

How to Deliver Self-Service Business Intelligence

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IT organizations dream of providing self-service BI to business users, but they struggle with users' analytical skills and issues of data governance. Self-service BI is possible, but it requires changes to BI architecture and the BI organizational model.

Key Challenges

- Consider self-service business intelligence (BI) from two perspectives: users' ability to create analytical content and their ability to consume it.
- Offer data mashup capabilities, as these are essential to facilitate end-user creation of analytical content.
- Avoid focusing exclusively on ad hoc query and online analytical processing (OLAP) capabilities for users.

Recommendations to IT Leaders

- Create organizational structures that blend IT and business skills, and strike a balance between centralized and decentralized BI delivery.
- Invest in consumerization technologies such as mobile devices, interactive visualization tools and search applications to increase user adoption.
- Empower end users to create their own analytical views, but also provide a way to certify this content for distribution.

Analysis

Best Practice 1: Change Long-Held Beliefs About the Right BI Organizational Model and Technical Capabilities

The first step to delivering self-service BI is to recognize that "we're doing it wrong" — and have been for the past decade. The first mistake we made was in the organizational model. Centralized, IT-dominated BI teams are not conducive to empowering end users. BI leaders should replace the existing vendor-customer relationship that persists between IT and the business with a cross-functional team that blends IT and business skills (see "Q&A: Create a BI Competency Center That Fosters a Performance-Driven Culture"). Consider three ways of fostering such a team:

- **Colocate staff:** Locating people who fulfill IT and business roles in the same place can be a huge aid to building a team culture and increasing the agility and pace with which BI projects are delivered.
- **Use a shared-reward system:** The best way to make individuals act as a team is to introduce a shared-reward system. We need to end the common situation in which business users state that "IT couldn't deliver our requirements." Create a reward system whereby people with IT and business skills share the glory if the BI project goes well and share the blame if it goes badly. There must be shared accountability.
- **Make organizational changes:** When creating a cross-functional team one danger is that some members have only a dotted-line reporting relationship to the team — they do something else as their "day job." This prevents them fully committing to and focusing on the work of the BI team. Creating solid-line reporting relationships to the BI team will provide the necessary accountability for each team member.

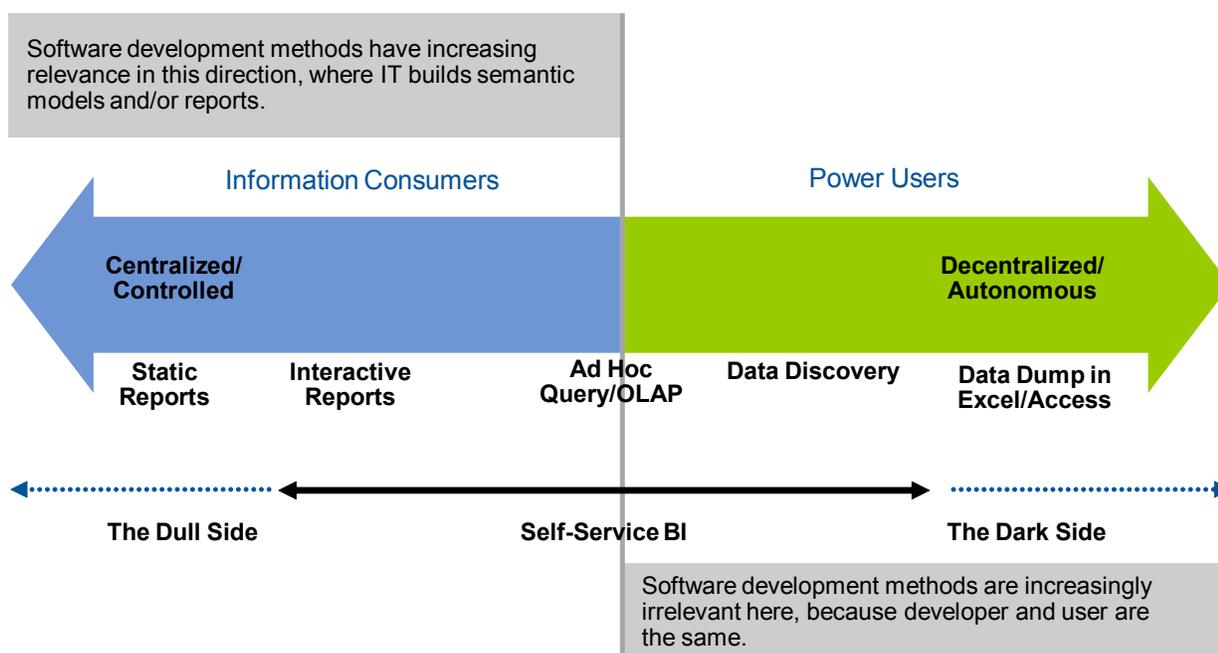
Admittedly, executing these team-building changes will be difficult. In particular, getting solid-line reporting relationships to the BI team poses a huge political challenge. Pragmatically, you may need to start with a dotted-line reporting relationship to the BI team in order to get a cross-functional BI team started, and then gradually make the virtual team more physically instantiated.

BI leaders should also create an organizational model that strikes a balance between centralization and decentralization. We describe a two-tier organizational model with cross-functional BI teams working at an enterprisewide/central level and a series of cross-functional teams operating at a local level in "Deliver Business Intelligence With a 'Think Global Act Local' Organizational Model" (*Note: This document has been archived; some of its content may not reflect current conditions*). This idea is not "one size fits all." Organizations will need to consider how much they should empower the various local teams, depending on the culture of the organization. Some more centralized organizations may want to use a franchise metaphor whereby the central BI team creates a globally common way to integrate, report and analyze data that is implemented consistently at a local level. Other organizations may favor a government metaphor where it is clearly determined what work will be done by the global team and what work will be done by the local teams. We recommend holding a "constitutional convention," with representation from across the business, to determine which data definitions, dimensional hierarchies, performance measures, algorithms and business rules need to be globally consistent, and that you make this the domain of the global BI team — a cross-

functional BI team that blends IT and business skills from across the business. Any data definitions, dimensional hierarchies, performance measures, algorithms and business rules that do not need to be globally consistent should fall under the jurisdiction of the local BI teams. Whichever approach you opt for, ensure there is close collaboration between the global and local BI teams.

The second mistake we made was to focus on the wrong technical capabilities. For the past decade we have provided semantic-layer-based ad hoc query tools and OLAP cubes as the primary BI capabilities for end users. BI leaders have viewed these tools as the "sweet spot" between static reports and Microsoft Excel spreadsheets. The problem is that ad hoc query and OLAP are not the sweet spot on the spectrum of capabilities shown in Figure 1. By focusing on the center of the spectrum, we, as BI leaders, have overshot information consumers, who do not want to write their own reports; they want someone else to write interactive reports for them — hence interactive reporting is the sweet spot for information consumers. At the same time, ad hoc query and OLAP undershoots power users, who want to mash up data from different sources and drill anywhere in the data: the semantic layer modeling of ad hoc query and OLAP tools means power users can only explore data that has been modeled and only drill down hierarchical paths defined by IT. This is why power users create spreadsheets — to gain the autonomy to mash up disparate data sources and the freedom to explore this data. BI leaders should focus on the data discovery sweet spot between ad hoc query/OLAP and isolated spreadsheets.

Figure 1. Find the Right "Sweet Spot" for Business Intelligence



BI = business intelligence; OLAP = online analytical processing

Source: Gartner (May 2012)

For the past two decades there have been two primary architectural options for BI platforms: OLAP cubes such as Oracle Essbase, Microsoft SQL Server Analysis Services, SAP BW InfoCubes, and semantic layers such as Business Objects Universe, Cognos Framework Manager and MicroStrategy Projects. But the emergence of data discovery tools during the past few years has disrupted the market (see "Emerging Technology Analysis: Visualization-Based Data Discovery Tools"). Data discovery tools such as those of QlikTech (QlikView), Tableau and Tibco (Spotfire) do not require a well-modeled semantic layer and are therefore more conducive to rapid prototyping of analytical content that has not already been modeled. Moreover, the lack of a semantic layer, coupled with the built-in performance layer, enables the unfettered drilling that power users want in order to explore detailed data.

Best Practice 2: Establish Governance of BI Content Creation and Dissemination

We are not suggesting, however, that organizations abandon the data warehouse OLAP- and semantic-layer-based architectures that are the foundation of every BI program. The need for well-defined information models will persist. IT leaders need to keep this foundation, but augment it with the data discovery approach for faster prototyping and greater user autonomy. Doing both will require innovation in governance models, since, if we enable more users to create analytical content, we need to ensure there is a promotion process to certify this content as validated and as something that should be disseminated to a broader audience.

A key capability emerging as the force behind this user empowerment trend is the data mashup. Vendors like Tableau and Microsoft (with PowerPivot) are essentially creating personal extract, transform and load tools that require little IT assistance. We expect the data mashup to emerge as a core BI platform capability and more vendors to differentiate themselves in this area.

Enabling end users to mash up disparate data sources to create their own custom analytical views, though empowering to them, also presents a major risk to the organization. Widespread adoption of data mashups will inevitably lead to the same result that widespread adoption of spreadsheets led to — pervasive errors in business logic. And just as with spreadsheets, prohibition will not be the answer. Power users are clamoring for data mashup functionality and IT leaders need to facilitate this requirement. But they also need to implement processes to "validate" and "promote" user-generated data mashups, from prototypes to systems of record (see Figure 2).

Figure 2. Certification of Business Intelligence Content

- **Published:**
 - Information that has gone through a rigorous validation process can be disseminated as official data.
- **Shared:**
 - Information has been created by end users and is worth sharing, but has not been validated.
- **Personal:**
 - Information is created by end users with little or no oversight. Users are empowered to integrate different data sources and make their own calculations.

Source: Gartner (May 2012)

Even without widespread use of data mashups, report accuracy can be a big problem in self-service environments, one that is often only detected in management meetings when all the users compare their self-service BI data and find it does not match. The problem stems from end users creating reports that look correct — because the SQL statement has returned rows and columns — but conceal logical flaws. These are most frequently caused by overestimated or underestimated measures, based on mistakes in joining fact and dimension tables. Because such problems are difficult to identify, they can persist undetected in flawed reports that are used to run the business and make decisions.

One potential answer is to provide business users with only simple semantic layers to create reports — single fact tables with basic dimensions. Another is to build a cultural understanding that ad hoc reports and analyses are not meant to be used as systems of record to run the business. Several companies have achieved success by enabling users to create their own reports and even to share them in public folders, but in these companies it is culturally understood that unless these reports go through a rigorous validation process (usually carried out by the central BI team) they should be treated as containing preliminary results; only once validated are they put in a system-of-record folder.

Best Practice 3: Invest in Consumerization Technologies to Increase Adoption

So far, we have examined how to enable users to create their own analytical content, but we should not forget the need to make it easier for users to consume BI content that has already been created. There is a clear trend toward the consumerization of IT, and it is impacting the world of BI by making it more user-friendly. In particular, three technologies — mobile-, visualization- and search-related — are making BI consumption more palatable to a mainstream audience.

In April 2010, Apple released the iPad. Shortly after, it became apparent that media tablets are strong devices for BI consumption in some use cases. In addition to the interactivity of the tablet's touchscreen and larger display (compared with a smartphone), we now have a user community that

is accustomed to searching for the information they require on mobile devices. For years, one of the major flaws of BI initiatives was the belief that "if you build it, they will come." As BI architects, we assumed that if we put valuable content in a data warehouse mainstream business users would break away from their personal workflows and scour that warehouse for the right report or information. This rarely happened as envisioned, because users were simply too busy. The mobile trend will not solve this problem, but it will help.

Interactive visualization tools are also expected to increase mainstream adoption of BI. With these tools, in addition to the visual display being more attractive than most dashboards, the interactivity tends to be more intuitive than with the traditional BI approach that relies on more complicated menu options. Indeed, with most interactive visualization tools (see "Who's Who in Interactive Visualization for Analysis and Dashboarding") users require very little training to consume content and perform BI tasks such as ranking, sorting, filtering and pivoting.

Similarly, the trend toward BI-integrated search has the potential to attract a much wider audience of users. At the very least, applying a search index to existing reports will make it much easier for business users to find relevant reports, as they will no longer have to sort through a hierarchical folder structure. Many BI vendors also enable the creation of simple reports, based on the mapping of key words to a semantic layer. The big news, however, is the arrival of true natural-language query technology. We saw two very high-profile uses of this technology in 2011: IBM's Watson and Apple's Siri. Figure 3 shows a screen shot of the search engine of EasyAsk — a third vendor in this space — which enables users to use natural language to enter a question and have it translated into SQL (see "Cool Vendors in Analytics and Business Intelligence, 2012").

Figure 3. Make Business Intelligence Consumer-Friendly With Search Technology

The screenshot shows the EasyAsk Studio interface. At the top, there's a navigation bar with 'Ask', 'Schedule', 'Reports', 'Configure', and 'Help'. Below that, a 'Query' section prompts the user to enter a question. The user has entered 'show deals in pipeline from existing customers'. Below the query, there's a section for 'By "Account Name", do you mean?' with a list of related terms: Accounts, Customers, Partners, Prospects, Resellers. A table of results is displayed with columns: Account Name, Opportunity Name, Opportunity Amount, Probability, Opportunity Date Closed, and Sales Stage. The table contains five rows of data. At the bottom, there's a 'SQL' section showing the underlying query.

Account Name	Opportunity Name	Opportunity Amount	Probability	Opportunity Date Closed	Sales Stage
Kaiser Permanente	Kaiser Permanente - Administrator Training	\$25,000	40	7/16/11	Qualification
Blackwater	100 Licenses	\$10,000	10	5/18/11	Prospecting
De Ram	End User Training	\$185,000	50	8/18/11	Perception Analysis
General Electric Company	General Electric - Data Migration	\$6,000	60	3/5/11	Qualification
Calera Corporation	Calera - 250 Pro	\$90,000	40	10/31/11	Needs Analysis

The SQL query at the bottom is: `SELECT 'accounts'.name as 'Account Name', 'opportunities'.name as 'Opportunity Name', 'opportunities'.amount as 'Opportunity Amount', 'opportunities'.probability as 'Probability', 'opportunities'.date_closed as 'Opportunity Date Closed', 'opportunities'.sales_stage as 'Sales Stage' FROM 'accounts' LEFT JOIN 'accounts_opportunities' ON 'accounts_opportunities'.account_id='accounts'.id INNER JOIN 'opportunities' ON 'opportunities'.id='accounts_opportunities'.opportunity_id WHERE (((('opportunities'.sales_stage <<'Closed Won' and 'opportunities'.sales_stage <<'Closed Lost') and 'opportunities'.lead_source='Existing Customer') and 'accounts_opportunities'.deleted=0) and 'accounts'.deleted=0) and 'opportunities'.deleted=0`

Source: EasyAsk

Individually any one of these technologies will have a positive impact, but the cumulative impact of all three should make consuming BI content substantially more user-friendly.

Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"Business Analytics Require New Information Management Capabilities"

"The Consumerization of BI Drives Greater Adoption"

"Who's Who in Interactive Visualization for Analysis and Dashboarding"

"Who's Who in Mobile BI"

"Emerging Technology Analysis: Visualization-Based Data Discovery Tools"

"Extending MDM Principles to BI Content"

This is part of a set of related research. See the following for an overview:

- Research Roundup for Domain-Specific Analytics

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