What Makes BI "Enterprise"?

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Abstract

Business intelligence helps management better understand the condition of their organization through descriptive analysis while moving into predictive analytics to better assist and plan with forward-looking analysis. It is useful to individuals running their own businesses and to executives in global corporations. In the past, only the latter businesses were referred to as "enterprise," but the democratization of powerful technologies means even smaller companies can access disparate data and visualize analytics as larger enterprises do.

However, enterprises often fail when attempting to add BI to their IT offerings. One problem is that many technologists look to technology first. To address enterprise BI, start by understanding what management needs and then translate that into technical solutions.

The companies that build a truly integrated platform, with data and metadata fully shared and managed from source through desktop, will have a strong advantage. Software developers need to provide a smooth, vertically integrated information chain from source to visualization.

Introduction

One software industry founder told me his platform was what made his business intelligence software "enterprise quality." When I asked about a user interface (UI) that allowed customers to easily see reports, roll up information from different divisions, and manage other critical tasks, his response was that it was just a UI issue. It was only the platform that made his product enterprise quality.

That is something I've heard repeatedly throughout my career, though to be fair, not just from IT professionals working with BI. Technologists spend years focusing on the platforms because that's where most of their technical interest lies. That challenge provides joy, but *companies*

use technology, and even technology companies are focused on business at least as much as technology.

Enterprise Is Not a Starship

What makes BI enterprise? Let's first answer the question: What does *enterprise* mean?

At its simplest, any formal business is an enterprise, but that's not what we mean. The old definitions of small, midsize, and large businesses had boundaries usually based on annual revenue—for example, large businesses had a minimum of $1 billion in revenue. It was these large, mostly global corporations that used enterprise software.

The success of both the software and new business models has changed that. The multiple departments and international presence that defined the enterprise customer are no longer limited to the largest companies. Most midsize businesses now have the features we used to describe as enterprise, as do some smaller companies. Those features include:

- Multiple internal departments split by product or region

- A hierarchy of executive management at both divisional and corporate levels

- A requirement to roll up cross-functional information to help executives understand corporate history and more accurately plan for the future

- Sufficiently large processes that require formal tracking of vertical units, sales, manufacturing, etc., using software such as sales force automation or enterprise resource planning systems

ETL and BI: A Technical Viewpoint

It's the final feature in that list that leads us to enterprise systems. Even smaller companies can organize themselves in complex ways, but usually the company's initial executive team handles everything and the number of deals is small enough that complex systems aren't cost justifiable. It's only when a business has the complexity or volume that requires significant process or tracking software that it's considered enterprise.

The simplest explanation for enterprise BI is that the BI system must be able to access data from the full enterprise (including from enterprise software packages) and provide it to management. As those in the BI industry understand, the technical issues restricting such data access are great, so that's been a focal point. Most enterprises initially focused on how to access, aggregate, and relocate system data for executive use. This has happened from the early ETL days until now, with companies concerned about their ability to do this critical work.

However, although data access and manipulation is critical, it's not sufficient. MicroStrategy, Cognos, Business Objects, and others came along and focused on the presentation of information. Worrying about ETL and slapping on Crystal Reports for simplistic display was no longer sufficient. Providing management with better analytics tools became a critical requirement. This transition formalized the concept of BI. It's one thing to find and grab the data, but it's another thing to turn that data into information.

Finally, there was a new category of solutions—an outgrowth of old reporting systems—that businesses could use to look at their information. Those were the first enterprise BI solutions. However, notice something critical: the sale to most companies wasn't just Business Objects or MicroStrategy—it was Business Objects *and* Information Builders, Cognos *and* Informatica, or some other combination of BI *and* ETL. Both are required to provide enterprise information.

As with all technology, the more BI was adopted, organizations expected more *and* less of BI: more data and more users; less time to wait for answers—always a challenging conundrum.

Trends That Affect BI Today

Two new issues have become critical to businesses: big data and mobile devices. They are changing how we look at BI.

Big Data

Big data is a bit of a misnomer. There is always big data and that continues to grow. The term amuses me as much as the art term *modern*. After that period, we had postmodern, but where do we go from there? There will always be a new modern, just as there will always be a new big data. The issue in enterprises is *wide data*,[1] as a vast variety of data is being tracked in multiple places, from a variety of sources, and in many formats.

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Big data should really be called wide data because the volumes are a technical issue, but accessing and massaging a variety of new data sources and integrating them with the plethora of existing systems is what enterprises must address.

Regardless, big data refers to new analytical tools to improve sifting through large amounts of transactional data for trends, outliers, and other actionable information. Big data is an extension of what people were already doing, and it's a critical change even if it is an evolutionary one rather than the revolution too many people present it as being. New abilities to track trends by demographic groups will enhance retailers just as other big data analysis will help other verticals.

What big data means to BI is that the largest of the data sets being analyzed are far larger than many systems can handle. When you create a platform, you create it for expected traffic. You create algorithms that you think will provide the appropriate response for current data volumes. You want a business's investment to solve its existing pain points. You might work in a bit of wiggle room for a short-term expansion in volume, but if you

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[1] Teich, David A. [2015]. "Focus on Wide Data, Not Just Big Data, in Analytics Systems," searchbusinessanalytics.techtarget.com, January 2015. http://searchbusinessanalytics.techtarget.com/feature/Focus-on-wide-data-not-just-big-data-in-analytics-systems (accessed December 21, 2015).

look back at expected volume growth in existing systems, you'll be unprepared for the high-end growth that some big data has required.

In-memory BI solutions are one example. Most solutions rely on a single server. As data volumes expand, those servers become increasingly specialized and more expensive. That means a significantly higher outlay per data unit. It also puts a clear upper limit to data sizes that can be manipulated; server memory, regardless of financial outlay, is not unlimited.

Mobile Devices

From CICS to smartphones, access has changed. The long dominion of the desktop PC is declining, but many BI firms have been slow to adapt. Planning for the next change means that a few assumptions have been made about BI interfaces:

- We're used to smart clients

- Broadband from servers to desktops within a corporate firewall provides the connection between client and server

- A certain screen size is assumed

- Desktop licensing models have meant the number of people in a corporation with access to the BI system is often limited

The power of PCs has grown phenomenally, which means large client-server applications such as BI can rely on the PC to off-load some of the server's processing, providing better response to management with lower-priced servers. However, tablets have significantly less power and smartphones are smart only in comparison to older telephones. To provide analytics to mobile devices means rethinking the client-server relationship and moving a greater processing load back to the server.

We must also factor in the difference between broadband inside a firewall and wireless broadband. The latter is far narrower. You can't push the same amount of information to a tablet or smartphone used remotely as you can

on your corporate backbone. That means dashboards, reports, and other analytic elements must be rethought for mobile devices. What's the minimum level of detail someone working off premises needs to be productive?

I don't remember the last time I saw a desktop monitor smaller than 21 inches. Laptops typically provide 14- to 17-inch screens and larger sizes are available. Tablets are usually 8 to 10 inches and smartphones are far smaller. Information displays need new techniques for the mobile world. On the technology side, how to get enough information onto a screen is a challenge. In addition, we must consider how to manage multiple reports or configurations for each device, depending on how the device will add to the complexity of the software system, the time required by IT staff, and the work of business analysts.

Per-seat licensing, whether named or concurrent user, is the typical enterprise software practice. For powerful applications, that licensing can be expensive and ends up limiting access to systems.

Smartphones and tablets have a wider market and less powerful applications, so licenses for each device generally cost less. Companies have had to modify their processes in response but haven't realized cost savings, as the resulting increase in volume of mobile business has offset the lower price. This increased volume has also led to a new problem. Servers were not often designed to handle such high levels of traffic, which has led to clashes in databases, lost data volume or limited concurrent users for in-memory applications, and a host of other performance problems.

What Business Needs

It's important to solve those problems and companies are working hard at it, but those who don't want to be labeled "dinosaurs" or "last generation" need a way to stay ahead of the curve. How do we turn things around and look forward?

We can start by lifting our heads out of the trenches. Don't focus on the data and the technologies required to transform the data into useful information. Start

by looking at what business needs to make intelligent, proactive decisions.

Strategic planning can help longer term. Rather than looking at point technologies, the market should be addressing issues at a higher level. What does big data want? It's not hardware. Remember, it's not *computer* intelligence but *business* intelligence. The people paying for and using the systems want to better understand their businesses in order to make better business decisions.

Today, business managers are asking enterprise BI to:

- Get data from all the systems in their companies

- Provide their analysts with tools to create reports about the state of their companies

- Let them see the results on their desktop monitors, their laptops, their tablets, and their smartphones

- Help more people see information

- Allow them to drill down through reports to better understand information as needed

- Provide them with the ability to run what-if scenarios and predictive analysis

- Do it quickly

- Do it securely

- Make it manageable

What's important to note is that translating the list into technical specs means more than looking at the server platform or the client devices; it means starting at the business needs. A number of vendors are already talking the talk. Different versions of "empowering the user" are being used in multiple companies' marketing messages.

Get the Data

One way to address what a business needs is to stop thinking about BI and ETL as separate. That's a techni-

cal viewpoint; the business customer couldn't care less. The C-suite wants information and doesn't want to know how the sausage is made. If we look at most BI sales today, they're not made by a BI company but by a BI company and an ETL company working in partnership. You can't perform analysis until you get the data. The problem is that there's still no widely accepted standard for data interchange in the BI space, so one-to-one integrations are still the norm. All the issues with linking two disparate data sources are beyond the scope of this article, but everyone in the industry understands them.

Provision Analysts

This change of perspective is happening now. From written reports to spreadsheets and computer-printed reports, static reporting has historically been the norm. Early dashboards were just an accumulation of static reports. Moore's Law has provided us with faster hardware that has allowed firms to create reports with more than the simplest of drill-downs. Part of data discovery is the ability to look at a wedge from a pie chart and drill down to see details as well as to filter on dimensions, look at related information, and continually look at different levels of information.

Providing analysts with tools is more than adding deeper reports; it's what analysis you can do. The increased computing power is also providing access to better algorithms. More complex analysis can provide additional insight. Big data is more about the ability to perform complex analysis than the specific size of the data set.

See Results Now

Notice that the closest thing to a hardware specification in the above list is the ability to access information on mobile devices. The two main issues with mobile devices are real estate and computing power. The former means the UI becomes even more important in order to fit the most information possible in a usable format.

The challenge for companies using BI is to realize that this task is not one for technologists but for UI and graphical design specialists. It's more about cognitive ability than technology. The firms that realize this and

work with appropriate tools to design those screens will take the lead.

The other issue is computing power. We've spent a few decades with powerful client PCs, such that we can off-load server tasks onto PCs. Although smartphones will get more powerful, it's unknown when they will be able to handle more processing tasks, so many tasks are moving back to the server for processing. This should be one of the key drivers for a distributed architecture, because supporting large numbers of less-powerful devices means you need to better allocate small units of processing—a task clearly enhanced by distributed processing in the cloud.

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Provide Information to More People

The power and pervasiveness of modern computing means more knowledge workers can take advantage of BI. The past saw business analysts, specific individuals in IT, or a department creating specific reports for specific users. That created a bottleneck.

The anytime, anywhere need for current business information is leading a transformation from the business analyst being a bottleneck and pushing information to enabling knowledge workers to directly access and build reports.

The first generation of products has provided report-creating capabilities via the knowledge worker's desktop. The key problem with many of those tools is that they were designed by engineers with an engineering perspec-

tive on what business users want. The tools are often unwieldy and unintuitive. A serious effort is needed to create tools that help both the information guru and the business manager create what they need easily.

Drill Faster and Deeper

The days of a pie chart expanding a single slice when clicked are dying. Several vendors are creating interfaces that provide data discovery capabilities to the business masses. See sales by region? Drill down to local, slice by product, re-slice by vertical? Allowing knowledge workers to wander through the information is a much better way to provide insight than is requiring a request to create a new report. An interface that allows such flexibility means not only a more efficient knowledge worker but also a less overburdened IT staff.

What-If Predictive Analysis

Management doesn't work to understand the past because they're historians. They do it to uncover patterns that might help predict the future. As BI has grown in power, the time to understand information about the past has shortened from monthly reports to real-time dashboards. The computer power that allows this is now providing the capability to run simulations of business operations and to vary conditions to perform predictive analysis.

That ability is only now being tied into BI. Early predictive analytics are either very expensive or of limited functionality. However, within the next 18–24 months, expect to see the power-to-price ratio change to the business user's benefit.

Do It Quickly

Real time is always a dangerous term. First, it means different things to different people. Minute adjustments to a fighter jet in flight follow a different interpretation of real time than a person at a desk reading dashboards. For business systems, a current rule of thumb is that a response time of three to five seconds is reasonably real-time for all but the most complex analytics—any longer and the users become frustrated.

That response time is driving ISVs to work with distributed servers and to pre-calculate standard metrics. It means using lean interfaces that can quickly display new information. It also means that more thought has to be put into what can be mobile versus what needs higher connectivity and more client-server power.

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Do It Securely

Privacy matters. Business information may contain not only a corporation's intellectual property but also confidential information about clients. Ensuring protection of information is critical and becomes more so as far more people access the information, especially because much of that access is from beyond the corporate firewall.

However, security is more than just securing the transmission and controlling access to information at technical and networking levels. Just as retail stores often lose more from insider stealing than from shoplifting, ensuring the right access to the right information for approved users is critical.

Many vendors seem to have fairly simple security schemes that create a single set of roles for access. Yet that's based on looking back at a world where each installation of a product at a company is independent.

As BI grows in breadth of access, there are colliding security interests. First, the growth of SaaS, the cloud, and other forms of shared computing power means that servers will begin to overlap and share more information. A BI back end will manage the flow of information from many operational systems and roles will become more complex. That can conflict with the push for single sign-on passwords to control the unwieldy proliferation

of system passwords at any large firm. A manager might be assigned a role but would have different access to different systems all managed by the same set of metadata.

Make It Manageable

Manageability combines a few points from our discussion. Knowledge workers need to be able to understand and manage dashboards and reports. They should be able to create and do basic manipulation of information on the fly without IT business analyst involvement, which will enhance the productivity of both sides.

The other management issue is the pure IT side, the first part of which is solely a technical issue. Can the applications go onto affordable and reliable servers that IT or contractors can manage affordably? Both human and financial costs are always of concern; bloated products can take away resources from other needs.

The second IT management need is managing the logical layer of BI. A business goal is to provide all management with the same data, KPIs, and other key business resources. Without that, there's no way to ensure that, for example, one division is defining regional sales in the same way as other divisions do. Can IT easily manage the metadata defining the information the BI system uses? Can the company enforce basic standards while allowing for innovation in data analysis? At present, this seems to be one of the biggest outstanding issues.

Are We There Yet?

Anyone vacationing as a child or with a child knows that refrain. We always want to be there more quickly than possible. The simple answer, as always, is an obvious no. To make people feel better, however, understand that we'll never be there. Feel better? No?

One of the great things about computing is that as we are able to answer more questions, new questions appear. The issues discussed are in progress and there are short-term solutions based on what we know. After a full report discussing the problem of "fighting the last war," we should all admit it's very difficult to figure out what the next "war" will be.

The challenges described should keep the industry busy for at least the next two years. New issues will come up. The key is to work on the solutions to things we know we need while looking ahead to identify new issues. There will always be the matter of identifying which new issue matters before it becomes blindingly obvious, but that keeps things interesting.

What is known is that we are at another inflection point in the growth of BI. Technologists are working on solutions but need to be reminded that it's not the technology that matters; rather, it's the business. The enterprise solution that wins won't be one with the coolest interface or the most powerful, distributed server. It will be the one that takes the full cycle—from data capture through ETL to display—and presents it so that everyone in an enterprise can perceive value, even those who might never touch the technology. ■