themselves offering a portfolio of disparate, best-of-breed products.

The best example of this is the acquisition by Oracle of Hyperion Solutions. The full integration and standardization of the Hyperion CPM products into Oracle’s own BI platform, according to Gartner, “could take several release cycles to complete.” They are currently offered separately and will most likely continue to be offered as separate product lines for some time (Hostmann, Van Decker, and Rayner, 2007).

The biggest issue to a best-of-breed customer is losing continuity of product support if their vendor is acquired. They also risk having their existing product replaced by a new product that does not offer the same functionality (Rao, 2006). Even where a forced product change proves technically satisfactory, there could be pricing changes and both financial and productivity costs associated with migration and retraining of users (Hostmann and
Schlegel, 2006). However, a best-of-breed customer will always have the leverage of finding alternative suppliers for a given stand-alone application, whereas for a customer of an integrated business suite, the switching costs are much higher (On-Line Consultant Software, 2003).

A viable alternative is to adopt a middle-of-the-road approach and go for one of the larger pure-play BI vendors (such as SAS Institute or MicroStrategy) for a BI-only platform, retaining the enterprise suite for the rest of the application portfolio. This option has the dual benefit of incorporating market-leading specialist BI capabilities while avoiding vendor lock-in.

Still, not even these established BI vendors are exempt from being acquired by even larger vendors such as SAP or Oracle, as evidenced by Oracle’s Hyperion acquisition in the first quarter of 2007 and SAP’s acquisition of Business Objects in the last quarter of 2007. Therefore, clear guidelines should be defined, derived from the company’s IT guiding principles that pertain to software investments.

In any case, the investment choice must be based on a firm business case. Those opting for a best-of-breed option will have to prepare a more detailed and rigorous cost/benefit analysis to quantify, justify, and communicate their selection decision. Ultimately, vendor stability as a selection criterion favors a larger player, but its road map for future consolidation and integration of acquisitions should be a key consideration.

Conclusion
Optimization of the parts does not necessarily optimize the whole. Trying to attain the best possible individual architecture components to satisfy each functional requirement may lead to a sub-optimized enterprise architecture. Costs for an integrated business suite are more predictable and controllable than costs for a best-of-breed application portfolio.

For a business with a long tradition of using ERP and other enterprise systems, it makes sense to acquire BI capabilities from the same vendor, considering the convenience of integrating the back-end transactional data with the front-end analytics on a single platform.

Generally, most businesses still prefer to obtain BI from best-of-breed vendors, but there is a clear trend toward standardization and consolidation, enabled by a BICC, which plays a key role in defining the company’s overall BI strategy, standardization efforts, and prioritization of business requirements, as well as driving user adoption.

As they extend their presence in the BI market, large vendors are acquiring best-of-breed vendors to gain the functionality lacking in their own solutions. The challenge for these suite vendors is to seamlessly integrate their standard OLAP and reporting data warehouse applications with the segment-specific tools they purchased.

Best-of-breed vendors are highly skilled and innovative in developing BI functionality. The best of these smaller vendors may ultimately be acquired by larger software vendors, so their competitive stability should be a factor for selection. Large enterprise application vendors offer a promising way forward, integrating BI functionality into business processes to ensure user acceptance and adoption, and to make BI use more strategic and pervasive.

References
Burton, Betsy, and Kurt Schlegel [2006]. “BICCs Drive Business Intelligence Platform Standardization,” Gartner Inc.


Sommer, Dan, and Colleen Graham [2007]. “User Survey Analysis: Spending and Sourcing Preferences for Business Intelligence, North America and Europe,” Gartner Inc.


BI Experts’ Perspective

Revitalizing BI

Rob Armstrong, Amr Awadallah, Matt McGivern, and Monica Tyson

Carol Williams has worked in BI at Alpha Manufacturing for five years and has been BI director for the past two. When Carol was hired, Alpha was beginning a BI initiative. The company had no single, integrated source of decision support data, and (not surprisingly) reports were inconsistent and often lacked needed data. Most analysis was done using Excel spreadsheets.

Carol and her BI team developed the company’s first data warehouse and successfully introduced a reporting and analysis tool for end users. Several years later, the CEO got behind a business performance initiative that provided dashboards for management and enabled operational personnel to perform tasks associated with critical business processes. This initiative, which was largely completed a year and a half ago, was also successful. Carol’s performance on these projects led to her promotion to BI director.

The company’s long-time CEO announced recently that he is retiring. This causes Carol some concern, because the CEO was a key supporter of BI. Furthermore, it sometimes seems that BI has become “old news.” People take the warehouse and dashboards for granted, and there are no new initiatives on the horizon to create excitement about BI.

Carol has seen this before—not only with BI, but also with other initiatives. There is great early support for an initiative, the project is completed, everyone is pleased with the outcome, and then—over time—it ends up being taken for granted. This seems to be the current situation at Alpha.

This has caused Carol to ask some questions:

1. Is it common for BI to become “old news” in mature BI environments?
2. If so, what are some things other BI directors have done to revitalize interest in BI?
3. In particular, what might Carol do in her situation?
Carol sees the arrival of a new CEO as a double-edged sword. She hates to lose the CEO who has been supportive of BI, but a new CEO is likely to bring about changes that will require BI support (or at least, that is the positive spin that Carol is putting on it). This raises a final question:

4. What actions can Carol take—both before and after the new CEO arrives—to put BI in the spotlight again?

Rob Armstrong

Before answering the questions posed by Carol, I will make some assumptions of my own. I will assume the most positive situation—that the BI and data warehouse environment were implemented correctly and have laid the proper foundation for what lies ahead. “Correctly” means that the data warehouse was done through business-driven implementation, adding subject areas to a flexible, cross-business model with direct data access by the user community.

“Incorrectly” would mean that the system was report-driven and data sets were simply processed and staged to answer the “known.” If the incorrect foundation was laid, then Carol has a much worse problem. If she has the right foundation, she has many opportunities ahead.

This is a common situation in data warehouse implementations, so Carol can take solace that she is not alone. The irony is that this phenomenon is actually a sign of success in the business due to the BI efforts. The original intention of the BI environment was likely to allow access and analysis that were not previously available. The BI capability provided new insights and actions for the business. Over time, the novelty of the insights provided by the BI tool lessens such that what was once deemed new and exciting is now expected. The data warehouse exists to provide insight and drive change, and therefore it must constantly evolve as well.

The good news is that since many others have hit this bump in the road, there are plenty of examples of ways to reenergize the environment. Other companies investigate what reports or analytics are the most popular so the BI teams can focus on how to make them more timely, relevant, or automated. As one company stated, “If you are not making decisions, then stop asking questions. If you are not measuring your results, then stop taking action.” The BI tool needs to be seen as an integral part of understanding the business and directing profitable actions.

Over time, the novelty of the insights provided by the BI tool lessens such that what was once deemed new and exciting is now expected.

While these are some good general ideas that should be explored, there are also some specific actions Carol can take. The first is to understand and educate others; explain that the data warehouse and BI environment is not a “project” but an infrastructure philosophy that is delivered in projects. Carol should have a funnel of “what’s next” so the business community gains new capabilities.

Specific tasks would be to integrate new data elements, increase the timeliness of the data feeds to enable more relevant actions, and increase the data quality and consistency across the model to provide more reliable information. Carol should work with the user community and business owners so they understand
the positive impacts of each project. Many of these actions can be executed in short time frames (four to eight weeks) but deliver big results.

Carol should make sure she measures and communicates business results. This will keep the focus on the benefits of the BI arena and help Carol plan the continued evolution and reinvestment into the environment. Before the new CEO arrives, Carol should go back and work with the users to see how the analytics provided have turned into relevant and profitable actions. What has changed in the business as a result? What metric moved for the better? These results need to be documented and socialized. Carol has to instill an aura of benefit and get business owners who will champion the continued evolution of the BI environment. Documenting the past annual business and BI goals, along with the projects implemented to align to the business goals, goes a long way toward showing that BI provides value and should be supported in the future.

All this is good ammunition to have, but Carol must also understand how the direction of the company can be further supported by the BI environment. Again, assuming the environment was built correctly, as the new CEO comes on board and outlines the new vision for the company, Carol should be prepared to show how the agile and flexible access to corporate-wide data via the BI arena supports the new vision and provides an accelerated path to achieving it with little or no change to the existing data environment.

Carol should also work with applications and user communities that are traditionally not associated with BI. By bringing operational processes that can benefit from timely and corporate-wide data into the fold, Carol will further cement the value and benefit of BI into the company’s, and the CEO’s, future.

Carol has to instill an aura of benefit and get business owners who will champion the continued evolution of the BI environment.

Amr Awadallah

It is indeed possible for BI to become “old news” once it reaches maturity. However, as the introduction mentions, this maturity dilemma is true for any project, not just for BI. There are three types of people needed for any project: creators, builders, and maintainers. I personally like to create and build. I can maintain, but I do not enjoy maintaining. However, there are people who are good at maintaining and like to do it, so I need to complement my team with such individuals. Carol should hire such people, too, for the mature parts of her system.

Regarding the second question, I think most of our BI systems are still years from being mature—at least that is what I am seeing at Yahoo!. There are a number of new problems we need to tackle:

1. **Event-level BI.** Carol must expand the BI systems from aggregate data only to include event data. This can lead to a two-orders-of-magnitude increase in database volumes. Having event-level data allows the BI system to answer any question, and enables advanced data mining and modeling analytics.

2. **Unified data marts (enterprise data warehouse).** Unifying all the data marts for the various product offerings into one system is a never-ending task if the company continues to acquire smaller companies (or gets acquired by a larger one!). In many cases, a federated data model might be a better answer than a unified data model.

3. **Real-time BI.** Carol and her team must deliver the data to the BI systems within no more than five minutes. This is necessary for “active” BI, which enables feeding the data from the BI systems directly into the company’s online products, stores, or management processes.

All that said, losing the support of upper managers who believe in the value of data could, indeed, be a significant problem. If upper management consists of “data-holics,”
then your job becomes easier in terms of securing resources and starting new cutting-edge BI initiatives. I am fortunate to have such data-holics at Yahoo!—may they never be cured of their addiction to data. If the new CEO does not appreciate the value of data, then Carol should be concerned. She might be asked to downsize her group and switch the system to maintenance mode.

Carol needs to prepare herself by working closely with the new CEO and the product teams as they define the overall company road map for the next year. She should then map that to her BI systems and uncover new areas where BI can make a real impact on the top or bottom line. Where can BI help as an active tool instead of being a reactive analytical tool?

If the new CEO does not appreciate the value of data, Carol should educate him or her on the reasons why BI systems are needed:

1. **If you can’t measure it, you can’t fix it.** If there is no active measurement loop for business performance, recognizing too late that a product is seriously broken or a sales region is quickly decelerating means you cannot remedy the problems. BI systems allow us to detect that something is broken, but most importantly, BI gives us the ability to promptly drill down and determine the causes behind these trends.

2. **If you can’t measure it, you can’t grow it.** If the business is doing well, how can you grow it further? You need to see which cities are doing well in terms of sales and why, so that you can learn from that and improve performance in other cities. You need to find out which product features are resonating with users so you can change the other product lines to mimic those features.

Carol needs to prepare herself by working closely with the new CEO and the product teams as they define the overall company road map for the next year.

3. **If you can’t measure it, you can’t build it.** This is the evolution of BI as an “active” component of the processes and products of the company. For example, most online Web sites have what we call “data-as-content” modules that show things such as the top news articles from the last 15 minutes, or how many users commented on your blog posting and from which cities. Furthermore, many online properties dynamically change the layout and ordering of content/modules on the page based on how the users are clicking/interacting with different modules on the page, and so on.

For Carol’s sake, I hope the new CEO understands the value of data. Otherwise, Alpha Manufacturing will be in trouble.

**Matt McGivern**

As IT professionals, we are responsible for bringing new technological innovations to our users. However, this hard work and effort are often forgotten when the next wave of technology emerges in the marketplace.

Currently, Carol is at a crossroads. At Alpha Manufacturing, her earlier business intelligence (BI) innovations have become institutionalized to the point where they are considered just a part of everyday business. This is not a bad thing, however, since the organization most likely could not continue its “business as usual” without the BI and reporting platforms.

It may seem that BI is old news, but that is only because it has become a key part of the organization’s core operations. Once users become hooked on new technological innovations, they often end up taking the innovations for granted as part of daily operations. Over the last two decades, for instance, e-mail has become vital to most businesses. Although many users would consider the technology old news, everyone knows how quickly the help desk gets flooded with calls when the server is down.
Becoming ingrained in business as usual is an important milestone for any technology. Reaching that point means it has proven itself reliable enough to be considered old news, as opposed to something always on the front page due to a never-ending stream of issues. Often, being old news is a very good thing for a system owner: It's a sign they are doing their job!

For argument’s sake, let’s assume BI has become widely adopted within Alpha, but has lost some of its luster. An important thing for Carol to reinforce is that technology is only the enabler here. The organization should be constantly adapting BI requirements and dashboards to meet changing business needs. The Alpha dashboards were designed to help improve critical business processes and, as such, must be kept in lockstep with the business to stay relevant. Therefore, Carol should be working closely with executive management to define new metrics and dashboards that support corporate strategy.

In addition to revitalizing interest in BI by focusing on strategic alignment, Carol should also be listening to her user community to ensure she is delivering a quality product. Issues with data quality, performance, timeliness, and completeness of reporting, as well as availability of source systems, can quickly erode support for a BI initiative.

Carol should be interacting frequently with the core users of the system and seeking ways to expand that group. She should be actively training users on the system and educating the organization about what is currently housed within the existing data stores. Many users may not realize the full extent of the data available within the data warehouse, and are instead focused only on their current reports. By working closely with the business, and educating—or perhaps, reeducating—users, Carol may be able to derive more value from current BI solutions without making investments in additional development.

The arrival of the new CEO offers a great opportunity to place BI squarely in the center of any new strategic initiatives. In preparation for the change, Carol should make sure the rest of the executive team supports the BI platforms. This is important, as they also will need to prepare for the new CEO by providing updated planning, budgeting, and operations reports. If the BI platform supports these efforts, then it is already invaluable to the CEO from day one.

As the new CEO assumes control of the organization, Carol is in a unique position. She has a wealth of organizational knowledge about Alpha’s technology platforms as well as strategic initiatives supported by her dashboards. This knowledge will enable her to help the new CEO as he or she navigates through the organization. In addition, this will help position BI to the CEO as a key repository for tracking new initiatives or strategy changes under consideration.

In summary, Carol’s current position is not uncommon. To remain relevant, owners of BI platforms must be vigilant about staying aligned with the needs of the business. Focusing too much on technology and not enough on strategy will lead to a “cool tool” no one uses, while conversely, focusing too much on strategy and not enough on technology may lead to a platform that can’t deliver on user needs.

Monica Tyson

I do not believe a BI program should become “old news.” It is true that once a project has implemented the tools and associated processes successfully into the organization, the targeted solution may be taken for granted. This should be seen as good news. The BI solution is now considered part of the infrastructure that runs the business.

The first issue I see for Carol and Alpha Manufacturing is that they have treated their BI initiatives as discrete projects and not an overall program. The retirement of the current CEO provides the opportunity to re-launch as a program. Carol should start by learning how the BI solution is used to support business processes, then capture the benefits provided. She should utilize the CEO and other key stakeholders to provide insight into the difference between their day-to-day life now and before the BI solution was implemented. She should ask questions such as: If the BI solution were taken away, what...
would be the impact to your business area?

Next, she should look for opportunities to expand the BI solution:

- Is BI pervasive throughout the organization? Does all reporting and analysis rely on the BI solution?

- Has the organization outgrown the initial tools provided? Is it ready for more advanced analysis or different ways to represent the data, such as visualization?

- Are the results of the analysis efforts captured back into the data warehouse?

- Are there operational applications that could benefit from data that exists within the data warehouse?

- Do current users have ideas about how to improve the environment?

Carol can also conduct assessments of the current solution to generate ideas. The assessment might compare Alpha’s solution to a BI maturity model or to best practices. There may be an opportunity to expand the portfolio to include other responsibilities such as master data management.

In looking for potential opportunities, remember that any proposed initiative should be business-driven. Introducing new technology for technology’s sake, and not to serve a business purpose, is the equivalent of “fool’s gold”—flashy, but of no value.

Now is the time to think in terms of marketing. Seek out and gather from users stories of how they are using the solution. If Alpha Manufacturing has an internal newsletter, suggest a series of articles focusing on different business areas and how they utilize BI. Strive to get the business areas talking about how they are utilizing the system. Encourage the sharing of ideas and success stories across departments.

To remain relevant, owners of BI platforms must be vigilant about staying aligned with the needs of the business.

Since the BI solution has been successful, Carol could work with the finance department to conduct a post-implementation review, including quantifying the return on investment.

In addition to reviewing the past, it is also important to focus on the future. Develop a road map for the program that focuses on two key areas: base activities and projects. Base activities include both day-to-day support as well as incremental changes implemented to improve and extend the existing solutions. Base activities ensure the solution continues to grow to match the needs of the business as its sophistication increases.

Since Carol has a good relationship with the current CEO, she could meet with him to offer assistance in pulling together information for the new CEO to aid in the transition. Carol could also meet with other business executives to understand what information they are planning to pull together for the new CEO; the BI solution should be a critical resource in this process.

Carol should offer to give the new CEO a presentation on the BI solution and utilize the presentation to talk about both past successes and the future road map as well as solicit new ideas and priority areas of focus. She should specifically highlight the successful track record as an indication that any new BI project should be considered as both low-risk and potentially highly visible to the organization (which garners the attention of any new executive looking to have a successful project early on in his or her tenure).

The bottom line is that Carol can use this opportunity to launch the Alpha Manufacturing BI program. She can get the business areas talking about the solution (both the successes of the past and the plans for the future) and get ready to expand the solution as required to meet the expectations of the new CEO.

To remain relevant, owners of BI platforms must be vigilant about staying aligned with the needs of the business.
Achieving a High-Performance Supply Chain: Sharing Information with Partners

Alan Eisman

Abstract
Companies have long relied on BI to measure the performance of their internal operations and ensure profitability. As companies outsource more aspects of their business, they must extend their visibility into the operations of partners up- and downstream. They must build trust and be willing to share business strategies and operations information that previously would have been considered privileged.

This article looks at using balanced scorecards, key performance indicators, and BI dashboards to improve efficiency throughout the supply chain, reducing inventories without endangering customer delivery. We look at how to align these metrics with company goals and how to communicate vital information with supply chain partners. We also include an example of how a company might use a BI dashboard to drill down and locate a manufacturing problem that is causing the company to miss its profitability target.

Companies have traditionally used business intelligence (BI) primarily to monitor their data and measure the performance of their internal business operations. As companies outsource more aspects of their operations, they must share information and align activities among all the entities that make up the supply chain.

Past efforts to improve quality have focused on the total quality management (TQM) approach and on cutting costs by eliminating excess inventory though just-in-time manufacturing. These were important first steps, but they are not enough for today’s business environment.
Supply Chains and BI

Competitive advantage lies in finding or creating a customer need and rapidly assembling the components necessary to fill it.

The older model of supply chain management may be compared to the way early studios produced motion pictures. The studio would have a crew of writers, directors, actors, and technicians under contract to work on any project the studio boss ordered. When a studio produces a movie today, it assembles a select team of individuals and organizations with the skills required to work on the specific film. Sit through the credits of any summer blockbuster and you will see the names of hundreds of freelancers and dozens of firms who worked together on the movie.

Executives of all types of organizations need to think like modern moviemakers. Much of the work is done internally, but a rising percentage is done on a contract basis. Executives must select the right partners, share information with all involved, and gain visibility into all levels of the supply chain. Companies that effectively execute their strategies across the extended enterprise can expect impressive performance premiums. The list below is based on nearly 1,000 benchmarks done by the Performance Measurement Group (PMG; pmgbenchmarking.com). They found that “Best in Class” performers versus median performers in their peer groups:

- Have 22 percent lower supply chain costs, or save 2–3 percent of revenue
- Have 50 percent lower material acquisition costs
- Have 55–70 percent lower total days of inventory
- Have 70–80 percent lower order management costs than the median
- Have lead times 2.5 shorter than the median
- Have an on-time delivery advantage of 10–20 percent

Balancing Act

Effective management of supply chain performance requires a careful balance of competing business needs.
Supply Chain and BI

The finance department, for example, wants to minimize inventory, but the sales department wants adequate finished stock on hand to rapidly fill any customer order. When competitors are only a mouse-click away, companies need to find a way to meet both needs.

Customer satisfaction and retention depend on perfect order fulfillment: delivering all of the items requested, in the right quantities, on time, and with zero defects. Given enough lead time and cash reserves, a company can achieve perfect order fulfillment. Unfortunately, customers expect delivery in a much shorter time frame than it takes to manufacture products. To accommodate fluctuations in demand, safety stock inventory must be kept at various stages throughout the supply chain.

Maintaining excess inventory, however, conflicts with the goal of maximizing inventory turnover and return on assets. This conflict can be resolved only by improving the granularity of data used for decision making. Activity-based costing (ABC)—breaking down cost metrics to the lowest level and by customer across the supply chain—identifies the individual costs and inefficiencies associated with individual customer buying patterns. Using ABC at all levels, and sharing this information throughout the supply chain, lets all participants work in unison to reduce costs without adversely affecting delivery performance.

PMG has identified the high-level measures that need to be balanced and aligned with the business strategy and organizational model (see Figure 1). These metrics, which are based on its Supply Chain Operations Reference Model (SCOR), are then broken down into level 2 and level 3 component metrics.

**Risky Business**

Achieving supply chain efficiency within an organization requires strong leadership to unite the different groups in achieving the overall corporate goals and business strategies. Incentives can be designed to reward the individual unit’s performance as well as its contribution to the broader objectives of profitability, return on assets, and stock price. When dealing with outside suppliers (who are also looking to maximize their profitability, return on assets, and stock price), the job is much harder and becomes one of managing risk.

Companies have several options for managing the risks posed by breakdowns in the supply chain. Maintaining a safety stock is one option. This is good for evening out short-term fluctuations in demand, but it does tie up

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**Figure 2:** Companies can take action to minimize supply chain risks

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance contracts with suppliers or service providers</td>
<td>54%</td>
</tr>
<tr>
<td>Alerting customers well ahead of time to potential concerns</td>
<td>38%</td>
</tr>
<tr>
<td>Redundant suppliers/product designs</td>
<td>37%</td>
</tr>
<tr>
<td>Passing price increases through to customers</td>
<td>35%</td>
</tr>
<tr>
<td>Vertical integration</td>
<td>29%</td>
</tr>
<tr>
<td>Currency hedges (e.g., foreign exchange)</td>
<td>25%</td>
</tr>
<tr>
<td>Insurance</td>
<td>20%</td>
</tr>
<tr>
<td>Commodity hedges (e.g., options, collars, forward buys)</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>9%</td>
</tr>
</tbody>
</table>
Tracking Down Lost Profits

This example shows how a company can use BI software to improve its supply chain. The screenshots were generated using Information Builders’ WebFOCUS Performance Management Framework (PMF).

Figure 1 shows a user’s personalized dashboard containing only relevant KPIs, alerts, and graphs. As needed, the user can drill down for more detail, including metrics data, alerts, trends, projects, and commentary.

In this example, the profit per customer measure, although up over the previous quarter (33.5 percent to 36.2 percent), is still underperforming. Looking at the other measures, the company has reduced its operating cost per customer, which should help the profits, but the revenue per existing customer has dropped. The user could then drill down through the chain of information to determine whether a particular division or product is responsible for the poor profits, and then take action accordingly.

Figure 2 takes a deeper look at the stalled profitability target. Here we see that three causal objectives were assigned to that target: improving sales, increasing the margins percentage, and reducing the number of customer returns. This screen shows that the sales and margins are up, but so are the returns. This identifies customer returns as the likely cause of the poor profits. Drilling down further into the customer returns would identify that product quality is the cause. The user could then continue the process to identify which particular products, suppliers, or plants are responsible, and which customer orders are being affected.

Figure 3 shows the complete balanced scorecard. On the left are the four main areas (financial; customers; internal processes; learning and growth). In the field to the right are the measured components of that scorecard and how they relate to each other. Here we see that the profitability target in the financial area (the gray oval at the top) is directly related to stalled targets in each of the other three areas: improve staff proficiency (learning and growth), improve product quality (internal process), and customer returns down (customer). As this shows, improving staff proficiency should lead to improved product quality, fewer returns, and thus higher profit.

Looking next at the green targets, we see that employee attrition is down and employee training time is up, both of which should lead to improved proficiency and higher-quality products. We also see that product assembly time is down, which is also a desirable goal. However, since the proficiency and quality are down, this might lead the user to investigate whether workers are rushing to meet production goals (sales are up 15 percent), resulting in more errors. If this is the case, investing in more personnel may be necessary to meet the profitability goal.
capital, and there is a risk of ending up with inventory that cannot be sold. Other risks to take into account include the availability of quality labor, commodity shortages, fluctuations in prices and exchange rates, obsolescence, political instability, natural disasters, and plant breakdowns.

No single strategy will mitigate all these risks. Recently, two-thirds of respondents to a 2006 McKinsey & Company quarterly global survey said that risks to their supply chain had increased over the previous five years. They were taking a variety of approaches to reduce those risks, including commodity hedges (15 percent), insurance (20 percent), and currency hedges (25 percent). See Figure 2 (page 31).

The most common actions, however, did not ensure against disaster, but took steps to improve the performance of the supply chain. More than half (54 percent) of the companies had established performance contracts with their suppliers or service providers. The next two most common approaches, each being taken by nearly 40 percent of the companies, established redundant suppliers and product designs, and alerted customers to potential concerns well ahead of time.

These risk mitigation strategies work only when all members of the extended supply chain work together to align their goals and mitigate risk. According to AMR Research, best practices include having a formal sales and operations planning
process, and sharing forecasts and replenishment plans with customers, suppliers, and logistics providers.

Achieving this level of coordination among all participants in the supply chain requires adopting a new strategy. Collaborative Planning, Forecasting, and Replenishment (CPFR) is a concept that seeks cooperative management of inventory by replenishing products throughout the supply chain.

CPFR originated in the mid-1990s as a framework for sharing information between business partners in the supply chain. The initial funding came from firms such as Wal-Mart and IBM, and CPFR is now managed by a committee of the Voluntary Interindustry Commerce Solutions (VICS) association (www.vics.org/committees/cpfr). VICS released its first standards in 1998, and more than 300 companies have implemented them. CPFR links sales and marketing activities (sales, promotions, and other retail events) with supply chain planning and execution to ensure optimum levels of inventory at each level of the supply chain. VICS has developed CPFR Business Message Standards and CPFR XML Schemas to make it easier to exchange information.

With CPFR, suppliers and retailers share information in real time in order to plan for and satisfy customer demands. This makes the supply chain process more efficient by:

- Decreasing inventory, logistics, and transportation
- Improving the flow of goods from raw material suppliers and manufacturers to retailers
- Quickly identifying discrepancies in forecasts, inventory, and order data so problems can be corrected before they impact sales or profits
- Gaining up-front agreements—SLA scorecards
- Sharing information and fostering collaboration
- Responding to and measuring issues as well as improving processes

CPFR can even eliminate entire steps from the process of delivering products to customers. For example, one of Information Builders’ clients is a large distributor of office supplies and furniture whose major customers are office supply superstores. This distributor ships 640,000 order lines per day through 64 warehouses. In addition to shipping products to the superstores for retail sales, the company also drop ships directly to those superstores’ commercial customers, reducing shipping, stocking, and warehousing costs.

**The Key to Building Trust**

Achieving this level of cooperation between supplier and retailer requires both information sharing and real trust. In effect, the retailer must entrust its customer relationship to the supplier. This trust is developed initially through shared goals so that otherwise-conflicting objectives of agility versus cost and efficiency versus effectiveness are balanced.

Shared goals are not enough. Those goals must be backed up by hard facts that are openly communicated. So, while there is a tendency to try to preserve the confidentiality of business information, this doesn’t work when trying to create a high-performance supply chain.
To build trust, secrecy must give way to openness and transparency. Dov Seidman, chairman of the corporate governance firm LRN Corporation, described the relationship between communication and trust in his 2007 book *How: Why How We Do Anything Means Everything ... in Business (and in Life)*. In a chapter discussing transparency, Seidman cites the results of a survey conducted in 2002 by professors Jeffrey H. Dyer of the Marriott School at Brigham Young University and Wujin Chu of the College of Business Administration at Seoul National University:

Dyer and Chu surveyed almost 350 buyer/supplier relationships involving eight automakers in the United States, Japan, and South Korea and found a direct and dramatic relationship between trust and transaction costs. The least trusted buyer incurred procurement costs six times higher than the most trusted: same parts; same sorts of transactions. These additional costs came from added resources that went into the selection, negotiation, and compliance costs of executing deals. Dyer and Chu point to Nobel Prize–winning economist Douglas C. North’s findings that these sorts of transaction costs account for more than a third of all business activity and that the least-trusted companies were the least profitable.

To optimize supply chains, companies must communicate their strategies, performance goals, key performance indicators (KPIs), and operational information with their partners. This ensures that the necessary alignment is in place and that all stakeholders are pulling in the same direction. The operational information enables agile, real-time collaboration. The KPIs show whether the strategic goals are being achieved so tactics can be adjusted as needed.

**Setting Up the Scorecard**

Before it can share—or even measure—its KPIs, an organization needs to take a clear look at its strategy and define what it is uniquely qualified to do. Anything else can be jettisoned and outsourced.

Take a look at the PC market, for example. IBM sold its PC manufacturing business to Acer so it could concentrate...
on its services offerings. Apple Inc. dropped the word “Computer” from its corporate name because of its move into music. Dell Inc. has opened new manufacturing plants in North Carolina and Brazil. Although each of these firms is still in the PC business, each would have different metrics to match its strategy.

The most common methodology for developing and implementing strategy is the balanced scorecard approach, developed in the early 1990s by Robert Kaplan and David Norton. As Kaplan and Norton described it in their book, *The Balanced Scorecard: Translating Strategy into Action* (1996):

The Balanced Scorecard complements financial measures of past performance with measures of the drivers of future performance. The objectives and measures of the scorecard are derived from an organization’s vision and strategy.

Balanced scorecards measure performance in four areas:

- Financial
- Customer
- Internal business process
- Learning and growth

In developing a scorecard, companies need to select a few themes that will guide the inevitable trade-offs among objectives and resource allocations (Table 1, previous page). These objectives are then assigned measures and targets so progress can be measured. The objectives, their metrics, and the targets are then grouped into the four scorecard perspectives and loaded into a performance management database.

Every business, even those within the same industry, would have a different set of objectives, targets, and metrics. In the PC example just described, IBM might look at maximizing PCs’ value in an enterprise setting, Dell at delivering more value for consumers at a lower price point, and Apple at how well its iMac/iPod/iPhone/iTunes products operate together to create a seamless media environment.

After completing these preliminary steps, a company must take action to get its data into the hands of decision makers. A business intelligence (BI) system can be used to take raw data from the enterprise systems and put it into a form that guides day-to-day operations. Dashboards and KPIs inform people on the front lines as to how they are doing, and analytic tools let them drill down into the details that uncover the root causes of any performance problems. Management uses the data to further define strategies and implement new initiatives aimed at improving performance.

Providing staff at all levels of the organization with real-time information appropriate to their level allows workers to align their activities to the overall company strategies and goals, resulting in improved performance.

As Kaplan and Norton explained, by using the balanced scorecard:

> Corporate executives can now measure how their business units create value for current and future customers and how they must enhance internal capabilities and the investment in people, systems, and procedures necessary to improve future performance. The Balanced Scorecard captures the critical value-creation activities created by skilled, motivated organizational participants.

**From Planning to Action**

Developing the basic strategies and goals is an essential step in creating a high-performance supply chain, but this is not enough. The stakeholders need tools that let them execute on the enterprise’s organizational plans.

These tools must communicate performance information through intuitive and personalized dashboards. Since all stakeholders will ultimately use these tools, implementation should require no training, be strictly browser-based (without plug-ins), adhere to the strictest security standards, and be highly scalable. The personalization should give each user instant access to the KPIs, alerts, and drill...
paths they need to do their own jobs, without complexity and clutter, while also allowing them to seamlessly collaborate with others. For advanced users, the dashboards should provide comprehensive analytical tools that enable them to drill down anywhere and evaluate trends.

To provide coordination and alignment, those dashboards and analytics must be part of a common framework for the entire organization. A framework provides one lingua franca necessary to maintain order and context (in contrast to each group presenting its own departmental numbers in the most favorable light). For example, an individual employee’s scorecard must align with and help to accomplish departmental goals, which must contribute to the enterprise goals. Staff at every level must be able to examine how these all work together.

A true performance management system must oversee all business-unit operational systems. It needs to evenly and objectively manage the indicators and plans of each unit, and it needs to review each unit’s key performance indicators and objectives within the context of the organization as a whole.

Providing staff at all levels of the organization with real-time information appropriate to their level allows workers to align their activities to the overall company strategies and goals, resulting in improved performance.

A high-performance supply chain can be achieved only when goals and strategies are aligned across all supply chain stakeholders. This alignment is made possible through BI software and real-time data sharing. As each participant optimizes his or her level of service and integrates it seamlessly with others in the supply chain, otherwise-conflicting objectives can be balanced and the goals of all stakeholders can be realized.

References


Virtual Prototyping: Bridging the Business/IT Gap

Jeff Reagan

Abstract
Many companies that embark on business intelligence (BI) initiatives experience serious setbacks to project budgets and timelines. Recent research reveals that “efforts to eliminate time and cost overruns in business intelligence and data warehousing projects are mostly unsuccessful.” In fact, these issues are so common that 62 percent of those surveyed factor delays and cost overruns into the budgets for data warehouse projects (Havenstein, 2007).

One of the many factors that contribute to the high costs and missed deadlines of BI projects is a lack of alignment between the business and information technology (IT). Prototyping is one way to bridge the gap between business and IT and regain control over BI projects. Prototypes provide a means to validate business requirements, design decisions, and data quality issues before the final product or service is delivered. Prototypes can also be controversial: their associated time and cost are perceived to be prohibitive, and the risks may outweigh the prototype’s benefits.

In this article, we explore the use of a virtual prototyping warehouse (VPW), created using data federation technology, to achieve the same goals as a physical prototype but at a fraction of the cost and time.

Introduction
Business intelligence is not driven by IT alone. Many business initiatives require access to data across many sources to drive profits and reduce costs. Among the common drivers are:

- Management: planning, budgeting, and forecasting
- Marketing: marketing analysis, customer segmentation, direct marketing
Operations: risk reduction, quality improvement, asset reduction

Each of these business drivers requires specific information reported in very specific ways to gain the promised returns. Unfortunately, capturing requirements and consolidating data is not an easy task. Despite the challenges, these strategic projects are a must if an organization is to gain a competitive advantage. Although the challenges come in many shapes and sizes, a few stand out because they are both common and difficult to overcome:

- Communication gaps between business and IT (referred to as the business/IT gap)
- Changing requirements during development due to long project duration
- Difficulty integrating technology from multiple vendors
- Complications from dealing with multiple, disparate data sources
- Unsatisfactory data quality

Of these obstacles, the business/IT gap has the greatest negative impact, both because the problem runs so deep and because it affects BI projects at so many points within the development cycle. The virtual prototyping warehouse (VPW) development environment provides a powerful way to overcome this issue by enabling:

- More accurate determination of functional requirements through input from business early in the project
- Access by business users to integrated data throughout development
- Early identification of data quality and standardization issues
- A faster return on investment

Formally defined, a physical prototype is an original or model upon which the final project is based. In a data-sharing project, a prototype can be used to validate design decisions, test the alignment of design to business needs, and ensure that data quality is satisfactory. However, some people view prototypes as counterproductive because of the additional cost and impact on project deadlines from a prototype’s development. Many people simply do not want to do the work twice, fearing that the prototype will fail and the effort and resources will be wasted.

A virtual prototype’s goals and use are similar to those of a physical prototype. However, the two prototyping methods vary greatly in their implementation. Whereas physical prototypes require new physical data structures, data movement, and data access methods, virtual prototypes do not move data; they use existing data structures, and they access data via federation technologies. These differences help to overcome many—if not all—of the challenges physical prototypes typically present.

The Great Divide: Business versus IT

Business users communicate daily with IT about needs, business initiatives, and IT solutions. Unfortunately, what business says and IT hears are often different. This lack of understanding causes a gap that is often too wide to overcome, putting projects (particularly BI initiatives) at risk.

Some communication issues stem from misconceptions about what motivates the other party. Business users often perceive IT staff as inflexible and wanting technology solely for technology’s sake. They believe IT doesn’t understand the business and doesn’t interact well with others. On the other hand, IT perceives that business people refuse to learn anything about IT but act like they are knowledgeable and resist innovation. IT professionals believe business people are money-driven and value image over substance.

This lack of understanding and frequent miscommunication becomes detrimental during the project’s requirements-gathering stage. Because requirements are often lost in translation, IT can go down the wrong
development path. If business users are not actively involved in the development process, those errors can go undetected until the project is completed. Once they are uncovered, IT may be forced to start over to correct them.

**Bridging the Business/IT Gap: Virtual Prototyping**

A virtual prototype can be a highly successful way to bridge the business/IT gap, helping business and IT to successfully complete BI initiatives.

Business users can be involved earlier in the development of the solution, ensuring that what IT builds is what the business needs. It also allows all stakeholders to identify and avoid costly mistakes before they are made.

A VPW can overcome the common fears about prototypes. It uses federated technology and avoids the cost and effort of physical development. Hardware and software costs are significantly lower, and resource usage is dramatically lower because business requirements are more readily captured and vetted by users.

A VPW differs from a physical prototype in several ways:

- The VPW does not permanently store data; it leaves data at the source and accesses it only as needed to fulfill a user request

- It is not intended for full-scale production use and thus is not concerned with performance, resulting in lower hardware costs

- It can be created in a fraction of the time it takes to create a physical prototype, making it cost-effective

- The main objective of a VPW is business validation; it helps business users visualize the end result in a tangible way so they can actively participate in testing throughout the development cycle

**Benefits**

The VPW helps mitigate risk and bridge the business/IT gap. Business users can be involved earlier in the development of the solution, ensuring that what IT builds is what the business needs. It also allows all stakeholders to identify and avoid costly mistakes before they are made.

From a project-management perspective, the VPW helps reduce the risk of missed deadlines by providing more precise information on which to base accurate and achievable project timelines. Furthermore, it provides a method to quickly uncover and find workarounds for project showstoppers (e.g., data quality issues).

After an initial short exercise to create the prototype, the VPW aids project approval by allowing key stakeholders (including executives) to see the value of the target data model or repository up front and to determine whether it meets their requirements. Because the VPW is tangible, users can clearly see the capabilities they will receive, and decision makers can visualize the potential benefits. With this invaluable example, buy-in is much more easily achieved and continues throughout the project lifecycle.

In addition, this approach allows IT to fine-tune requirements to make sure they deliver what business users want. To further facilitate organizational support, the VPW can be tweaked to provide specific information to appeal to different stakeholders. For example, one view can be prototyped to convey a targeted message to C-level executives and a separate view can be generated from sales data to show value to regional sales managers.

A VPW that is developed at the beginning of a BI project will yield benefits throughout the entire development cycle. A VPW complements most data management tools, accelerates the implementation of the BI solution, and helps improve the overall performance of the end product.
Figure 1 demonstrates a typical BI development process that utilizes many of the more popular categories of data management tools. It describes the benefits that can be achieved at each phase.

Thanks to their ease of development, VPWs can be used after project implementation to develop and manage an ongoing change management strategy to keep up with changing business requirements.

**Potential Pitfalls**

VPWs have many benefits, but they are not without risk. For example, what if users like the VPW so much that they begin to question the need for a production data warehouse? To prevent this, set expectations early in the project, emphasizing that the intention is not to use the VPW in a production environment but rather to validate business requirements.

There are several reasons why a VPW should not be used in place of the production data warehouse. First, owners of operational applications will likely not want to compete against VPW users for their computing resources on an ongoing basis. Second, the query performance of a VPW will never match that of a physical data warehouse, which uses optimized indexing. Finally, a VPW offers no true data persistence and therefore no mechanism to handle slowly changing dimensions.

Another concern arises when the VPW produces different information from the existing BI, data warehouse, data mart, or OLAP applications. This can be viewed as either an opportunity or a risk, as it may introduce doubt about previously trusted information sources. One way to address this scenario is to proactively create an environment that promotes a “culture of opportunity” where the users are enabled and emboldened to help clean up “dirty data.” By giving users a more active role in data stewardship and data ownership, tactical and strategic company metrics will more closely match actual results, and better decisions can be made.

Another potential pitfall of a VPW is the effect it may have on existing applications that access the

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**Figure 1:** A virtual prototyping warehouse provides benefits at multiple phases of the development cycle

<table>
<thead>
<tr>
<th>ASSESSMENT AND PLANNING</th>
<th>DESIGN AND DEVELOPMENT</th>
<th>DEPLOYMENT AND MAINTENANCE</th>
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<td>Discovery</td>
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<td>Profiling tools</td>
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<tr>
<td>Virtual prototyping</td>
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<td>EII / federated application</td>
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**Virtual Prototyping Warehouse**

**Business benefits:**
- Business user review and validation of required data elements
- Validate perceived mapping relationships to ensure mapped columns are used appropriately
- Further leverage for ad hoc report requirements

**IT benefits:**
- More accurately determine functional requirements with necessary input
- Discover source-to-target transformation requirements by visualizing the data
- Highlight data quality and standardization issues by visualizing data
- Assist in design of production requirements based on known requirements and challenges
- Streamline ETL process by providing a single, consistent view for ETL tool to interface with individual data sources

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**Figure 1:** A virtual prototyping warehouse provides benefits at multiple phases of the development cycle.
same data sources. Because virtual prototyping allows developers and users to directly access operational data sources, resources may become constrained, negatively affecting primary users of the data. This risk can be reduced by allowing the federated queries to run only during non-peak hours or by carefully monitoring their resource consumption.

A fourth potential pitfall of using a VPW is that it may contribute to “scope creep.” As users access data they’ve never seen before, they will want to see and explore even more. To counter this situation—which many would not consider detrimental to the project—put controls in place to keep developers and business users focused on the project requirements. Virtual prototyping should be viewed as both a tool for exploration and as a means to quickly validate existing requirements—with emphasis on the latter for project-related work.

**Improving Business Value**

The direct result of a VPW is ease of communication, but a more powerful effect is improved business value. The intangible benefits described thus far ultimately lead to real dollars saved through greater support and involvement from executives, improved requirements gathering, properly directed development efforts, less rework, and faster implementation.

“Time to value” is a driving component of improved business value. If it takes two years to roll out an enterprise data warehouse, or six months for a line-of-business data mart, the effective business value is reduced by the opportunities that are missed during these long development cycles. The traditional “waterfall” approach to project management often leads to such lengthy development cycles (Royce, 1970).

Figure 2 shows how the traditional implementation process addresses user testing and changes once the development cycle is almost complete. This static, “waterfall” approach to project management manifests the shortcomings outlined earlier.

Conversely, an implementation that utilizes a VPW involves users for testing and validation early in the development cycle, and keeps them involved throughout (see Figure 3). This project management model can be iterated as often as necessary to achieve the desired results, and helps to build a better relationship between the business group and IT.

As a result, choosing to create a VPW before rolling out a static production version reduces the time, effort, cost, and risk related to BI initiatives or data-sharing implementations. As shown in Figure 4, the VPW provides ROI to the business community sooner. In
addition, it maximizes the value of many BI or related initiatives, including:

- **Business performance management (BPM)**: At the top of the business intelligence food chain, a BPM application relies on solid metrics and requirements to drive the business effectively. The underlying data structures needed to populate a BPM application can be derived more quickly and accurately using a VPW, with quicker buy-in and ROI to executive management.

- **Enterprise data warehousing (EDW)**: The high demands on reporting for business intelligence require integrated data from many disparate data sources. A VPW provides a mechanism early in the development process so business stakeholders can identify what data should be included in and excluded from the final data warehouse design.

- **Data marts**: As with enterprise data warehousing initiatives, line-of-business data marts require discovery and integration from multiple sources and typically have a shorter time frame for implementation. These factors make a strong case for virtual prototyping.

- **Enterprise architecture**: A VPW enables an organization to quickly document what information exists within baseline systems, helping it to better structure its enterprise MDM initiatives. Organizations of all types and sizes want to gain a better understanding of what data they have and where it exists, and store that information in a master repository or an operational data store (ODS). Virtual prototyping facilitates a quicker turnaround.

**Using VPW**

The following scenarios illustrate how a VPW can help bridge the business/IT gap and cement a positive relationship between the two groups, resulting in more successful projects.

**Business-Case Justification**

When IT project prioritization and funding is a challenge, simplifying the approval process for IT projects is a must. Early in the development cycle or as a pilot, the VPW can be used to justify the data consolidation projects. Furthermore, the VPW provides a way to more accurately predict costs and enables the business to apply appropriate budgeting.

**Reverse-Engineer Production Systems Requirements**

With a VPW, IT organizations can quickly build multiple views of the enterprise data to help them better understand
business requirements. With samples of a finished data warehouse, IT can work closely with business users to build use-case scenarios that describe how the business would use each configuration. The business can define what data they want and what type of performance they expect, giving IT clear instructions on how to tweak the final product.

For example, a customer service representative may need real-time access to all customer data to address inbound support calls, so a full-scale data warehouse would be necessary. Business and IT can work together to define the criteria, identifying scales of timeliness and breadth of information to generate the right solution for each business scenario.

Prototype for Production System
Because a VPW creates a single but flexible view of the data, it is ideal for testing and verification at both the business and IT levels. This functionality enables potential modifications to be identified, modeled, reviewed, and approved more quickly and at less cost than other methods.

When building a data warehouse or data mart, testing typically does not begin until a solution is nearly complete. Developers may have to start over to correct errors, adding both time and cost to the project. A VPW enables users to create a replica of the target system in a fraction of the time and cost it takes to create the production system.

A VPW enables testing sooner and at various levels of the production system (such as sizing, tuning, security, validation of mapping relationships, and identification of data quality or standardization issues) and verifies the data to be included in production system.

Working Example: Virtual Prototyping Warehouse
The first step in designing and building a data warehouse is requirements gathering, including the identification of key data sources and the warehouse’s key performance indicators (KPIs). Automated mapping and data-profiling tools can help identify key data sources, but some domain knowledge is necessary to pare all of the enterprise’s data sources into a manageable, useful list that corresponds to the initial business requirements for the data warehouse or data mart.

Once the data sources have been identified, KPIs should be outlined. KPIs are quantifiable, agreed-upon measurements that reflect the critical success factors of the data warehouse initiative. In a data warehouse, KPIs are typically numeric values or facts that users can slice and dice by various dimensions. Typical dimensions include time, geography, customers, products, and employees.
The goal of a VPW is to validate the data sources for KPIs and help determine the data sources for the needed dimensions and associated drill-down hierarchies.

A common data warehouse KPI is the time dimension. Time dimensions are standard in their granularity (year, quarter, month, week, day, and so on), but other dimensions will likely be unique to every business. Thus, the “discovery” of these dimensions is fundamental to understanding the KPIs that drive the business. As a best practice, we suggest breaking the task of discovering these operational dimensions into manageable chunks, one dimension at a time. Rather than prototyping an entire star schema (the most common data warehouse schema) with all of the final dimensions, start small and prototype one dimension at a time, including the measures that form the basis of your KPIs for each dimension.

When prototyping dimensions, strive for consistent dimension naming and values that are recognizable and visible across the entire enterprise—what are called conformed dimensions. For example, one area of the business might view the “western region” as simply “west,” while another might view this as “California.”

A common dimension that can span many data sources is the customer dimension. Customer name and region might come from one data source, customer sales measures from a second, and customer type from a third. The data would be related by primary and foreign keys.

Virtual prototyping allows the data warehouse designer to issue federated queries across the enterprise and return all values of interest from all of the candidate dimension data sources. This will allow a consistent set of dimension values to be agreed upon by all parties. This is also needed to create consistent hierarchies within each dimension. Failure to do so may lead to invalid aggregate values and inconsistent rollups when fact tables are designed, built, populated, and queried.

Once the requirements-gathering phase is complete, the following basic steps should be considered when implementing a prototype:

1. **Create ODBC/JDBC connections**: ODBC or JDBC connections to each data source enable subsequent discovery of the conformed dimensions (and the associated KPIs). This can be a manual or
2. Profile and discover: After the data source connections have been established, either use an automated data mapping tool (with data federation capabilities or a bridge to a data federation technology) or manually discover and use a data federation technology. The automated mapping and discovery tool will retrieve data-source schemas, their relationships, and basic data profiling data. A data federation tool will typically retrieve only data source schema information.

3. Identify tables of interest: Once the data source catalogs and schemas have been retrieved from the candidate data sources, identify tables of interest. Much of the heavy lifting can be handled by automated mapping and discovery tools, but some domain knowledge is required to finalize relationships. If only the data federation technology is available, the process can be manual and time-consuming.

4. Determine relationships and mappings: A key component of the discovery process is identifying the primary and foreign keys (or other join criteria) for the tables of interest. An automated data mapping tool will discover most of these intrinsic relationships, or the relationships can be manually inferred by writing SQL queries.

5. Build federated queries: Once an understanding of the data sources has been gleaned, the VPW designer can design and build the federated queries needed to further explore the candidate data sources for dimensional data and fact table measures (KPIs).

6. Evaluate the results: Evaluating the query results includes looking for consistency of data values; understanding the definition of the data; and evaluating the frequency distribution and data latency (e.g., date/time stamps). Get the most up-to-date and consistent data to determine the proper attributes and their sources for use in the conformed dimensions.

7. Create and publish federated views: Select the chosen dimension attributes and combine them in a series of saved, federated SQL queries. These federated views must include the appropriate fact table measure columns (KPIs) and be grouped in the SQL statement by dimension. Check that the results are reasonable and that the KPIs are accurate.

8. User validation: Once the VPW has been validated by IT staff, release it to end users. Typically, all that is required for access to the VPW is an ODBC/JDBC connection to the data federation server and a BI analytic tool. Because it is not optimized for performance, a VPW will not offer the same query response or permanent data storage as a normal data warehouse or data mart, but the VPW will provide a much quicker mechanism of validation for the business community, without the overhead and cost of building a complete data warehouse or data mart.

Although this is only an example, locating the correct data is a common goal for virtual prototyping. This can be accomplished only by accessing the relevant data sources using a single federated query. Users can view the results and judge whether the desired information has been captured.

Virtual Prototyping: Key Features
To realize the full potential of the VPW, embed it in the corporate culture as a best practice, and make it part of the project management methodology.

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selecting data federation tools or building a virtual prototyping framework:

- **Data federation capabilities with automatic determination of data relationships across data source tables and columns**: Data federation is the key enabling technology for virtual prototyping. The technology should provide the technical basis to query heterogeneous data sources concurrently and return the result set as a single view of data, with intelligent data source tagging. The technology should also automatically determine data relationships across data source tables and columns.

- **An intuitive, user-friendly interface with instantaneous “what-if” analysis capability**: This allows rapid data visualization and the quick building of virtual views that include or exclude specific data sources or elements.

- **Compatibility with common reporting and analytic tools**: The data federation engine must support ODBC or JDBC access (preferably both) so that views created and published through the data federation interface can be treated as a single data source in most applications.

- **The option to share metadata with other data-sharing products**: One of the benefits of virtual prototyping is its ability to capture new metadata and business definitions for data elements. The ability to share this information with other data-sharing initiatives via metadata repositories helps leverage and show value to the virtual prototyping environment.

- **Automatic configuration and provision of ETL processes with other products**: For virtual prototyping of OLTP or operational systems, the automatic configuration and provisioning of ETL sessions, processes, and pipelines with other products allows
organizations to leverage any relationships discovered during the prototyping.

- **A small footprint, eliminating the need for large capital hardware expenditures:** The ability to install the data federation engine on an existing server or hardware platform is one of its benefits. Queries to the data federation server are then issued from client workstations, requiring only an ODBC or JDBC connection.

One of the benefits of virtual prototyping is its ability to capture new metadata and business definitions for data elements.

In addition to these key features, the organization must build a technical architecture to support a virtual prototyping environment (see Figure 6). Such an architecture should provide access to all of the necessary data sources. Standard query tools should be used to access the federated views, and the architecture should support interfaces to third-party tools such as ASG Rochade, CA-ERWIN, and Informatica. Once the necessary metadata has been collected, and the dimensional and fact data have been validated, you can build physical models and deploy BI applications more quickly than with typical prototyping methods that use waterfall project management techniques.

**Conclusion**

The implementation best practices and business cases described here demonstrate how building a VPW can benefit organizations in any development phase. Through cost reduction, accelerated time frames, and greater involvement from business stakeholders, BI projects have a better chance of succeeding with virtual prototyping.

In November 2005, analyst firm Gartner agreed that using a prototype (which it defines as “an iterative or spiral approach, but allows for adaptation of requirements based on customer feedback from prototype-assisted design reviews”) yields a more than 10 percent improvement in development productivity compared to the more traditional “waterfall” project management method (Duggan, Hotle, Light, and Solon, 2005).

Lowering the total cost of delivery and enabling business users with better data (knowledge) faster and sooner (access) and with consistent results (reliability) should be the goal for all business intelligence and data integration projects. Virtual prototyping is one approach that helps make this happen.

**References**


Making sure customer contact data is correct and clean, no matter where it resides, is an ongoing challenge for most businesses. At AAA Missouri, the automobile club first saw the need for a data quality management system that could validate addresses beginning in 2004. Today, its address verification system has worked so well for the original task that the software solution has been expanded to several other areas.

Although road maps and roadside assistance come to mind at the mention of AAA, the club has expanded its offerings in recent years. At AAA Missouri, which processes some 600,000 records a year and serves Arkansas, Louisiana, Mississippi, and parts of Kansas, Illinois, and Indiana, members can take advantage of the well-known emergency road service and travel planning, as well as financial services and automobile and homeowners insurance.

AAA Missouri first built and deployed an online Java-based policy processing system in 2004. During the two-year process, the custom front end was designed to interface with its backend policy processing system for homeowners insurance. To handle the address validation it needed, the club selected and implemented Melissa Data’s DQWS (Data Quality Web Service). A Web services solution, DQWS is hosted offsite on Melissa Data servers and is available around the clock for real-time address verification. It is used to verify, update, and “scrub” member and insurance addresses as they are entered in AAA’s large-scale policy processing database.

DQWS uses its databases to validate the addresses of homeowners insurance policyholders, which are entered into AAA’s internal insurance processing Web site by agents. DQWS also cleans up membership addresses—checking for accuracy, proper formatting, and updated area codes, among other things—as they are entered by AAA members in its public Web site. Data is also checked as it is entered by AAA Missouri employees into the club’s internal membership processing Web site.

The address scrub takes place in real time, but Dan Perry, a project leader within AAA Missouri’s IT department, says he’s seen no performance impact. When a user enters an address and clicks to continue, Perry says, “we call Melissa Data to scrub the address. If there are no errors returned, we save the address to the database.” If any errors are found, or if the scrubber changes
the address, the system displays the error or corrected address to the user. That step allows a user to override the address scrubber—an option that is sometimes needed for an address in a new subdivision, for example, that isn’t yet in Melissa Data’s database.

**Behind the Need for Clean Data**

According to Perry, the specific business issue that triggered a search for a solution had nothing to do with mailing address inaccuracies (a common challenge for businesses). Rather, AAA’s homeowners insurance line of business requires retrieval of specific information on a property, including its fire district. Based on the property address, AAA Missouri uses a specialized onsite software product to retrieve the needed information.

The catch: The property address must be strictly formatted to U.S. Postal Service standards when the request is made. Before the address verification solution was introduced, problems in the data included duplicate addresses, incorrect street name formats, misspellings, and incorrect ZIP codes. Previously, the addresses were entered directly into the mainframe with little validation, prompting AAA to search for a product that could validate and format member and customer addresses.

**Selecting the Solution**

A committee made up of a project lead, the club’s manager of insurance systems, and the IT director selected the Melissa Data product after testing data quality products from several companies. Perry researched and presented the pros and cons of the solutions; the committee then weighed products based on cost, ease of implementation, speed, and maintenance.

The specific business issue that triggered a search for a solution had nothing to do with mailing address inaccuracies.

Several data-quality products were considered, but according to Perry, a key difference with DQWS was that it is a hosted Web service. “All of the other products required us to host the solution,” he explains. The offsite hosting was a huge consideration for AAA and “probably the top reason we went with Melissa,” Perry says. The lack of up-front hardware costs and long-term maintenance expenses proved to be strong selling points.

Because there was no installation, the rollout process was simple. Perry says that prior to implementation, Melissa provided documentation with detailed instructions about merging the service into the AAA system. Connecting to DQWS took the IT staff less than a day, although integrating DQWS into the AAA Web site took additional time because IT needed requirements from the business side describing how errors and corrections would be handled on the screen.

One initial concern was the speed at which data would be returned. To address that, the selection committee conducted a proof of concept during the evaluation process to compare DQWS’s speed against the other in-house solutions. “We found that DQWS was just as fast as the other products with sub-second response times,” Perry says, which clinched the decision.

Today, the Melissa Data system at AAA Missouri is used by a range of workers, including both internal and independent agents, underwriters, and customer care groups. For example, it is used by agents in selling insurance policies and AAA memberships, by underwriters to underwrite insurance policies, and by customer care agents to service those policies. In each group, the users include agents and underwriters as well as help desk personnel and middle management.

Having a Web service hosted offsite has translated into a number of benefits for AAA Missouri, such as no additional hardware or maintenance costs. Requests are returned fast enough that the DQWS interface is seamless to users—a critical requirement, Perry says. Other benefits include ease of implementation (which has allowed the auto club to expand its use to other areas) and price. In addition to money saved on
mailings that might have had incorrect addresses before the project, Perry says, DQWS helps ensure that any AAA mailing has the correct address for the recipient.

**Future Plans**
AAA Missouri’s initial plan was to use the Melissa Data product only to validate and format the household addresses for the homeowners insurance line of business. However, Perry says, once the service was implemented and the club began to realize its benefits, AAA decided to use the product for other functions as well. For example, the club began validating and formatting mailing addresses when they were entered by a user; it also began to add functionality to validate both addresses as part of the policy renewal process.

“We already had some custom code in place that runs during the policy renewal process,” Perry points out. Calls to DQWS were added to the process so the addresses are scrubbed on renewal. “Adding a DQWS call to the renewal process was important because it allowed us to validate and format addresses that were converted from our mainframe,” Perry says. Making the DQWS call for an address check at renewal time also assures the club that any changes made by the postal service are reflected in AAA’s database.

Next, AAA decided to implement DQWS to validate and format addresses entered into its online membership system, which is accessed through the same Web site as the insurance system and is used by employees and the public to purchase AAA memberships. This was done in an effort to increase the accuracy of mailings. Since the membership processing system is still mainframe-based, Perry says, DQWS is not used for membership renewal.

Once the service was implemented and the club began to realize its benefits, AAA decided to use the product for such tasks as validating and formatting mailing addresses when they were entered.

In 2006, the club began to design and develop a project to add auto insurance to its online processing. “We decided from the beginning that we would use DQWS to validate and format all addresses entered into the system,” Perry explains, including garaging, mailing, lien-holder, and leaseholder. To do that, Perry says, AAA implemented DQWS in much the same way as for the original homeowners insurance line of business. Perry and his team of developers set up the system to call DQWS as the user enters the addresses into the screen and during the renewal process; the new system went live in September 2007.

Also in 2006, the club added rental dwelling insurance to its online system, and implemented DQWS to check the household and mailing addresses entered in real time, as well as those entered during the renewal process. Perry says that they are now working on the design phase of adding an excess liability line of business to the online system and plan to implement DQWS for that line of business as well to validate and format every address entered.

AAA Missouri’s ultimate goal, Perry says, is an ambitious one: To have every insurance address in the AAA database scrubbed by DQWS, either at entry or on renewal, and to have every membership address scrubbed at time of entry. That ensures that AAA Missouri is dealing with the sort of clean and correct address data that every business desires.

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Building a Common Data Foundation for Enterprise Integration and Growth

Julianna DeLua

If you are thinking about how best to establish and ensure the success of a real-time integration competency center (ICC) within your organization, you are part of a rapidly growing vanguard of information management professionals.

The impetus for enterprise integration is stronger than ever thanks to an accelerated move toward real-time information management. We’re part of a braver new world where BI is not just for back-office employees anymore. Instead, it’s becoming pervasive. Pervasive BI is about delivering right-time information to all users, including front-line operational personnel, customers, and partners. Although data integration provides the critical underpinning, it is not data integration as it has been traditionally understood or employed.

As the drive toward the front-line operational use of data continues, organizations are looking beyond traditional data integration. Five years ago, integrating data into data warehouses for strategic analysis was generally good enough. However, empowering all users all of the time with real-time information requires both analytical and operational data integration. There are several front-line operational and business-process steps that will benefit from up-to-the-minute information delivered at the point of impact: customer relationship management (CRM), logistics, operations, real-time detection of money laundering and other fraud prevention, supply chain activity, real-time manufacturing quality monitoring—and the list goes on.
Going Beyond Traditional Integration Competencies
To support these real-time-oriented applications—with their mixed workloads, complex reporting, and high-priority tactical requests—requires a new breed of integration competencies. Integration technologies such as enterprise application integration (EAI), enterprise information integration (EII), and extract, transform, and load (ETL) have all advanced sufficiently to yield significant business returns, but they have largely developed separately from each other. EAI has become the go-to technology for real-time messaging. EII has given us effective, on-the-fly, federated querying. ETL has traditionally excelled at handling complex data transformations. BI takes advantage of the data coming from all of these integration methods so business users can understand the health of an enterprise.

Modern enterprise data integration has evolved beyond ETL. It addresses all types of data and transformations, and incorporates metadata management and data quality management as part of the overall integration process. Enterprise data integration also supports mission-critical deployment, today’s service-oriented architectures, and enterprise ICCs.

Collectively, all these integration technologies make effective real-time information management possible. For a company to be a leader in its industry, it must (at a minimum) have a plan for leveraging a common data foundation that brings together EAI, EII, and data integration technologies. By the same token, companies must look to their ICCs to take on an expanded role in optimizing and managing this common foundation.

A New Definition and Role for the ICC
If you are already moving into pervasive BI, you understand the need for a new definition and role for the ICC. At the highest level, an ICC links a company’s technical investments to its business values. By definition, this involves managing organizational change, and it absolutely requires executive sponsorship. Pervasive BI exerts new operational demands on top of this traditional role.

Pervasive BI calls for an ICC that can handle all of an organization’s data warehousing needs, including operational data. This is essential to enable front-line workers to make decisions in real time in light of historical information and predictive methods—i.e., right-time analytics based on historical and projected behaviors. Functionally, doing so means you will manage data in ways that go considerably beyond the traditional ETL domain. Politically and organizationally, it calls for an ICC that is capable of managing the entire lifecycle of integration projects (from business requirements to technical deployments) across all integration disciplines.

Data service-level agreements (SLAs) are another key factor in pervasive BI. A data SLA is a useful way to quantify user expectations and the intrinsic capabilities of the integration architecture. It is the measure of success, and a good data SLA will define expected, acceptable, and unacceptable values for such key factors as data completeness, freshness, and accuracy. A data SLA also takes into account proactive resource management for scheduling and prioritizing pervasive BI’s highly diversified workloads across the enterprise.

Furthermore, data SLAs provide a means for measuring and adjusting how well organizations are performing against their information management objectives. Many organizations use this as one indicator to gauge how well their information management investment is paying off. For this reason, the linkages between data SLAs and organizationwide metrics (such as margins, market share, and customer satisfaction) are used to rationalize and balance further investments.

Because they are critical to enterprise performance, data SLAs demand to be managed under the umbrella of a single entity. It is absolutely natural for the ownership to reside in the new, or real-time, ICC.

New Architectural Requirements and Opportunities
We have discussed the need for a common data foundation that brings together EAI, EII, and data integration. From a data warehousing perspective, this is a tall order, but industry leaders who are already moving ahead on this front are reaping substantial benefits.
Historically, data warehousing was born from the need to support analytic BI. Moving from departmental data warehouses to enterprise data warehouses (EDW) is a significant achievement. Going from an EDW to a real-time EDW environment that supports both operational and analytic BI is another major progression on the maturity curve. To stay competitive, this move is vital.

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Pervasive BI requires physical or virtual linkages for all systems, architectures, data marts, and spreadsheet marts across all business units in the enterprise. This is the crucial foundation on which an ICC runs a real-time enterprise data warehouse and achieves its data service-level agreements.

ETL has largely been a physically driven technology (as opposed to messaging, which is principally logic-driven). Messaging is transactional, with a real-time element, and involves only low-complexity data transformations, if any at all. The idea has always been to do it faster with guaranteed delivery. Capturing metadata has not usually been a concern.

ETL-driven applications, on the other hand, are typically batch-oriented. They tend to have an analytic focus, involve very complex transformations, and generally entail collecting the metadata that is so crucial to understanding deeper context and relationships.

Moving to a real-time EDW demands the deployment of operational data integration to bridge the gap between these distinct technologies. Operational data integration can provide direct connectivity to messaging applications, workflow and business process management, data replication and synchronization, and orchestration as part of a holistic enterprise data integration solution.

As operational data integration merges traditional ETL and messaging, the result is a fine blend of batch, micro-batch, real-time, changed data capture (CDC), push-pull, and complex transformation capabilities. Advanced lineage analysis and impact assessment through capturing metadata across all these elements is finally possible in this well-fused, well-orchestrated environment.

Organizations taking this new approach are putting resilient, unified architectures in place that encompass transaction services, data integration services, and decision services. The data integration services provide both batch file data exchange and continuous streams of information, and underpin the whole with an end-to-end metadata foundation.

**Evolving from Cost Center to Profit Center**

Another architectural necessity is a data SLA tracking and chargeback system. You need visibility into whether the right high-quality data is being reliably delivered at the right frequency across diverse targets. With the new data integration foundation just discussed, there is a new and interesting dynamic at play.

Data warehouses have traditionally been cost centers. If you are involved with data warehouses, you probably measure effectiveness by the ability to do projects on time, on budget, and with minimum risk, often at departmental- or business-unit levels. In other words, you play defensively.

Now organizations can tap data integration technologies that have been proven—through both real-time and
analytic processing—to be proactive. This enables many organizations to go beyond the departmental, defensive play. They now use EDW proactively to help drive new revenues and profits. If you are (or intend to be) in this advantageous position, you must measure effectiveness by working closely with end-user organizations. This is where data SLAs and their tracking come to the fore. With its charter to link technical investments with business values, and its position to drive partnerships between IT and business, the ICC is the right organization to manage the data SLAs leveraging the common data foundation.

Brokerage Giant Builds a Bridge across Integration Methods
As it seeks to escape the strictures of internally developed ETL routines and multiple vendor solutions, one global brokerage firm is rationalizing EAI, EII, and data integration to drive down complexity and achieve a common data foundation.

With five major lines of business and revenues measuring in the billions, the company saw an ICC as a way to centralize all integration expertise and best practices. It was envisioned that the ICC would provide integration consulting services to a diverse range of business groups, including investment banking, equities, fixed income, and enterprise risk management. The ICC was justified by senior management and the business units, after which partnerships were forged with business technology groups to use the ICC’s services. Some political issues arose about the new centralization, but senior management commitment remained strong, as enterprisewide data management was a key corporate initiative.

Some business units and their divisional IT organizations had already been working to reconcile data integration and messaging technologies. The ICC moved this effort along on an enterprise level and has been instrumental in standardizing the company on core data integration and messaging platforms. It has also established a global repository of reusable integration components, and has grown this base across the business units and their integration projects.

Forging ahead, the ICC now addresses a diverse set of requirements for integration across the enterprise, including:

- Messaging-centric applications backed by operational data stores
- Data-centric applications built on top of physical data warehouses and data marts
- EII-centric applications around logical federated databases

The many integration competencies encapsulated in the ICC are being leveraged for batch and immediate message transfers to support business processes and low-latency EII interactions.

The benefits of centralizing all these disciplines and competencies in a shared fashion continue to compound. From the beginning, the benefits included lower costs due to a shared hardware and software infrastructure. The benefits now extend to lower-cost development and faster project time-to-market thanks to extensive reuse of integration components. The firm has also benefits from easier and lower-cost vendor management now that it has standardized on a few key platforms. It is reducing the time needed to demonstrate the auditability and transparency mandated by corporate governance and regulatory compliance.

Most important, the firm is meeting its end-user requirements for low-latency data delivery. This directly enables high-impact decision-making, such as zeroing in on profitable clients and making risk-adjusted trading decisions while knowing the downstream impact in financial, risk, and compliance terms.

Pharmaceutical Leader Accelerating Business-Critical Reporting
As it grows organically and by acquisition, one global pharmaceutical leader is applying a consistent integration and reporting methodology across existing and acquired entities so it can scale as a business advantage.
With tens of billions of dollars in annual revenue and major research and development operations around the world, the company sought to accelerate critical reporting and enable decision-making with a direct line of sight to financial goals. The idea was to start with R&D and extend these capabilities to the finance, legal, and marketing departments—and beyond. In the business-critical R&D area, the company needed timely and certifiably accurate data to appraise scientific outcomes, evaluate processes about clinical pre-trials, and hit milestones in the product pipeline.

The ICC has also been instrumental in promoting enterprise data quality—an imperative in clinical environments—as an integral part of the overall integration process.

Along with fueling this vital information supply chain, the company wanted to simplify its overall information environment to reduce costs and fine-tune sales and marketing efforts. To execute this tall order, it established an ICC that would provide consistent data warehousing, data integration, and BI across the enterprise. It was (correctly) anticipated that the ICC would centralize valuable integration expertise, foster repeatable processes, and better leverage the company’s sheer scale.

Over time, the ICC expanded to become an enterprise-shared service encompassing three enterprise data warehouse environments. Central to its success has been the ability to leverage IT and business sponsorships and scalable technology platforms. It also serves as the organization that sets the guidelines, policies, and procedures for involving data owners and business users and creating partnerships across these entities.

The integration competencies resident in the ICC have enabled the company to effectively break down its information silos and integrate data to push through its information pipelines to front-line decision makers. One focus has been the product release cycle, from fundamental research and product development to clinical trial, regulatory approval, and product release. Other focal points include financial planning, budgeting, analysis, and reporting, involving aggregating disparate reporting systems and the ability to consolidate and analyze with greater confidence and efficiency. The ICC has also been instrumental in promoting enterprise data quality—an imperative in clinical environments—as an integral part of the overall integration process.

Summary
Real-time information management enables high-impact decisions that drive value for organizational success. A new approach to data integration is required to support such initiatives—an enterprise data integration solution optimized for both operational and analytic data integration. In addition, a new definition and role for the ICC is developing in innovative and highly competitive companies—a definition and role that encompasses establishing and managing a common data foundation across all major integration technologies, including EAI, EII, and data integration.

Continuous measurement and alignment of IT investments, resources, business values, and imperatives for all users is critical to the success of pervasive BI. Leveraging a common data foundation is the only viable way to make this possible in today’s complex and highly competitive business environments.

Finally, looking ahead, having a common data foundation that can be leveraged means your organization will be ready for future strategic initiatives. M&A activities, new market entries, alliance and distribution ecosystem expansions, and infrastructure simplification all benefit from shared integration competencies and a common data foundation.

Anything an information management professional can do to accelerate the creation and deployment of this foundation across all integration disciplines will pay dividends far into the future.
BI, Technology, and the Way We Work

Cheryl Massé

Abstract

There is a subtle but powerful movement setting the stage for the future of business intelligence (BI). We live in a world where it’s absolutely essential to access information when, where, and how we want it. Outside the office, the programs we use in our daily lives are becoming more sophisticated and Web-centric than they were even a year ago. Why shouldn’t our BI applications be the same?

From the growth of mobile devices and mashups to software-as-a-service and open source software, we look at how the latest technologies are changing the way we live, work, and interact with data.

Introduction

With rich Internet applications (RIAs), users obtain information in a more interactive, intuitive way using a wide variety of communication devices, creating advanced application development scenarios that require new information delivery technology. In 2008, the BI market will change further; innovators will lead the pack, but none will be more influential than those working with RIAs to empower business users in creating dynamic content and bringing information to life.

The adoption of any new technology always creates repercussions, and that will surely be the case as a new breed of BI applications is released. Crossover of information availability gives consumers data that was once available only to business users, financially empowering almost everyone. Think about how easy it is to look up your bank balance online and categorize your expenditures, amortize your own mortgage, and pay down your credit cards—then allocate your calculated savings in a “what-if” scenario. These are all very good things.

On the other end of the spectrum, however, are new uses for BI that are less innocent.
Dashboards and Mashups
If ever there was a BI bandwagon, it’s the recent proliferation of Web-based applications and add-ons that provide users with the GUIs they’re asking for: dashboards and mashups.

BI providers are scrambling to board what appears to be a runaway train. What was once the splash-and-dash playground of Web junkies—mostly those who attend marathon LAN parties and build virtual girlfriends—has crossed over (or is being monetized by BI developers) to mainstream business. Nearly every enterprise now needs to have its vital data displayed in the form of bars, speedometers, pie charts, and graphs—in millions of colors, and preferably in 3-D.

A look at the current BI landscape should include a backward glance, a close examination of the current state of affairs, and a glimpse of the future.

No longer content with simple buttons, today’s users want sliders, drag-and-drop portlets (in portals, of course), sound, video, animation, widgets, and more. More, in this context, means live feeds of transactional data in real time. Users want the most dramatic data display available, something that they can look at quickly and/or monitor to help them make decisions. The competitive, ever-faster-paced world of business is creating a demand for BI tools with data displays that enable immediate, at-a-glance comprehension and that deliver data at breakneck speed. The train races on.

One aspect of BI that has changed (and will continue to change) is the consumer or end user of such data. Here, too, we find a crossover; this time, though, it’s from BI vendors selling to businesses that will use BI tools to interpret and make meaning of their own data (business to business, or B2B) to businesses that will use BI tools to deliver information and allow consumers (business to consumer, or B2C) to access and manipulate their own data. Users who cut their teeth on Excel and other data manipulation tools at work want the same level of sophistication in the tools they use in their daily lives to manage their own affairs.

Business users and consumer end users, however, have a somewhat schizophrenic desire. Although users demand the application complexity to microscopically manage and manipulate data, they want the data presentation to be clear, concise, and easily understood. The delivery of actionable data is the ultimate goal of BI and performance management, and most people are just beginning to understand how to make their data actionable and meaningful for use in both their daily and professional lives. Consequently, B2C companies are adopting and supplying tools that would once have been required only by B2Bs. Information has gone public, and it’s not likely to be a trend that will be reversed anytime soon, if ever.

Although this demand for customer self-service, online BI applications could place additional demands on the financial services sector, those institutions that provide these services will most likely reap the rewards and realize an immediate ROI.

Special Delivery
What are BI providers to do? It appears that they can either jump on the interactive bandwagon or be left behind.

BI is among the fastest-growing segments in the software industry, as business headlines of the last few months attest. How will software firms differentiate themselves in a crowded market—amid a full field of competitors jostling, merging, and subsuming others—to get a slice of the BI pie?

The biggest wedge will almost certainly go to companies that are able to efficiently place information in the hands of users. However—and continuing our transportation metaphor—we don’t want a speeding train. What we need is more like a Pony Express: a method of transporting and delivering information that makes
improptu stops just about anywhere it’s needed, at any hour of the day or night, over any terrain. We need an information delivery method that depends on multiple operators performing a relay to get the job done (to get the message delivered).

Enter the modern-day equivalent: mobile devices that are daily (seemingly hourly) becoming more evolved, operating via a system of towers that transmit messages through the air. Wireless communication devices, tools of the imagination once reserved for Trekkies, have become reality. Our devices, which we clutch as though they’ve become parts of our bodies, already seem essential and are destined only to become more so in the future. We’ve developed a serious (and curious) dependency on our communicators, and this need is no longer confined to the starship Enterprise. What we need now are the applications that will deliver the kind of information we want and need, in the format required, without delay.

Providers of this mobile BI software will emerge from the pack and continue to lead us deeper into the information age, where it seems everything, including personal privacy, has become a commodity. Just try to get an unlisted phone number. You’ll have to pay for it.

**RIAs: Virtual Necessities**

RIAs are still in vogue. These AJAX-based, Web 2.0 apps provide users—both business and consumer—with the interactivity that has become de rigueur for a wide variety of users. At home, we look up our financial accounts and expect to be able to see, by category, where our money is going. While most financial institutions do not yet offer customers the ability to manipulate their own data, they might want to consider doing so; static data displays are going the way of the horse and buggy.

At work, more than 90 percent of all desktop computers are loaded with Microsoft Office, which includes the ubiquitous spreadsheet application Excel. Innovator Google now offers Google Docs, which includes in its three-app offering a free spreadsheet application that can be accessed online. A user can upload a document to Google Docs, then access it anytime, from any Internet-connected computer. Since the software exists online, there is no need to download and install it; the document is truly portable. The app itself is fully functional and fully compatible with the commercial versions offered by other vendors.

While the software is currently free, the question that begs to be answered is: for how long? The software-as-a-service (SaaS) wave is beginning to hit the shore, and its sound is closer to pounding surf than gentle waves. Most (if not all) BI vendors likely have some SaaS plan or product currently in development. They’re rushing to market in record numbers.

**Providers of this mobile BI software will emerge from the pack and continue to lead us deeper into the information age, where it seems everything, including personal privacy, has become a commodity.**

Other questions arise: Will they, in the rush to compete, end up with a product that doesn’t fully address issues such as security, and that isn’t mature (or even ready for release)? How many will actually fall into the deep?

SaaS development opens a significant opportunity for small and midsize businesses (SMBs). Companies seeking smaller-than-enterprise-class deployments are beginning to look seriously at BI solutions, as SaaS often requires a smaller initial cash outlay and offers accelerated ROI. As new pricing and options are rolled out, vendors developing online BI solutions for SMBs may well find themselves with an entirely new customer base—in addition to, rather than instead of, traditional enterprise BI consumers.
Information Skyway

Another BI wave coming ashore: information applications running on mobile devices. Computers, even ultra portables, have suddenly become too big; nobody wants to haul around an ounce more than is necessary. The problem is, consumers still want the functionality they have on their current computers, but they now want to be able to see their information—and manipulate it—in two square inches, literally on the fly.

As new pricing and options are rolled out, vendors developing online BI solutions for SMBs may well find themselves with an entirely new customer base—in addition to, rather than instead of, traditional enterprise BI consumers.

American Airlines’ recent announcement that Wi-Fi will now be conditionally available on its flights for selected hand-held devices drew attention to the trend. Jet Blue has made limited Wi-Fi available on its “BetaBlue” flights, and although this service is not full-access broadband, it does enable users with Wi-Fi-enabled laptops and other approved devices limited access to streamlined Yahoo! Mail in the Sky and Yahoo! Messenger in the Sky, Yahoo!’s in-flight versions of communications services. Though these features are available, there is a caveat on JetBlue’s Web site: “Customers on BetaBlue will not be able to access the Internet. This is not an Internet-surfing connection.”

As with the special version of Yahoo!, attachments cannot be opened via Yahoo! Mail in the Sky. Users with the BlackBerry 8820 and BlackBerry Curve 8320 will, however, be able to access both their personal and corporate e-mail. What is contained in that e-mail will, it is hoped, include BI information; the apps required to access that information should already be in development, since the airlines are obviously moving toward full connectivity, hinted at on JetBlue’s Web page: “BetaBlue’s email and instant messaging services are pioneering service enhancements, and we will continue to listen to what our Customers [sic] want as we test the aircraft’s current offerings. BetaBlue is our trial aircraft for new connectivity services available in-flight. Stay tuned for future enhancements!”

BI vendors with mobile apps in place when the time comes should be able to stand still and simply wait for customers to arrive at the gate en masse. Business users are finally getting their way and will soon be able to conduct business anywhere, even in places that once barred their communications, cutting them off from their offices for the length of time it took to travel from point A to point B.

In a worst-case scenario, the very technology that provides users mobile connections to their jobs can be used to track their locations and, indirectly, monitor performance when combined with BI analytic apps. Those without guilt—the workers who never goof off—have little to fear. Others will have to think twice before they switch on their gadgets and do whatever it is they do when they’re supposed to be working. Their chip-embedded devices will essentially rat them out to their employers.

In a best-case scenario, this GPS/BI union can be used for the greater good. For example, GPS and BI are being used to monitor and reroute traffic in the city of Bangalore, India. New cell towers have been placed in strategic locations within city limits to pick up cell phone signals. The convergence of these signals is associated with the number of cars in any given area, enabling traffic officials to monitor the number of cars on the road and, if necessary, to redirect them away from congested areas. The data gathered by the towers is run through BI analysis software, and is available online, steering drivers clear of the traffic jam. In the future, this information will be pushed to the very phones the system uses to monitor new pricing and options are rolled out, vendors developing online BI solutions for SMBs may well find themselves with an entirely new customer base—in addition to, rather than instead of, traditional enterprise BI consumers.
traffic. This pilot program has proven so successful that others like it are currently being planned.

**Open Source Meets Social Networking**

Another big development on the BI front is the prevalence of commercial products based on open source projects. While some BI developers have been touting their own projects for a few years, others are just beginning to see the logic in doing so. It’s a model that appears to be working.

Offering open-source versions of commercial software apps in a try-before-you-(it is hoped)-buy arrangement is luring developers by the thousands to these sites. It’s a model that has worked with other kinds of software, and it’s working now for BI. The idea is that once IT and developers become familiar with a particular application or group of applications, they’re more likely to recommend the purchase of the commercial version of the software. Buying versus building then becomes the issue, and anyone in the industry knows that it makes more sense, especially in enterprise-size deployments, to take advantage of the perks offered by buying: indemnification, service (both during deployment and on an ongoing basis), faster ROI through rapid deployment, and upgrades.

In addition, many companies have started online user forums, which seem to sprout organically wherever and whenever open source code is in development and use. Here, peers can share problems and solutions, exchange ideas, post code, and learn about the software in an informal environment that allows them to explore solutions without burning support hours. These informal networks are generally topic- or software-specific and model themselves after social networks such as Facebook and Yahoo! Forums. The networks adopt many of the same technologies and standards. Forums have also been started by BI vendors whose products are not based on open source.

The popularity and usage statistics of all peer-to-peer sites are impressive. According to a survey released in December 2007 by ITtoolbox (itself a professional networking forum) and PJA Advertising, users in North America spend 2.96 hours per week on social media/user-generated content sites (ITtoolbox, Wikipedia, LinkedIn, etc.); 3.11 hours on editorial media (CNN, the *Wall Street Journal*’s site, etc.); and 2.71 hours on vendor content (vendor-produced white papers, Webcasts, etc.) pages. When it comes time to buy, topic-based communities influence decisions; they came in second at 2.75 (on a scale of 1 to 5), after search at 2.81 and ahead of personal networks at 2.51 and user-driven content aggregators at 1.92.

Clearly, the use of social networking and topic-driven forums is becoming increasingly important for making BI and other technology purchase decisions. BI vendors associated with these networks and those that have set up their own sites will benefit. Those without a site might want to rethink the sales tools they’re using.

**Seamless Integration**

Just as the concept of mashups and dashboards has seeped from the Internet into mainstream usage, so has the need for integration of data from disparate sources. Users at work want the same Internet experience they enjoy at home: round-the-clock access with all of their data integrated into an easily understood, interactive interface. Users can access and view all of their personal financial accounts in one place, anytime they want; why shouldn’t they be able to do the same with their data from work? Why should that information be available to them only on site or on their company’s intranet? Finally, why should the BI application their company uses be available only to so-called “power users”?
It doesn’t take an MBA to balance a checkbook, so why should one be required to extract the number of widgets Salesman X sold in the Northwest region during the month of September?

It is unlikely that mammoth BI companies will have the time to provide customers with the custom data connectors needed to integrate disparate (and legacy) data sources into the single reports and/or dashboards users are demanding. Some of the largest BI vendors have recently been bought by even larger companies, and in the next few years they’ll be busy restructuring, consolidating, and/or integrating their own applications and product suites. They’ll be ironing out logistics and figuring out how to integrate their own companies with these newly acquired entities.

Smaller, more agile companies that are able to maintain their product development path—and veer from it should it become necessary—are going to prosper. The ability to turn on a dime and create solutions on the fly are going to be key differentiators in the coming years, as these smaller companies continue to innovate, creating new BI models and products and offering new services.

As a business’s data analysis trickles down to the line managers responsible for the numbers, this demand for easily understood data, in easily understood formats, is only going to increase. The same holds true in B2C scenarios. While out-of-the-box apps will probably be readily available from larger BI vendors, the deployment and interconnectivity services smaller companies can provide simply will not be a priority for companies enmeshed in a merger or acquisition. They’ll have fewer resources allocated for the innovation required to drive the industry and grow new business.

In addition, there will certainly be gaps and changes in the other support services they’ll be able to offer existing customers. As the path of these companies’ products and services becomes unclear to both current and new customers, BI consumers, and the customers of BI consumers, might be better served by smaller companies offering more stability and mature products.

**Confluence**

Transactional data streams converge to create right-time dashboards, and wireless communication towers stream information gathered from GPS-enabled cell phones, providing accurate representations of traffic flow in real time. As new technologies and new ways to use existing technologies emerge, BI is faced with new challenges.

Fortunately, with these challenges come opportunities. The industry is experiencing huge shifts, and the developments should be interesting to watch.

**References**


Editorial Calendar and Instructions for Authors

The Business Intelligence Journal is a quarterly journal that focuses on all aspects of data warehousing and business intelligence. It serves the needs of researchers and practitioners in this important field by publishing surveys of current practices, opinion pieces, conceptual frameworks, case studies that describe innovative practices or provide important insights, tutorials, technology discussions, and annotated bibliographies. The Journal publishes educational articles that do not market, advertise, or promote one particular product or company.

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Journal authors are encouraged to submit articles of interest to data warehousing and business intelligence professionals, including the following timely topics:

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- Data design and integration
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Upcoming Submission Deadline

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The Three Pillars of DG

The three pillars of data governance (DG)—compliance, transformation, and integration—represent the most common goals for data governance programs. Each can be a starting point for a new DG program, and all three relate and share dependencies in a mature, enterprisewide program. See Figure 1.

Compliance
At one end of the spectrum, many organizations initiate data governance programs because of pressing compliance issues that impact data usage. These issues are diverse, involving internal policies (for data security and privacy), legislated regulations (Basel II, HIPAA, and SOX), and standards for data exchange (EDI, HL7, SWIFT, etc.). Achieving compliance relative to data often involves limiting the number of people and applications that may access certain data.

Business Integration
At the other end of the spectrum, some organizations begin by governing data that’s shared broadly through a variety of data integration and application integration technologies. While shared data is subject to compliance, the focus here is on expanding data access and integration. The goal of business integration is to enable data-driven business activities like BI, CRM, and cross-business data exchange.

Business Transformation
In the middle, transformation is a goal unto itself, as well as an enabler for the goals of compliance and integration. The meaning and degree of transformation varies, but it always involves some kind of change. For instance, to comply with the data security requirements of SOX, most U.S. corporations have this decade changed who can access which data. Other firms have changed the ownership of data, as they move toward using “data as an enterprise asset.” Reorganizations, mergers, and acquisitions force dramatic changes in data ownership and usage. All benefit from data governance as a change management mechanism.

—Philip Russom

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