Better Answers, Faster

Using technology to derive intelligence from data

The Power to Know®

A SAS White Paper

Table of Contents

Introduction

The IT industry has come far over the last 40 years: from the days of mainframe applications limited to a few technical users, to more distributed Web and desktop applications for a large number of non-technical users. In addition to an expanding user base, the time it takes to process data has significantly decreased with processing capabilities that are faster than ever. With larger volumes of data being processed quickly, why are companies still struggling to turn data into information and make sense of that information? Rather than dwell on the why, let's focus on how you get your company past this impasse and move them to a new level of information use.

A Quick Trip Down Memory Lane

Technology has been transforming the way companies do business for more than 40 years. It started in the early 1960s with the introduction of the mainframe computer and a new automated way to process data. Suddenly, companies were sprouting IT departments – groups dedicated to managing technology infrastructures. In 1971, Intel introduced the first microprocessor, the 4004, and we started to think about pushing the limits of what we thought was fast.

In the 1970s, we also saw 4GLs (fourth-generation languages) for database querying, report generation, data manipulation, analysis and graphical user interfaces. The late 1970s and early 1980s brought us decision support systems and, in 1981, IBM introduced the personal computer. In 1982, TCP/IP (Transmission Control Protocol/Internet Protocol) allowed us to transmit data over networks, changing our views on information access with the ability to connect users to the data. Relational databases took off in the 1980s, and in 1985 Intel introduced the 386 processor. Remember how fast we thought that was? Little did we know that more change was coming with enterprise information systems in the late 1980s and CERN's release of the worldwide Web in 1990. In 1997, there were 20 million Internet hosts. That number reached a staggering 350 million hosts by 2005.

Personal computers got faster with the launch of Intel's Pentium processor in 1992. It was also at this time that query and reporting software packages came onto the market. As part of the quest to continue to improve computational performance, Intel introduced its Xeon brand processor for servers in 1998. Performance management software and analytic solutions became prevalent in the early 2000s as companies wanted more than just historical data from their query-and-reporting systems. And, to provide an alternative to the proprietary architectures that still dominate the back end of mission-critical systems, Intel took another step forward in 2001 with the launch of the Itanium processor family.

We've seen how far technology has brought us, but where is technology going? We have obviously figured out how to generate overwhelming amounts of data that we can continually process faster. But what good is the data if you can't turn it into meaningful information and derive intelligence that drives business performance? This is where technology is headed in the future.

Technologies to Get Better Answers Faster

If we agree that the next evolution will be turning data into meaningful information and deriving intelligence from that information, how will IT enable that advancement? There are technologies that IT can deploy to better align infrastructure with company goals and objectives. These technologies help manage data, analyze data and disseminate key information. Collectively, these technologies are known as business intelligence.

What is Business Intelligence?

Business intelligence means different things to different people. In its simplest form, business intelligence is getting the right information to the right people at the right time so they can make decisions that ultimately improve performance. A more technical view of business intelligence usually centers on the process of, or applications and technologies for, gathering, storing, analyzing and providing access to data to help make better business decisions.

Despite the debate over the definition, business intelligence is proliferating and reaching more and more constituents inside and outside your organization. Information demands, data volumes and audience populations are growing and will continue to grow exponentially. As the demand increases so does the imperative for a sound strategy that meets short-term needs and provides the foundation to support a long-term vision. According to Gartner, business intelligence even has the attention of CIOs with CIOs identifying business intelligence as the number one technology priority.[1]

Although business intelligence was synonymous with query-and-reporting tools for many years, many organizations have discovered that the effective use of information requires more than reports that show historical data. In addition to the information-delivery component of business intelligence, data integration and analytics are garnering just as much attention in overall business intelligence strategies. This comprehensive approach to business intelligence is driving the need for a platform for business intelligence.

A Platform for Business Intelligence

Market dynamics – including deregulation, globalization, commoditization and political uncertainty – have created an environment where successful companies have learned the importance of business intelligence and learned how to turn business intelligence into a competitive advantage. To execute a successful business intelligence strategy, the IT infrastructure must be aligned with business needs in a way that the infrastructure supports the business in achieving goals and objectives. A successful business intelligence infrastructure must be able to transform disparate data and systems into an efficient flow of information, analyze data with a forward-looking view, and deliver key information to decision makers on demand.

To achieve such results, many organizations are now assessing their business intelligence strategies and architectures with a platform approach to the underlying technology. A platform for enterprise business intelligence routinely consists of the following categories of technologies:

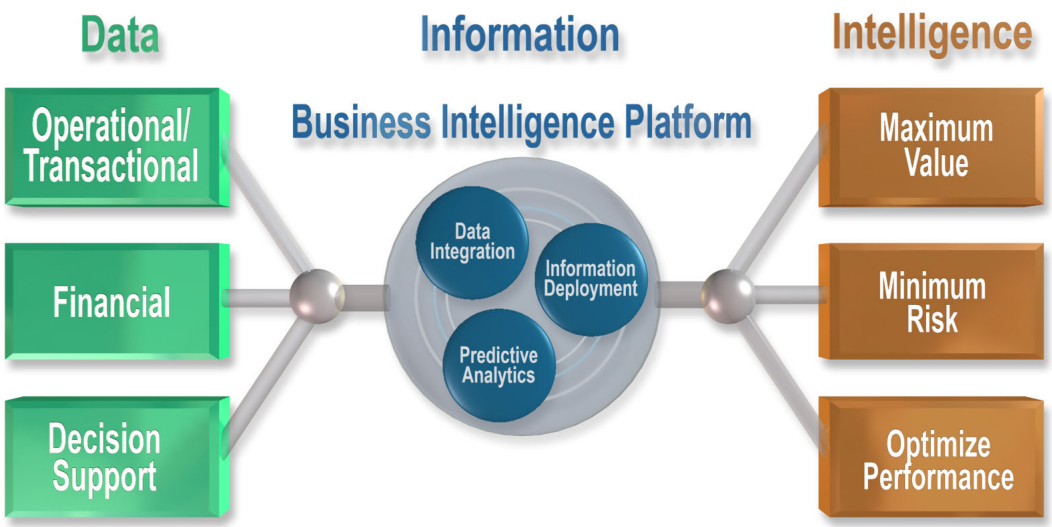
- Data integration – capabilities for data connectivity, data quality, ETL (extract, transform and load), data migration, data synchronization and data federation.

[1] Gartner Presentation, "The Business Intelligence Market Trends and Directions" by C. Graham, K. Schlegel. March 2006

- Predictive analytics – predictive and descriptive modeling, forecasting, optimization, simulation, experimental design and more.
- Information delivery – capabilities to surface information from data collection points across the enterprise.

Each of these components should be integrated not only with the business intelligence platform but also with your existing investments in hardware and software. A comprehensive business intelligence platform will be able to access all your data no matter where it resides and no matter what operating system is being used. It will move the data, if necessary, store it properly, analyze it thoroughly, and disseminate it to users through familiar interfaces.

In addition to being integrated, each component should be centrally maintained by IT. The central point of administration should allow IT to maintain applications, users and security in one location, reducing the burden on the IT staff of satisfying disparate business intelligence needs across the organization. Furthermore, metadata should be stored in a single metadata repository and shared across all the platform components.



Using Data Integration to Get a Head Start

It all starts with the data. As the adage says, garbage in equals garbage out. Most organizations capture data in a wide variety of sources and formats, including ERP, legacy systems, RDBMSs, flat files, Web logs and more. You know the hassles associated with trying to locate, identify and select the data that needs to be extracted, transformed and moved from all these silos. For these reasons and others, new data integration technology should give IT capabilities for data connectivity, data quality, ETL, data migration, data synchronization and data federation.

It is important to make sure that the technology you choose is independent and offers a range of access engines, a multithreaded transformation engine, integrated data quality transformations, end-to-end metadata, and an easy-to-navigate graphical interface. If you can't extend the value of existing systems with your data integration technology, then chances are it will not fit your needs.

Your data integration technology should provide many capabilities out of the box but also should include development tools that make it easy to create customized data integration strategies without requiring in-depth programming expertise or heavy maintenance of code. In addition, your data integration technology should allow you to schedule and load balance processes that fit into allotted time windows so you can operate as efficiently as possible. Furthermore, accountability and control should be offered as part of your data integration technology so that it is easy for you to administer processes, track process changes and manage metadata.

Data quality is a critical factor for the success of business intelligence initiatives. Bad data on one system can easily and rapidly propagate to other systems. You probably have encountered the problem where different people in your organization all claim to have accurate information, yet they each have *different* information. If information shared across the organization is contradictory, inconsistent or inaccurate, then interactions with customers, suppliers and others will be based on inaccurate information, resulting in higher costs, reduced credibility and lost business. To prevent these problems, make sure the data integration technology you choose includes integrated data quality.

Data quality capabilities should take you from profiling and rules creation through execution and monitoring of results. You should be able to transform and combine disparate data, remove inaccuracies, standardize on common values, parse values and cleanse dirty data to create consistent, reliable information.

The right data integration capabilities can help companies get better answers faster – better by improving the quality of the data and faster by decreasing the amount of time it takes to develop data integration processes.

Helpful Hint: Map out all the different data sources in your organization and then draw lines from the data to the people in your organization who use it, noting what business objective is attached to the data. You most likely will find patterns that you were not aware of and identify areas where the company overall can be more efficient.

Using Analytics to Get Ahead of the Pack

Just as there is debate over what business intelligence is, the term analytics is used inconsistently throughout the industry. Most of the blame lies with software vendors that have seen recent market interest in analytics and want to jump on the analytics bandwagon.

Interest is growing in analytics because it is proven to deliver high and repeated returns on investment. Not only does analytics solve critical business issues and reveal new opportunities, it also helps minimize the risk of drawing wrong conclusions or pursuing less than optimal actions. Be wary of claims of advanced analytics, as many software vendors try to pass off basic descriptive statistics, historical analysis, and OLAP as analytics. **True analytics is predictive in nature, providing organizations with a forward-looking view into the business.** True analytics should help your company anticipate the future and go beyond "what happened?" to more complex questions: "How are today's actions likely to impact us tomorrow, and what will the ongoing best course of action be?"

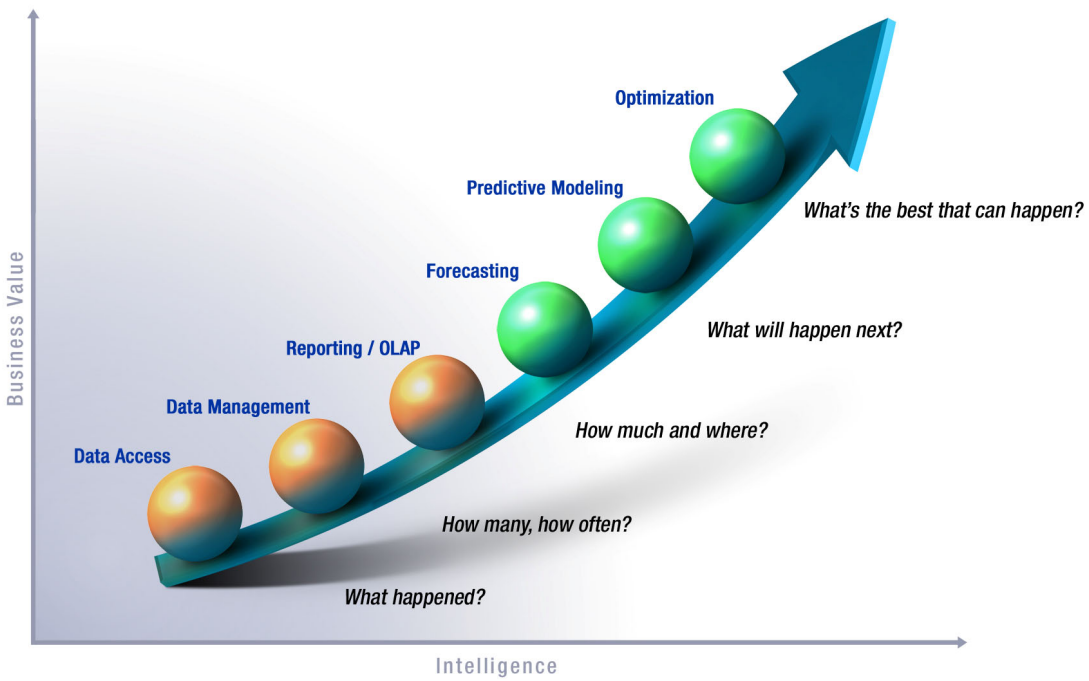
Analytics uses data to deliver insight for better decisions. Analytics includes quantitative techniques such as data and text mining, modeling, forecasting and optimization. For organizations, analytics offers the ability to address difficult business issues and then use those findings to differentiate the business from the competition. Analytics can be applied across industries to help communication service providers improve customer retention, manufacturers predict accurate inventory levels, financial services firms find more profitable customers, and healthcare organizations predict the effects of government policies – just to name a few examples.

Business and IT executives are taking notice of analytics, considering it critical to their organizations' own business intelligence strategies. As Thomas H. Davenport reported in *Competing on Analytics*, "At a time when firms in many industries offer similar products and use comparable technologies, business processes are among the last remaining points of differentiation. And analytics competitors wring every last drop of value from those processes." Davenport's research goes on to provide real-world applications of analytics at companies including Capital One, Marriott International, UPS, Procter & Gamble, Harrah's, and Amazon. To learn more about how some companies have built their businesses on analytics, see Davenport's research as it appeared in the January 2006 issue of *Harvard Business Review* at **www.sas.com/hbr06**.

Analytics should easily integrate into information delivery systems so that results can be shared with upper management and decision makers. This type of technology should include a wide portfolio of algorithms, visualization techniques, flexible data exploration and manipulation capabilities that produce accurate models. Results should be delivered in a format that even non-technical users can understand – using everyday business terms to explain the results.

True analytics can help companies get better answers faster – better by providing predictive capabilities that determine the best possible outcome, and faster by being readily deployed to decision makers.

Helpful Hint: Seek out the individuals in your organization (typically analysts or statisticians) who are conducting the heavy-duty analysis of your data. Build a relationship with them so you can understand how they are using the data and the results they are getting. Work with them to disseminate their results to key decision makers in your organization. Chances are that the individuals analyzing data in your company are doing powerful things with it that should be shared more broadly



Using Information Delivery to Break Down Silos

Most organizations operate today with distributed teams, managers and executives all needing accurate, up-to-date information for decision making. And they need it fast – really fast. You probably have been down the path of trying to satisfy business users through ad hoc requests or by implementing different reporting tools across the organization. Despite your best efforts to deliver the information requested, you were labeled as the bottleneck. The right information delivery technology can help you shed that stereotype permanently.

Information delivery technology should give business users easy access to information in the format they need, when they need it. It should provide tailored user interfaces targeted at audiences with varying skill levels and deliver analytic results in easily understood terms. It is also important that IT be able to maintain control and security over the data while giving users the ability to access data on their own when they need it. Whether your business intelligence strategy is tackling the entire enterprise or a staggered deployment by department, ensure that the information delivery technology you are using meets your long-term needs as well as short-term requirements. Think about all the users who will need to be served by the technology and make sure you are getting a comprehensive set of user interfaces to satisfy the different audiences – from the most casual users to those who can do advanced analysis. Interfaces to consider are: portals, dashboards, Web reporting, Microsoft Office integration, search, advanced data exploration, guided analysis, metadata management, OLAP cube creation, and application development. Almost all companies will find that their long-term goals require delivering information via those interfaces listed above.

The right information delivery technology can help your organization properly address the breadth of users and reduce problems of access by curtailing information storage in departmental silos. It increases the likelihood that information will be shared, creating a collaborative environment. Store the information in a central location and give all types of users a way to get to it. Consider technologies that allow you to deploy to an unlimited number of users, making information more accessible and eliminating administrative hassles associated with managing named and concurrent users.

Comprehensive information delivery capabilities can help companies get better answers faster – better by providing consistent information that everyone is sharing, and faster by providing familiar interfaces where users are comfortable taking in information. This reduces the learning curve normally associated with new technologies.

Helpful Hint: Spend time with each type of user in your organization to understand how they best receive information. Build a relationship with them to get to know what business issues they are facing and how they use information. You have a broad view of the organization and can see processes and information that business users in individual departments may not see. These users also might help you uncover some pitfalls of existing data sources.

Will Technology Solve All Your Problems?

Technology is a major piece of the puzzle, but technology alone will not solve all your problems. To have a successful business intelligence initiative it is also important to understand how your organization uses information. **Information use is affected not only by technology but also by people, processes and organizational culture**. A business intelligence competency center (BICC) can be an excellent vehicle for articulating and executing your information goals and objectives.

A BICC is a permanent and formal organizational structure, staffed internally, with defined tasks, roles, responsibilities and processes, supporting and promoting the effective use of business intelligence to drive the business strategy. A BICC provides a central location for driving and supporting your organization's overall information strategy. It enables your organization to coordinate and complement existing efforts, while reducing redundancy and increasing effectiveness. The centralization of these efforts ensures that information and best practices are communicated and shared through the entire organization so that everyone can benefit from successes and lessons learned.

The BICC is instrumental in enabling knowledge transfer and enhancing analytic skills, empowering business users with new skills that drive innovation and discovery. It also is instrumental in turning analysis into action and ensuring greater information consumption and higher levels of ROI.

Conclusion

Technology has brought us far, and we can continue to depend on it as we push limits to improve the way we use information. As more compute capacity becomes available to every aspect of the integrated business intelligence platform, companies will be able to get answers to questions they didn't even know to ask – with results in hours or minutes, instead of weeks or days. At the same time, companies will be able to get better answers to their questions as business intelligence platforms change the way companies turn raw data into meaningful information and, ultimately, intelligence.

A comprehensive, integrated business intelligence platform includes data integration, predictive analytics and information delivery all working together to help IT align with business goals and objectives. These technologies will allow you to turn data coming from disparate sources into an efficient flow of information, analyze that data using predictive quantitative techniques, and disseminate the resulting information to decision makers across your organization. Intelligence results when your organization uses this information to maximize value, minimize risk or optimize performance. And as all these aspects come together, the companies with the incremental competitive advantage will come out ahead.

About SAS

SAS is the leader in business intelligence software and services. Customers at 40,000 sites use SAS software to manage and gain insights from vast amounts of data, resulting in faster, more accurate business decisions; more profitable relationships with customers and suppliers; compliance with governmental regulations; research breakthroughs; and better products. Only SAS offers leading data integration, intelligence storage, advanced analytics and traditional business intelligence applications within a comprehensive enterprise intelligence platform. Since 1976, SAS has been giving customers around the world **The Power to Know®**. www.sas.com

World Headquarters
and SAS Americas
SAS Campus Drive
Cary, NC 27513 USA
Tel: (1) 919 677 8000
Fax: (1) 919 677 4444
U.S. & Canada sales:
(1) 800 727 0025

SAS International
PO Box 10 53 40
Neuenheimer Landsr. 28-30
D-69043 Heidelberg, Germany
Tel: (49) 6221 4160
Fax: (49) 6221 474850

www.sas.com

 386887US.0406