

The Cost of a Question

**Examining Total Cost of Ownership for
Business Intelligence Solutions**

A White Paper

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Executive Overview

Today's business intelligence (BI) software products are expected to handle a broad spectrum of activities, from scheduled reporting to ad hoc queries to complex analytical processing. To meet user needs, BI vendors that were formerly concerned mainly with enterprise reporting are now delivering enterprise business intelligence suites (EBIS) consisting of production reporting, portal connections, spreadsheet connections, ad hoc reporting, and OLAP viewing. This makes it easier to purchase and maintain software assets because IT managers can minimize the number of vendors they work with. But it also necessitates careful planning and cost projections to ensure IT resources aren't overwhelmed by burgeoning use of the tools.

“With the move toward convergence, enterprises can begin planning to reduce or limit the number of vendors and technologies they use for many business intelligence (BI) activities,” says Gartner analyst Howard Dresner. “This suggests a needs assessment process to determine how BI technologies are used today and how they will be used into the future.”¹

Business intelligence tools were initially dominated by analysts and power users trained to use multidimensional databases, online analytical processing (OLAP) tools, and other specialized software. The new breed of business intelligence applications enables casual business users to access and analyze information through intuitive user interfaces using little more than a Web browser. As BI tools become more capable and widely used, organizations must be able to accurately gauge the associated costs over both the short and long term. IT managers must consider not only the up-front costs for hardware, software, and infrastructure, but the ongoing costs of maintaining and upgrading those solutions over time.

Yet many organizations roll out BI solutions in an iterative fashion without giving adequate consideration to the optimum way to deploy, upgrade, and maintain their software assets. In short, they fail to consider the total cost of ownership (TCO) for these important solutions. “Organizations often focus on visible cost drivers like product-license costs and consulting fees,” suggests Jim Mullen, business intelligence practice leader in Information Builders' consulting organization. “But it is more difficult for a business to forecast the total expected breakdown of maintenance costs – labor and assets – for any given IT solution.”

¹Dresner, Howard. “Enterprise BI Suites and Reporting: Convergence at Last.” Gartner, Inc., September 2002.

Getting a Handle on BI Expenditures

There are dozens of cost elements to consider when calculating TCO, most of which can be grouped into three major categories: purchase costs, implementation costs, and maintenance costs. Some questions to ask at the outset of a BI implementation include the following:

- Which reports require real-time information versus data from a warehouse, and how will the infrastructure accommodate them?
- Can the BI architecture be economically expanded to support a growing user base?
- Can the tools handle constantly expanding internal user requirements as well as external deployment to customers, partners, and other third parties via the Internet?
- How much does the BI vendor charge in license fees for self-service users (who are not named or identifiable)? Do they make a licensing distinction between generalized reporting and personalized reporting?

Answering these questions requires a solid understanding of the BI architecture – how it is configured, how it is deployed, and how it is scaled – as well as an informed estimate of the current and potential user base. Armed with this information, you can predict how deploying specific types of BI applications will impact costs – both the cost of various types of user licenses and the hidden costs associated with expanding the BI infrastructure. It is particularly important to know precisely how a vendor will charge for each type of user, since it can have a big impact on overall costs down the road.

If you asked most business owners who sponsor BI initiatives, they would probably describe a TCO as being comprised of systems integration, design, and implementation; software license costs; and IT staffing to support the application solution set. But that leaves out the downstream, monthly recurring cost of application maintenance and support – when the software vendor and systems integrator are long gone.

Most vendors tally up costs such as assets, labor, and duration – with assets including data center, hardware, networking equipment, bandwidth, software licenses, and tools – to name a few. One-time fees such as system design, implementation, and product licenses are

predictable and consistent, although maintenance fees are typically not negotiable. (For example, you might get a discount on the list price of the software, but the maintenance fees are fixed as a percentage of the list price – anywhere from 15 percent to 25 percent.)

To make matters more difficult, implementation costs can change in unexpected ways. BI managers commonly experience a *Field of Dreams* phenomenon – build it and they will come – as users both inside and outside of the organization discover the benefits of real-time reporting. That’s why Gartner analyst Kevin Strange believes enterprises should continually evaluate BI and data warehouse implementations to reduce costs and increase the value of the opportunity. “Even successful data warehouse implementations will be under pressure to get more done with less, creating a need in 2003 to evaluate everything from implementation topology to user training,” Strange says. “Under continuing economic pressure, most enterprises are questioning and evaluating all of their IT projects and efforts, even the ones that are considered most strategic, such as data warehouses. Across the enterprise, departments are being asked to do more with less. However, it is critical that enterprises reevaluate their data warehouse strategies and emphasize the need to reduce redundancy and complexity while also increasing the total value of opportunity (TVO).”²

² Strange, Kevin. “Unearthing Better Value From Data Warehouses in 2003.” Gartner, Inc., December 2002.

Case in Point

Many business intelligence applications are created initially for departmental use. As they grow in popularity, they are rolled out to a larger user base. In other instances, reporting requirements change or expand beyond the capabilities of the toolset. It isn't always easy to predict these progressions, let alone accurately forecast their impact on IT budgets. In some cases, IT managers are surprised to discover that scaling the BI infrastructure is more than a simple matter of extrapolating the existing demand on resources.

Consider the case of a leading wireless network provider with towers and property located throughout the U.S. and U.K. To support all their daily and monthly reporting, this organization depends on various database applications and an ERP system running on several different computing platforms. Over the years IT and other groups in the company have acquired reporting tools to run report applications, and the firm also has created some home-grown reporting systems. To access the company's disparate data, people either transform it into new formats or dimensional cubes, or write report queries against existing data sources.

In 2003, the company set out to create a common enterprise reporting solution that could serve the needs of all employees and partners. Evaluators, including developers and users, reviewed the tools currently utilized within their organization. Their mission was to eliminate redundancy, provide expanded functionality, and open up the opportunity to extend BI reporting beyond their existing firewall.

Before making a final decision developers had already become involved with one vendor in delivering an initial phase of the enterprise reporting project with a completion target date of one month. At the end of that month, they were to begin training users on the initial reporting solution while working on the next phase of the implementation, which was to include hundreds of additional applications aimed at a user base intended to comprise enterprise employees as well as suppliers and even customers.

At that point, they discovered that several issues were preventing the company from moving forward to expand the current environment:

- Unexpected license fees
- Prohibitive costs for building and maintaining dimensional data structures or cubes

- Exorbitant hardware and installation requirements
- Inability to deliver effective user-reporting capabilities
- Failure to leverage existing knowledge and resources
- Limited and unstable vendor support with limited local resources
- Insufficient IT resources and expertise to build a large range and number of applications using the vendor's various tools
- The need to build from scratch an easy-to-use executive interface

With their current licensing structures and technology, most of the BI vendors evaluated could not scale up to deploy hundreds of applications without significantly increased license costs, additional hardware purchases, and escalating support requirements.

Seeking a Cost-Effective Solution

Based on its experience implementing Web-based self-service reporting applications for companies of all sizes, Information Builders put together a detailed proposal for a successful BI solution for this global wireless network provider. These same recommendations pertain to many organizations evaluating or expanding BI solutions. Let's look at them in detail.

An Extensible Architecture – Without Growing Pains

An effective BI environment must be able to scale easily and cost effectively to meet new and expanding business requirements. The environment should use a server-based architecture to simplify software maintenance, streamline report distribution, and minimize network activity.

While most vendors boast about their thin-client orientation, that's not good enough for broad external deployments. For example, some vendors use the common gateway interface (CGI) protocol to connect PCs to servers, which requires separate resources for each connected user – often as much as 10MB to 20MB per user. This approach works fine for departmental implementations, and even for some large-scale corporate rollouts. But when it comes time to deploy a self-service application over the Internet – where user loads can easily number in the tens of thousands – the cost becomes prohibitive.

For example, if this wireless network provider chose one of its other existing BI vendors, it would need to add two additional servers to support the estimated user load, rolling up to as many as four over a two-year period. That would cost about \$100,000 just for the initial hardware purchase, plus additional system administrators at a fully loaded rate of about \$60,000 per administrator per year.

As this company quickly learned, a truly scalable BI tool should have a zero-client footprint, with no software other than a standard Web browser required on user devices. Not only does this ensure that hardware and administrative costs are kept to a minimum, but it minimizes training costs as well, since users don't need to contend with a unique client-side software environment. Industry experts such as Howard Dresner believe this is a prerequisite for self-service applications.

Information Builders' WebFOCUS business intelligence environment supports a Java™-based approach with nonpersistent connections. Additional users don't add to the memory footprint,

and concurrency is not impacted if somebody forgets to turn off their browser. That's because WebFOCUS is a true zero-client solution – no plug-ins or client-side software of any kind is required. WebFOCUS would allow the wireless network provider to deliver BI functionality to all of its users without requiring a massive hardware upgrade or installing any client software on user PCs.

Comprehensive BI Capabilities – The Swiss Army Knife of Software

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. Thus the starting point for managing costs is to pick a comprehensive BI environment at the outset.

Each user and 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 piques 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 types of reports, allowing users to access information using familiar tools. Otherwise, an organization needs to enlist extra programming resources to create custom capabilities or integrate third-party tools. At an average cost of \$1,500 to \$2,000 per day, that quickly becomes an expensive prospect.

WebFOCUS' Business Intelligence Dashboard delivers an intuitive front end for executive users. To construct such an environment for the wireless internet provider's executives, other vendors projected a three-month development cost. Similarly, WebFOCUS' Managed Reporting environment provides a great ad hoc development environment for power users who may not know how to properly join tables and what JDE table and file descriptions are. And it's a simple matter to develop a significant number of prejoined reporting objects for all users to have access to within their organization.

Getting the Right Data, Thanks to Embedded ETL Capabilities

IT pros calculating the TCO for a BI implementation often overlook the development, deployment, and support required for data extraction, transformation, and loading (ETL) processes. These processes are essential and ongoing, since it is here that an organization acquires data for reporting and analysis, as well as refreshing it so the data is relevant over time. “When evaluating the TCO for a data warehouse implementation, enterprises must include the staffing requirements and computing resources required to build, manage, and execute the ETL processes,” says Strange. “Staffing – for the implementation and support – needs careful evaluation because of the many factors that influence it.”³

It is not sufficient for a BI solution to access only a limited number of data sources. For example, to fulfill the needs of this globally focused provider, the company referenced here must access, integrate, and cross-reference new data, external data, and legacy data. According to corporate IT pros, cross-referencing data with multiple public and partner data sources increases the value of information and makes decision-making more accurate and timely. In the past, they faced the prospect of writing code to migrate data and connect dissimilar data types.

WebFOCUS, by contrast, adheres to common standards for connectivity, with native access to more than 85 types of data on 35 computing platforms. This shields developers from the arduous task of writing code to support data access, transformation, and movement, dramatically simplifying report development when new types of data are involved.

Real-Time Reporting From Production Systems

Many organizations believe they have to build a data warehouse before they can generate custom or scheduled reports. But if the BI environment supports native access to the database systems at hand, consolidated reports can be created directly from production systems. There are several advantages to this approach. First, end users don’t have to wait for a data warehouse to be completed before they can derive benefit from the BI tools. Secondly, instead of relying on dated information that is only periodically staged to a data warehouse, users can access real-time data directly from operational systems. Last but not least, this approach takes the pressure off of the IT group to deliver a data warehouse right away – if at all. As long as

³Strange, Kevin. “Data Warehouse TCO: Don’t Underestimate the Cost of ETL.” Gartner, Inc., March 2002.

system administrators have tools for analyzing queries and tracking resource usage, report procedures can be safely executed against production data sources.

WebFOCUS Resource Analyzer allows administrators to easily determine what data is requested, how often it is accessed, and how quickly it is delivered to requesters. It generates lists of the longest-running reports and identifies which queries consume the most CPU resources. Armed with this knowledge, administrators can make sure that reporting activities don't adversely impact production data processing activities. Similarly, WebFOCUS Resource Governor uses intelligent governing technology that can predict the required system resources before a request is executed. It can then identify and stop problem queries before they deplete costly CPU cycles and bog down critical systems and networks.

Reducing Administrative and Network Resources

In those cases when a data warehouse is required, access through the Web simplifies its deployment to a large user base. Initially, the primary motivation for replacing traditional client/server applications with Web-based applications was lower TCO and zero administration. Relative to client/server applications, the per-seat costs of Web-based applications are less. Training costs are reduced because for the average user Web applications are easier to learn than client/server applications. However, the real savings come from the reduction in administrative costs. Administrators are not burdened with distributing upgrades, patches, and applications to individual desktops. The changes take place on the server, which makes them automatically available to application users, and that reduces software distribution and data synchronization costs.

In the Internet age, browser-driven applications have quickly proven their worth. Yet many BI products still require client-side software to perform complex tasks such as statistical analysis and online analytical processing (OLAP). The global wireless network provider knew there was a better way. By creating a centralized, easy-to-use Web reporting environment for all of its departments, corporate developers can eliminate duplicate reports (which saves programming resources) and multiple departmental databases (which saves disk space and ensures consistent reports). And with OLAP built into the reporting solution, the same Web environment can be used by analysts and by other business users.

This same line of thinking pertains to report distribution as well. If you need to distribute 10 different versions of the same report to 10 different people, some BI tools force you to run and distribute the report 10 different times. More mature BI environments such as WebFOCUS allow you to run the entire report, then use an automatic bursting mechanism to distribute each section to the intended recipient. What's the take-away point for IT decision-makers? When complex queries are submitted, only the answer set should be sent to the requesting user. This type of architecture minimizes network congestion – and bandwidth requirements.

Leveraging Assets, Maximizing Reuse

Many organizations initially used client/server-based reporting systems, which were restricted to a few dozen or, at most, a few hundred users. Widespread usage of these applications has been hindered by application and network costs. Today, by relying on the Internet and focusing on HTML production reports, enterprises have been able to substantially broaden the recipients of warehouse analysis to include thousands of users both inside and outside the enterprise. Increased demand is also being created as Web warehouse tools and applications are transformed into enterprise portals, and analytical applications are extended to transactional systems.⁴

These BI solutions must optimize the use of existing hardware, software, and network assets wherever possible. Reporting applications should be interchangeable among popular computing platforms such as Microsoft Windows, UNIX, AS/400, and mainframe systems. This way, organizations can utilize the computers they already have in place. As business requirements change, they can migrate their reporting applications intact to other platforms. Sound straightforward? Guess again. This was a red flag for our wireless network provider. The company's initial BI software would have required them to purchase two additional servers. By contrast, Information Builders proposed installing it on an existing UNIX Sun Solaris 2500, which had plenty of capacity to support their expected rollout.

This is a fundamental precept of IT deployments, and it applies not only to server hardware, but also to client-side personal productivity tools as well. For example, most organizations have made tremendous investments in e-mail, spreadsheets, Web browsers, and other common

⁴King, David R., Ph.D. "Web Warehousing: Business as Usual?" *DM Review*, May 2000.

productivity tools. Rather than forcing them to learn a proprietary decision-support environment, why not let them retrieve and analyze information using the tools that are already ingrained in the business process? This dramatically reduces training costs, since users don't need any special knowledge or skills to use the reporting system.

Constructing a Robust Data Security Architecture

BI tools should work with existing security constructs, from network and operating system security to database security. On top of that, developers should be able to add application-level security and user-based security down to the field level. This type of comprehensive security architecture minimizes custom development while protecting confidential information. WebFOCUS developers obtain these capabilities right out of the box.

This wireless network provider discovered another bonus as well. Because WebFOCUS can import SQL code into reports, any reports that have been created with SQL-based tools can be used within the WebFOCUS environment. WebFOCUS can natively access all the major ERP packages, including their existing J.D. Edwards package as well as their Lawson HRD system. If reports or ETL jobs are set up against one data source and later the data source changes, the reports and transformations do not need to change.

One of the cornerstones of the WebFOCUS solution is its metadata (master files or "data about data"), which facilitates a uniform relational view of all data in the enterprise. End users don't need to know where the data is coming from; all they see are the data element and report constructs that have been presented to them. Developers can apply user-friendly aliases to field names. Even fields that have different names within different data sources can be given the same aliases. This makes it easier to learn about the data and reduces training costs.

Comparing Licensing Costs for BI Tools

The biggest "gotcha" came when this global wireless network provider discovered the license costs associated with additional users. With an incremental cost of \$400 per user to support each self-service OLAP user, rolling out its new reporting system would require a licensing

outlay of \$400,000 for 1,000 self-service users – based on ten \$40,000 “license packs” for 100 users each – a hefty-enough cost. But in addition, there would also be the cost to build and maintain dimensional cubes for all those users! Surprising as this sounds, the charge for accumulating users adds up quickly for most BI vendors, particularly in the area of self-service applications – precisely the area where most organizations expect rampant growth.

For example, assume you wish to deploy your BI software to a large corporate user base. You purchase licenses for 10 developers, 200 business users (100 of whom are enabled to use Excel), and 1,000 self-service users. Here’s how three popular BI vendors break down the charges.

Type of User	Cognos	Business Objects	Information Builders
Business	200 x \$695 = \$139,000	200 x \$395 = \$79,000	200 x \$540 = \$108,000
Developer	10 x \$1,995 = \$19,950	10 x \$1,995 = \$19,950	10 x \$795 = \$7,950
Excel	100 x 0 = 0	100 x \$250 = \$25,000	100 x 0 = 0
Self-Service	1,000 x \$400 = \$400,000	1,000 x \$395 = \$395,000	1,000 x \$100 = \$100,000
Total	\$558,950	\$518,950	\$215,950

Advantage, Information Builders

The company also ran into snags finding knowledgeable consultants who could help with phases two and three of their deployment plans. They needed a stable, full-service vendor that could implement their applications efficiently and effectively. The third-party BI vendor they began with just didn't have the resources to finish the job.

It is clear that Information Builders' WebFOCUS software is the right fit for the company's needs, based on its predictable cost, comprehensive abilities, and extensive vendor support. IT pros summed up the business drivers as follows:

- **Ease of migration** – WebFOCUS is optimized for native deployment in the HP-UX/Oracle environment
- **Resource efficiency** – With WebFOCUS, no client-side software is required, simply a standard Web browser with no plug-in
- **No license fee surprises** – WebFOCUS server software is licensed on the designated CPU; additional user licenses are required only for domain-based reporting or individual security
- **More effective user-reporting capabilities** – A structured ad hoc query environment allows the bulk of the user population to easily create complex reports while power users can create advanced ad hoc queries
- **Ability to leverage existing knowledge and investments** – The county can leverage existing HP-UX expertise in conjunction with Information Builders' local technical support, training classes, and sales support

This global wireless network provider is not alone – corporations and government agencies at the local, regional, and national levels are looking for optimum ways to present information online, both to internal and external users. When the U.S. Federal Emergency Management Agency (FEMA) needed to access important insurance data that was buried in mainframe databases, they brought in consultants to construct a more modern environment using WebFOCUS. Today, FEMA staff no longer leaf through cumbersome “green bar” reports to find the data they need. Instead, they browse insurance data posted on a new intranet site, select just the information they want to see, and get an on-screen report or download the data as an Excel spreadsheet. “With WebFOCUS, we were able to skip a lot of steps in the development process,” says Bill Barton, a project manager who worked with FEMA. “The resources we needed to do this were very small.”

Barton estimates that using conventional Web and database software to export data from FEMA's mainframe, store it in a new database, and link that to a Web server would have cost about 100 times as much – more than \$500,000 – and taken about two years to complete. Instead, using WebFOCUS, it only took six months, and they saved more than 90 percent of the development cost and time that conventional solutions would have required.

Information Builders has more than 25 years of experience implementing BI applications. Companies all over the world have used our solutions to build Web-reporting systems that run on intranets, extranets, and the Internet. The New York Department of Health restaurant inspection application, which is available on the Internet, receives more than 20,000 hits per day and runs against an SQLSVR database on a Microsoft Windows NT platform. At the Renfe Spanish National Railroad public Web site, users anywhere in the world can instantly access train schedules via WebFOCUS reports using Oracle and IMS data. Ford Motor Company's warranty system has approximately 30,000 users in dealerships across the United States. New York City-based Mount Sinai/NYU Health is delivering information over an intranet to executives at its five hospital campuses – for better decision-making and cost-savings.

The list goes on. Thanks to Information Builders' affordable licensing structure and efficient BI deployment architecture, these customers have constructed cost-effective reporting applications that will serve them well over the long term.

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