

Business Intelligence Goes Operational

**On the Front Lines Making a
Bottom-Line Difference**

A White Paper

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Introduction

Historically, business intelligence (BI) technology has found a home at two primary levels: among senior executives who need to obtain strategic information and among line-of-business managers responsible for tactical analysis. These traditional decision-support activities are important, but they only scratch the surface of BI's potential within the enterprise – involving perhaps 5 percent of the users and 10 percent of the available data.

The next horizon for BI involves extending high-quality actionable business information to many different types of employees throughout the enterprise – as well as to external partners and customers – a trend known as operational business intelligence (OBI).

The ground rules haven't changed. Business intelligence is still about better decision-making – analyzing variables, predicting trends, synthesizing results, and delivering information. But operational BI systems do this and more. In many cases, they represent the key information systems that run the business, relying on real-time information from production systems as well as information that has been staged to a reporting database. When properly constructed, operational business intelligence systems become fundamental enablers for optimized performance by providing input and feedback to everyone in the enterprise and beyond – not just to managers and business analysts.

Operational Imperatives

Understanding the User Continuum

Enterprise business intelligence suites (EBIS) and robust reporting products have continued to converge, making it possible to select a single vendor for both feature sets.¹ These comprehensive BI environments are designed to support many types of users with ad hoc database query, reporting, and online analytical processing (OLAP) capabilities. Useful as these tools have become, however, many organizations fail to deploy them properly, or to fully understand their power. The reason is simple: most employees simply are not comfortable using sophisticated analytical tools. Gartner relates a scenario in which a company provided an OLAP application to 2,000 sales people and expected them to slice-and-dice revenue information. It was a brilliant system but it never took off, mainly because the salespeople were too busy to learn how to use it.

What's the moral of the story? You need to make it easy for users to get the information they need. Casual business users don't want to spend time trying to fathom the structure of database cubes or learn sophisticated analytical software. They want to access information using familiar tools such as e-mail, search engines, Web browsers, and spreadsheets. Even professional analysts generally prefer to use spreadsheets and pivot tables. They don't want to install a browser plug-in or use a custom report viewer just to view operational information.

Companies that are successful with their BI initiatives take a hard look at how different people use information. In today's flattened organizational hierarchies, everyone is a potential decision-maker. Employees need information they can use immediately and understand readily, in a form that suits their requirements.

For example, senior executives are concerned with strategy and results. They need highly consolidated information at a strategic level, rolled up from all the various lines of business. That generally means highly summarized, functional reports delivered through a portal, dashboard, or balanced scorecard interface.

The next level down includes line-of-business managers in charge of sales, marketing, operations, and other corporate functions. Typically, these users are analyzing the performance of their departments and asking questions about why certain events occurred or did not occur. Their reporting and analysis activities usually take place on a periodic basis – such as weekly, monthly, or quarterly – and can often be generated from a data warehouse. Why did we miss our

¹ Dresner, Howard J., "EBIS and Reporting Convergence: Almost There," (Gartner Research, COM-21-7771, 23 February 2004).

revenue goals? Let's drill down and find out. It turns out we lost 20 key customers due to customer support problems, many of which stemmed from unusually long hold times within one division of the call center.

This level of analysis is often referred to as tactical BI, and it is frequently equated with back-office research. It's where business intelligence grew up in most organizations, and where it still dominates today. Back-office analytics are important, but they represent only a small portion of today's BI requirements.

Operational BI – sometimes called enterprise business intelligence – includes individuals across and down the organizational chart as well as customers, business partners, and external constituents. These BI applications must be simple, straightforward, and ubiquitous. They succeed by making the operational level actionable, and they support critical business processes through their integration with real-time or near-real-time data. Operational BI helps leverage data warehouse investments in valuable new ways, and it makes use of data in production systems as well.

A New Mindset – Information Now

Shortening the time to discovery is the guiding principle of OBI. At most companies, executives receive reports and then start asking questions. They have intelligent tools to analyze problems, but they typically use them after the fact. This is a reactive way of running a business.

Returning to those 20 lost customers, if queue managers in the call center were properly equipped with information, they would know immediately when customers cancel orders and would be on the lookout for patterns. Perhaps these customers were confronting a common problem that reps weren't trained to resolve, which led to longer than usual hold times and unsatisfactory issue resolution. These are operational issues that must be identified and dealt with before they become major problems.

“As more businesses strive for the ideal of the real-time enterprise, there is growing interest in reducing the latency of BI delivery,” notes Gartner analyst Ted Friedman. “Making faster decisions based on more real-time information can benefit enterprises seeking faster and more-efficient operational processes.”²

² Friedman, Ted and Strange, Kevin H., “Architecture: The Foundation of Business Intelligence,” (Gartner Research, AV-22-6453, 14 April 2004).

Leveraging Information Assets

When properly deployed, OBI tools can deliver information in a variety of ways to many types of people, both inside and outside the enterprise. In many cases, getting there simply requires a new perspective. RBC Financial Group, based in Toronto, is a prime example. Until recently, personnel at the bank's operations service centers had to laboriously reconstruct personal transaction statements by combining information from legacy information systems with microfiche records. It was costing the bank millions of dollars each year to provide this service, and customers were not getting information in a timely manner.

RBC turned the situation around with an operational BI system called Bankbook Reconstruct that uses data from a data warehouse to instantly reconstruct consolidated bank statements. The warehouse contains six years of transaction history and is now available online to 12 million personal banking clients.

In this case, the requisite information was already available, but simply not being used to its full extent. The bank had an enterprise data warehouse, but it was not used as an operational system, only for trending and ad hoc reporting by a handful of managers and professional analysts. By envisioning a new usage for the data, the bank was able to improve its customer service. They now have more than 10,000 external users generating about 900,000 reports per month.

Including Customers and Partners

The RBC application illustrates another important feature in the OBI landscape: the rise of external-facing B2C and B2B applications, and a consequent surge in numbers of users. Many analysts believe these "extended applications" represent the fastest growing market for BI in the years ahead.³

In some cases, the implications are dramatic, particularly when a self-service application yields a competitive advantage – such as a new way to initiate and solidify relationships with customers. For example, Montreal-based Moneris Solutions is using OBI technology to let merchants view debit, Visa, and MasterCard transaction data online. Thanks to the system's user-friendly reporting capabilities, hundreds of thousands of Canadian financial institutions can quickly generate consolidated reports and obtain customized views of card payment activity.

³ "The Extended Enterprise: A New Era for Information Analysis and Delivery," (*Information Builders Magazine*, Winter 2003 Vol.13 No.3).

In the public sector, the New York City Department of Health created an OBI application to share health inspection information with citizens via the Internet. The site has been immensely popular, logging up to 40,000 hits per hour. Best of all, users don't need to bother with any special tools to find relevant information; they simply check their e-mail or log into the Web to find pertinent information.

Extending business intelligence outside the enterprise doesn't simply mean pushing information in a passive way. Many users want to be able to interact with the information – to obtain it on their terms, when and where they need it. Instead of simply sharing or pushing information out to partners and suppliers, astute companies are creating self-service applications that give outside users the ability to customize their views of relevant information.

For example, Travel and Transport, the eighth largest travel management company in the nation, created a self-service reporting environment for analyzing corporate travel purchases. Travel managers at about 300 corporations use the reports to analyze corporate travel spending on a daily, weekly, monthly, quarterly, and annual basis. The Web-based system helps companies like Kimberly-Clark, MetLife, and American Family Insurance plan, track, analyze, and budget their travel expenses more efficiently – saving them millions of dollars each year.

The take-home point is clear: you can maximize your investments in BI technology by delivering information to more people. Especially where existing data stores are involved, this can generate a return on investment that was never before realized.

As more and more standard business processes are handled online, companies are extending operational information to business partners via Web portals and extranets. For example, at Ford Motor Company, 48,000 employees, warranty specialists, and warranty consultants at both headquarters and more than 5,000 Ford dealerships use BI technology to identify and resolve problems with warranty repair and claim trends. Their OBI system is a performance management application, since it helps Ford keep its costs in line for warranty repair services on a global basis. It also helps individual dealers stay competitive, because if they charge too much for a particular type of repair, they are at risk of not being reimbursed.

While this OBI system is essential to running Ford's warranty business, it has a strategic component as well. The data can be examined at a higher level to determine what it costs to perform

various types of repairs. This gives Ford a tremendous amount of knowledge about repair trends, potential mechanical failures, and so forth. This raises another interesting fact about OBI systems: Ford didn't start by setting up an analysis system for warranty repair. They first set up an operational system to manage the repair process. One type of system led to the other.

Improving Performance

As we've seen from the above examples, OBI and performance management often go hand in hand. Keith Gile of Forrester Research sees performance management as tactically and operationally focused, while traditional business intelligence is strategic.⁴ In either case, OBI solutions can help organizations track and forecast trends, identifying patterns that can lead to more efficient resource allocation.

For example, TELUS, the largest telecommunications company in Western Canada and the second largest in the country, used OBI technology to create an application that enables about 3,000 field-service personnel to track their productivity. By measuring their output, the goal was to drive performance improvements for such common field-service tasks as the installation and repair of voice and data services. Each employee has a scorecard, and the information they enter is automatically rolled up into scorecards to compare overall productivity against corporate and industry benchmarks.

Being able to track contributions at all levels encourages TELUS employees to take personal responsibility for their activities. Additionally, having detailed information allows managers to improve systems and processes to further drive efficiencies in operations. TELUS attributes \$1 million to \$2 million per month in productivity increases to this OBI system. The company also has an invaluable database of information about labor trends, which helps them determine how to allocate staff for certain areas and times of the year. Managers are better informed, and employee performance has improved radically.

From Performance Management to Business Activity Monitoring

While most BI vendors promote their products purely for query, reporting, and analysis, a few BI vendors are concerned with operational performance management as well. Commonly known as

⁴ Gile, Keith and Orlov, Laurie M., "BI and Performance Management Complement Each Other — But Serve Different Purposes," (June 23, 2004).

business activity monitoring (BAM) and business event monitoring (BEM) solutions, these OBI applications can help organizations track, monitor, and forecast everything from package deliveries to crime patterns.

“Business activities and underlying business tasks are the nucleus of how organizations operate on a daily basis,” points out Mark Smith, CEO and senior vice president of research at Ventana Research. “Building an operational performance management strategy involves deciding on the best place to integrate BAM and BEM technologies to meet business requirements. Organizations that want to become proactive and responsive – centered on processes and workflows, not just on transactions – must learn how to use business events.”⁵

BAM solutions rely on business intelligence and application integration technologies to refine automated processes based on real-time feedback. Information about a business process can be propagated from any information source – real-time ERP transactions, warehoused data, business-to-business systems – and delivered to line managers, executives, or automated business processes. When properly constructed, these information systems enable users to look across multiple business applications and accept events from multiple sources, such as those supporting customer relationships, the supply chain, and sales transactions.

In addition to auditing business processes, BAM solutions can be used to alert individuals to changes in the business that may require action and provide aggregated insight for strategic planning. Gartner’s Bill Gassman believes these real-time monitoring applications represent a fundamental component of operational BI. “Unlike traditional BI users, such as business planners and executives who monitor slowly moving indicators and trends, users of operationally focused BI applications cannot afford to make decisions based on ‘stale’ data,” he says. “Instead of understanding the past, they must understand the present.”⁶

For example, surveillance systems are already in use by Delaware, New York City, Houston, and other state and local governments. These systems rely on software from Information Builders to identify data trends and aid collaboration across multiple healthcare facilities, in order to speed response to potential healthcare emergencies. This creates an extremely effective first-response system, protecting citizens from potential threats of bioterrorism.

⁵ Smith, Mark, “Driving Operational Performance,” (*Intelligent Enterprise*, May 13, 2003)

⁶ Gassman, Bill, “BAM Enhances Operationally Focused Business Intelligence,” (Gartner Research DF-23-0697, 9 July 2004).

BAM applications can also provide aggregated insight to executives involved in strategic planning. For example, a trigger can be set to cause a message to be sent at a designated time or when a predefined threshold is reached, such as when inventory falls below a certain level or new sales figures are available. These solutions can be used to audit any business process in real-time, providing feedback and associated data to people or systems in order to improve the process – as key events occur.

For example, Merrill Lynch Credit Corporation created an integrated workflow management process that automates key tasks, tracks process cycle times, and obtains qualitative management information for setting and validating loan production goals. The United States Postal Service created a compliance system that identifies suspicious transactions and reconstructs purchase patterns to track potential money-laundering activity. What do these two organizations have in common? As with all the other organizations mentioned in this paper, they both used Information Builders' software for the job.

Getting Under the Covers: Technology and Tools

Shortening the “time to discovery” is the guiding principle of OBI systems. This is an important concept, since it affects how information systems are designed and integrated with the entire IT infrastructure. As we have seen, rather than using decision support tools after the fact to analyze problems, OBI applications must work in conjunction with the operational systems that run the business.

While most BI vendors promote their products purely for query, reporting, and analysis, a few BI vendors are concerned with operational performance management as well. “Vendors are highlighting the details of the styles of reports, but you must keep an eye on the underlying architecture that supports these deployments,” suggests Ventana’s Mark Smith. “Selecting the wrong product and supporting architecture could greatly impact supporting hardware and personnel costs . . . The question you should be asking is how reporting can help improve the operational and overall business performance of your organization.”⁷

In other words, not every BI product has the right capabilities to create the kinds of information systems we have described in these pages. Analytically focused BI products don’t scale well, they don’t read all the data sources you might have, and they can’t combine different back-end sources into a cohesive presentation.

According to Gartner, when building business intelligence applications, most enterprises focus on the elements that are visible to the business users, such as boosting functionality in query/reporting tools and the impact of BI on critical business processes. Far too little time is spent on the critical underpinnings that ensure a robust implementation, which Gartner calls the “behind the scenes” or “hidden” aspects of BI. “The architecture of the individual components, as well as the overall BI solution, can make or break a BI effort,” Gartner analysts report.⁸

OBI tools must be able to access data on the fly in native formats and combine dissimilar data types. They should not require a data warehouse, since they can work directly with data in a company’s production information systems as well. Technically, this implies strong integration capabilities and a superior architecture that can deliver information to thousands or even tens of thousands of people efficiently. Information delivery is the flip side of that coin: the tools must be able to route, deliver, and present information in a usable way. Let’s examine each of these architectural underpinnings in turn.

⁷ “Stealing the Show: Is Reporting Really What Your Organization Needs for Improving Performance?” (*Intelligent Enterprise*, February 7, 2004).

⁸ Friedman and Strange, *op. cit.*

Inherent Scalability

Scalability involves taking optimum advantage of computing, memory, and I/O resources and using those resources in an efficient, cost-effective way. Most of today's leading BI tools use a server-based architecture to simplify software maintenance, streamline report distribution, and minimize network activity. However, there are many subtle architectural features that are essential to scalability, such as non-persistence, server multithreading, native data adapters, and automatic report bursting.

An enterprise-caliber business intelligence tool must be scalable along three dimensions:

- Number of users supported by a single application
- Number of user types (developers, power users, analysts, business users) whose needs can be met by the solution
- Number of types of applications that can be created

The best BI tools are architected for Web deployment by using a Java-based approach with non-persistent connections, centralized management, and a "zero-footprint" client. We describe these requirements in detail in a related paper.⁹

Suffice to say, a Web-architected BI tool centrally manages its environment, applications, and user privileges, enabling administrators to work from any browser. It can support a growing environment with minimal training and maximum user acceptance. As it scales up, it requires minimal additional support staff and hardware. Contrast that last point with products whose ancestry is client/server. Maintaining more local data environments can make it necessary to add up to eight times the number of hardware processors and ten times the number of support personnel.

Data Integration Framework

With the right data-access technology, BI users can establish real-time links to production data sources and avoid the costly process of extracting, modeling, and loading data into separate reporting databases. As Gartner points out, data integration issues consume a significant majority of the effort expended in a BI project. "Designing a repeatable process by which data is

⁹ "Why We Scale," A Technology Brief from Information Builders (www.informationbuilders.com/products/whitepapers/).

acquired from operational systems, transformed, integrated, and delivered to the data warehouse is technically challenging.”¹⁰

Traditional business intelligence tools discount the time, cost, and complexity of the data gathering and preparation processes necessary for making data available and useful to people. They also see BI as beginning at a database or warehouse and ending as a standard report – completely ignoring the operational transaction systems, packaged and legacy applications, and electronic data exchanges out there in the extended enterprise, all of them needed for an accurate view of the business.

Operational business intelligence sees things differently. It views business intelligence as an end-to-end process that relies on a data integration framework. By creating a unifying infrastructure with a unified metadata layer, the framework makes all data available, accessible, and meaningful at all levels of an organization – no matter where the data exists, how it’s stored, or the latency involved in its access. Only a robust framework can overcome the gaps in data availability and accessibility to enable uniform and cost-effective information production – for a complete and consistent view of the business.

It’s not just how many sources a BI tool can access that’s important, but how well the tool can exploit each individual interface. Can it trigger the stored procedures of any relational DBMS, support variable-length records in VSAM files on the mainframe, and provide packaged native interfaces to ERP systems, such as SAP R/3, BW, BAPI, iDoc, and OLE DB?

The WebFOCUS data integration framework comprises an entire portfolio of integration technologies, architected to enable people and applications to access and manipulate data in a uniform way, regardless of its form, format, or location. The framework provides comprehensive, native access to more than 210 sources – including relational and legacy data, data in enterprise applications and staged in warehouses or marts, and real-time data from operational systems – on any platform. In support of both business and technical users, WebFOCUS employs different access techniques and tools to produce high-quality data, a reusable infrastructure, and comprehensive metadata. Access tools include packaged adapters, ETL, real-time transformation, EII, and Web services. Access techniques, which vary according to need, can include using ETL to extract, transform, and load data directly into a data warehouse or mart; directly accessing operational data stores or the files that service operational systems’ own

¹⁰ Friedman and Strange, *op. cit.*

application functions to access data; and trickle-feeding a data warehouse to populate and refresh it, using real-time transformation.

Ford's warranty information system comprises more than 80 million records, spread across Oracle and Teradata databases on mainframe computers. Its diagnostic reports and claims lists were built with sophisticated COBOL code that Ford was reluctant to pull apart and rebuild. Ford used Information Builders' WebFOCUS to build its OBI system because it can talk to these disparate data sources in native mode, and it doesn't require dealers to put any special software on their computers. WebFOCUS delivers performance as well, dipping into the huge database to pull out the records, report the complex statistical calculations, and draw graphs with drill-down links – all within 60 to 90 seconds.

Comprehensive Administration and Security

OBI implies many cultural issues for how information is shared and displayed. Users want personalized views of corporate data, while administrators want to maintain a secure and cohesive environment. Managers need to buy into the importance of involving rank-and-file users in operational business processes. The BI stakeholders will be more comfortable giving users this kind of responsibility if the tools are able to enforce the requisite levels of security. Administrators should be able to build and deploy standard reports, provide ad hoc reporting and analysis capabilities to specified users, monitor usage, assign user groups, define access rights, schedule distribution, provide event-driven alerts, and ensure security.

We've just described WebFOCUS User Administration Services, a utility that makes it easy for developers to set up the overall look and feel of any application – who gets the information, when they get it, how they get it, and so forth. User Administration Services can also be used to identify the correct security infrastructure and apply it to each reporting application, such as database security, roll-based security, and user-level security. Additionally, WebFOCUS can be integrated and synchronized with custom security systems, as well as any standard Web or database security system for single-user log-on capabilities.

Advanced information systems are self-aware, self-healing, and self-optimizing. WebFOCUS sets the ground rules in this department as well, with an autonomic server that is capable of running itself under varying circumstances and workloads by continuously adjusting its resources.

Consolidating Software Assets – The Need for Standards

IT organizations continually strive to minimize the number of tools they are responsible for deploying, maintaining, and upgrading. Having multiple tools for each specialized purpose becomes counterproductive, especially as an organization attempts to scale, enhance, and maintain the BI infrastructure. CIOs want to consolidate their software assets, a trend that is encouraging the adoption of corporate standards and multi-purpose EBIS tools.

Reducing the number of business intelligence tools minimizes infrastructure costs and makes life easier for IT professionals – two factors that motivated Henry Ford Community College to select WebFOCUS as its reporting standard. Since installing the software two years ago, developers at the college have generated hundreds of self-service reports for administration, enrollment, registration, financial aid, HR, accounting, and security. The college also shares Web-based reports with external companies as part of its Trade and Apprentice program, and plans to integrate WebFOCUS into its student information portal as well.

Why did Henry Ford Community College pick WebFOCUS for the job? “WebFOCUS met all our criteria – qualitative, quantitative, and financial,” answers Jim Homan, director of institutional development and systems at the college. “The price was right and its capabilities met the needs of college staff. Most importantly, when we put WebFOCUS to the test with our own data and reports, it was the only product that delivered the performance and results we needed.”

Integration and Analysis: Putting It All Together

To satisfy the needs of today’s enterprises, BI tools must function at the strategic, tactical, and operational levels. The real hurdles are technical ones: they must be able to deliver complex functionality through a simple interface, be easy to manage, and have an architecture for deploying information on a broad scale in a cost-effective way. In addition to accessing data from a data warehouse, operational BI systems must be able to extract real-time data from production business processes.

Information Builders is the grand facilitator of taking any info, integrating it into a cohesive environment, and making it available to large numbers of users. The OBI system created by TELUS is a prime example. It is noteworthy for its ability to seamlessly gather information from many different applications and data sources and present it to managers in the form of key

performance indicators. Extract, transformation, and load (ETL) technology is used to gather field service information from applications such as Siebel, SAP, and Microsoft Access, and to combine data sources such as DB2, SAP BW, FOCUS, Informix, and various types of flat files into an enterprise data warehouse. WebFOCUS accesses data in the warehouse along with data from operational information systems.

In the end, operational BI is all about flexibility. Each user and each organization has different types of reporting needs. Some want alert-based reporting, meaning they only want to see a report when predefined conditions change. Others want to receive periodic summaries, yet have the ability to drill down into the data when something sparks their interest. Some users need action statements that allow them to set other activities in motion. Still others want to be notified immediately via their pagers or cell phones when certain thresholds are reached. The right information infrastructure will easily accommodate all of these needs, allowing users to access information using familiar tools. If it doesn't, an organization needs to enlist extra programming resources to create custom capabilities or integrate third-party tools.

Gartner's Bill Gassman sums it up succinctly. By moving BI to the operational level, the people directly involved in the business processes can leverage data to make better decisions on a more immediate basis. "Operationally focused business intelligence applications combine the real-time alerting functionality of a business activity management system, the historical information and analytic power of a BI environment, and the context and execution engine of a business process management system," he says.¹¹

With the right tools, you can do it all.

Setting the Standard for OBI

Information Builders sets the standard for operational business intelligence and enterprise reporting. The WebFOCUS product is a fully integrated suite that enables customers to make fast decisions based on complete information. WebFOCUS also provides access to more data sources and runs on more platforms than any other BI product.

- **Ease of migration** – WebFOCUS is optimized for native deployment in dozens of different operating environments.
- **Resource efficiency** – With WebFOCUS, no client-side software is required, simply a standard Web browser with no plug-ins.
- **No license fee surprises** – WebFOCUS server software is licensed on the designated CPU. Additional user licenses are only required for domain-based reporting or individual security.
- **More effective user capabilities** – A parameter-driven reporting environment allows the bulk of the user population to easily generate complex reports while power users create customized, ad hoc reports.
- **Ability to leverage existing knowledge and investments** – WebFOCUS customers can take advantage of a worldwide service organization for local technical support, training classes, and sales support.

About Information Builders

Information Builders was founded 30 years ago with a very simple mission: to help business people access information easily and quickly. We have succeeded. Today, our customers can efficiently put information in the hands of everyone they rely on to support, supply, run, and transact with their businesses. Thousands of customers and partners all over the world – including most of the Fortune 100, all major federal agencies, and many educational institutions – use Information Builders’ software and services to turn data into actionable information that helps their customers, employees, managers, and business partners make better decisions.

We’re an established vendor with mature solutions:

- \$300 million in revenue
- 30 years of experience
- More than 1,750 employees
- Over 12,000 customers
- 60 offices worldwide

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