

Understanding BI

The Top 10 Business Questions That Drive Your BI Technology Requirements

Question 1: Do you need to analyze data in your transactional applications (Salesforce.com, Oracle, SAP, etc...)

Business Scenario

A business analyst would like to analyze order data to improve on-time shipments, but when he exports order data from SAP, the hundreds of tables sent in spreadsheets are far too complex and unwieldy.

Technology

Data Warehouse, Extract Transform & Load (ETL)

Transactional applications store data in a format optimized for transactions (e.g. recording an order). This format is difficult, if not impossible, to utilize for analysis, due to the complexity and performance impact of analyzing large numbers of tables and joins. A BI platform extracts the data from these applications; transforms it into a format optimized for analysis (star-schema), and loads into a data warehouse. The star schema is a format that takes thousands of transactional tables and converts them into as few as 10 analytical tables optimized for analysis. The data is combined into Facts (numbers) at the center of the star and Dimensions (qualitative descriptors of facts) as the points of the star. (Example: Order Revenue = Fact, Order Date = Dimension.) The data warehouse serves the purpose of holding this data and any other data from other applications that you wish to analyze.

Why Care?

The business analyst no longer spends hours in Excel trying to analyze orders. Instead they simply ask the key question: What stage in my order process is slowing my most important orders? For which products? In which regions?

When Don't You Need It?

1. If you need to analyze a single data source that has fewer than 10 tables, are not concerned with tracking historical performance or the data source already contains business metrics.
2. You are a solo data analyst who is the only one doing analysis and you know all of the tables in your transactional application and have the ability to perform rules and calculations on that data... and you have lots of free time!

Question 2: Do you need to analyze data from multiple different sources?

Business Scenario

A financial analyst wants to identify and remove bottlenecks from her company's opportunity-to-cash process. The data lies across both its ERP and CRM systems, but the analyst can't bring the data together because key dimensions (like customer and product) don't match across the different systems.

Technology

Data Warehouse, Conforming Dimensions, Data Integrity Logic

Dimensions like *Customer* and *Product* are represented in various formats and tables in different applications and sources. However, an analyst simply wants to address the question with respect to the customer regardless of the data source. To solve this problem, data from different sources is transformed and brought into the warehouse via a single dimension called a "conformed dimension" so that there is only one, single record for each customer. This process requires technology that supports data integrity logic so that the same customer does not appear as two different representations (i.e. P&G vs. PandG vs. Proctor & Gamble).

Why Care?

Most business processes span multiple data sources—so it is difficult to get a single view of business metrics and terms that span these data sources. Your business needs a single version of the truth—with one view of the customer, one view of product hierarchy—and you can achieve that with proper data integrity logic and conforming dimensions. In the above business scenario, these technologies would enable the financial analyst to identify the specific bottlenecks for a customer and/or product, because she doesn't have to worry about combing unlike data across sources or having two different representations of a customer or product.

When Don't You Need It?

1. You already have a Master Data Management system (which is likely part of a data warehouse) that ensures there is only one view of the customer across your applications.

Question 3: Does your organization undergo sales territory alignments, job changes, mergers, or other organizational restructuring?

Business Scenario

A sales rep "rolls-up" to the Central Region in Q1. In Q2, sales territories are re-aligned and the sales rep now rolls-up to the West Region. When Sales Operations analyzes the regional sales performance for the first half of year, the sales rep's numbers roll up to West, because that is her current region, however, her numbers should be in Central for Q1. Sales Operations has to either manually manipulate exported data or report incorrect values for Central and West sales performance in Q1.

Technology

Data Warehouse, Slowly Changing Dimensions

Dimensional data (like sales rep region or job position) change frequently, but are important for analyzing business performance over time. Data warehouses handle this issue by turning the dimension (like region) into a slowly changing dimension, so that metrics (like sales) are properly compared to the dimension hierarchy as of the time that the metric (sales) is relevant. Beware of platforms that support slowly changing dimensions through one-off coding or scripting as they require more maintenance, very specific scripting skill sets, and are subject to errors in scripting. More sophisticated BI platforms will support these concepts as an integral part of their architecture.

Why Care?

The one constant in business is change. Without slowly changing dimensions, you are presenting analysis that is not only inaccurate, but possibly resulting in wrong decisions. Analyzing data is as dangerous as it is powerful, which is why you should ensure your BI platform can handle changes in dimensional data. As a result, as your business grows and flexes, your data can keep up with your state of constant change—and your sales rep's numbers are accurate, even if Illinois moves to California.

When Don't You Need It?

1. Your organization or dimensional data does not undergo any changes and you don't want to analyze data in the past. If this is the case, you probably do not need a BI platform and Excel should suffice.

Question 4: Do you need to compare performance today to snapshots of performance in the past?

Business Scenario

The VP of Sales wants to remove key bottlenecks in his pipeline and needs to analyze the revenue value and time duration of opportunities in each stage of the sales process. Unfortunately, his CRM solution does not provide this data, so the VP of Sales is blind to key bottlenecks in sales cycle.

Technology

Data Warehouse, Historical Snapshots

Historical snapshots capture data from transactional applications that are constantly changing. These snapshots are stored in the data warehouse as part of the facts and dimensions, so that business users can access the snapshot data quickly for analysis. For example, pipeline value in sales stage 3 one year ago, or same month last quarter. Some BI platforms may store this data in separate files or tables, which limits the reach of each snapshot since it is specific to a single analysis. This also requires technical maintenance since a new file is needed for each snapshot and the complex snapshotting logic is not easily handled with simple scripts. Some BI Platforms support historical snapshots as an integral component of the platform.

Why Care?

Very often the best way to make business decisions is to compare historical performance with current performance to help predict or influence future performance. Without snapshots, items that change in transactional systems are lost and can't be analyzed. This analysis is vital to identifying trends and patterns and key to understanding if performance is improving or locating the root-cause of performance issues. Most importantly for the business scenario above, you want your VP of Sales to know how to remove the bottlenecks in the pipeline and decrease the sales cycle time.

When Don't You Need It?

1. You do not need to analyze historical performance, and you don't care about improving future performance.
2. You already have a data warehouse that is capturing historical snapshots.

Question 5: Do you need to apply business rules or logic to data for analysis?

Business Scenario

The Director of Demand Generation would like to analyze and compare Social Media with traditional lead sources. However, the social media data (flat files) comes with little structure while other lead source information and internal website data have different data structures. The Director of Demand Generation needs a common way to analyze her various lead sources, yet there is no consistency to any of the data. As a result, the business has no visibility to the value and impact of its social media efforts.

Technology

ETL, Data Warehouse, Logical (Semantic) Layer

Data comes in various formats, including flat files, cubes, and relational databases, storing both unstructured and structured data. The data warehouse can store all of this data and organize it in a format that enables analysis, but the data may not be in a language (metrics/ business terms/rules) that business users can understand. The Logical Layer applies business meaning to warehouse data and defines how the various data elements relate to each other. It provides a robust way to create metrics and business rules that are not apparent in its data sources. The information represented in the logical layer is often called metadata. For example, a piece of metadata may be a single fact called number of touch points that applies specific logic to social media, email, web, and traditional lead sources to create a single business metric upon which a marketing analyst can run all touch point analyses. Even if you have a data warehouse, the logical layer is still required to provide business meaning and logic to all that raw data and empower business users to query the business metrics and dimensions.

Why Care?

Raw, unstructured data can provide valuable business insight, but it requires translation before a business user can analyze it. A Logical Layer gives that data business meaning without reliance on IT. For example, wouldn't it be nice to know the business impact of your social media spend and compare it to traditional sources?

When Don't You Need It?

1. Your data already incorporates business meaning, required metrics, and business rules.
2. You're a database guru and prefer to run SQL queries directly on top of the data.
3. You are a data scientist performing cutting edge machine learning analysis, which means you probably don't need a BI platform, but a data mining engine instead.

Question 6: Do you need to distribute professionally formatted reports to executives, customers, or other organizations?

Business Scenario

The Director of Customer Service wants to generate and distribute a customer-facing service performance report on a weekly basis that has a specific format for all customers and sensitive data tied to each customer. However, creating and distributing these reports would require one full time employee to manually manipulate data from three different data sources, match Customer IDs, format the report using Excel, and apply data security to generate reports just for his top 10 customers. This manual reporting method is neither scalable, nor professional in appearance, nor consistent over time.

Technology

Pixel-Perfect Banded Reporting

Enterprise reporting is much different than dashboards. Ensuring that a report meets professional standards requires specific technology capabilities for formatting, distribution, data security, parameterization, bands, sub-reports and other capabilities. Pixel-perfect reporting has deep requirements beyond simple analysis and charts and your organization should confirm that your specific reporting needs can be met with the platform you select. Furthermore, pixel-perfect reporting is part of a complete BI platform that will grow with your organization and enable you to leverage your investment beyond your initial use case.

Why Care?

When the CEO asks to see the data in a specific way (and that way only), you want to be sure you can provide that information to him consistently. Furthermore, you want to provide a professional image of your company when you distribute reports externally, especially to customers.

When Don't You Need It?

1. Your analysis needs are limited to a very small group and your enterprise reporting needs are already being fulfilled with another solution.
2. Your organization has very low cost resources who can create reports based on data from transactional systems and you can hire and retain more of these resources forever.
3. Your organization does not mind if the appearance of the reports vary from run to run.

Question 7: Does your organization have employees with different analytic skill levels?

Business Scenario

A data analyst wants to explore and 'play' with data—filtering, pivoting, and visualizing—while the VP of Sales demands a single dashboard showing her most current pipeline and order analysis.

Technology

Advanced Visualizations, Dashboards, and Ad-hoc Analysis

Among the most difficult and complex issues in analyzing is providing the right tools to allow users of different skill sets to properly visualize insights. A flat, static dashboard with non-interactive charts does not provide enough detail, nor the slice and dice or ad-hoc capabilities for the business analyst; while a complete blank canvas ad-hoc tool will be useless or overwhelm users who need access to simple reports. Robust ad-hoc tools allow business analysts to pick dimensions and measures to answer specific questions (I.e. "Tell me the departments where more than 20% of managers had performance review scores of 5 or higher"). Robust dashboards provide advanced visualizations through a diverse chart library and data exploration capabilities like drill paths, drag and drop filtering, column selectors, filters, prompts and pivoting—while providing these options in a view that does not overwhelm users with too many options.

Why Care?

This is where the rubber meets the road. Varied and strong dashboards along with visualizations ensure employees gain access to the rich insight they need to make decisions on behalf of the business. Easy to use ad-hoc analysis provide business analyst quick answers to question instead of spending hours manipulating data in excel. For the scenario above, you want to provide the VP of Sales with her clean pipeline dashboard while at the same time, enabling the data analyst to delve deep into the data.

When Don't You Need It?

1. Your users are a few data analysts who only need ad-hoc analysis ; your organization has no need to disseminate rich insight.

Question 8: Do you want to show reports or charts within the context of an existing application?

Business Scenario

The sales team receives half of their commission after the customer has paid the company. Each sales rep wants to understand customer payment history and know when each order has been paid. The sales operations analyst cannot provide this information, because the volume and format of order data from the ERP system is unusable, and she still has no way of disseminating the information in a timely fashion with proper data security. She would like to display a trend analysis of customer payment history and order detail in the Salesforce.com account page, but has no ability to do so.

Technology

Embedded Analytics and Row/Column Level Security

Once data is prepared for analysis (i.e. housed within the data warehouse and logical layer) and shown in a visually compelling way (i.e. reporting and dashboards), the expectation is often that the project is done and you're your users have all that they will need. However, the best way to drive business value from analysis is to make analytics part of your daily, ongoing business processes. In order to do this, your BI platform needs to support embedded analytics, which includes capabilities like security, authorization, APIs, iFrames, and UI customization, so that reports or dashboards can be displayed inside a transactional application—all while keeping data secure and providing a consistent look and feel. Keeping data secure requires row/column level security, which apply rules about who can access specific data, based on various properties such as geography, title, and type of customer.

Why Care?

Putting analytics in context and securing the data is among the best ways an organization can take action on the insights contained in reports and dashboards. In the above business scenario, the company has the ability to reduce their days sales outstanding, by giving sales reps visibility into their customer payments. Having such analysis embedded directly into the rep's Salesforce.com account page, gives the rep the ability to drill into exactly which orders are un-paid and do something about it.

When Don't You Need It?

1. The data you are analyzing does not live inside an application your company uses and has no value within other applications your company uses.

Question 9: Does the organization need to perform “what-if” planning? Or project future performance?

Business Scenario

A supply chain analyst would like to understand the impact of increasing the inventory re-stock value on shipment performance and inventory obsolescence. She would like to utilize past performance data on shipments and inventory as a proxy; however, with data across multiple product lines and from various systems, she is unable to perform the analysis. Without all data together in a single model, she cannot perform the “what-if” analysis to determine which levers to pull to improve business performance.

Technology

Projection Analytics, “What-if” Modeling

“What-if” modeling does exactly what it says. It uses historical data to build a model and enables a business analyst to pull specific levers (change data) to project future performance. This projection analytics can be accomplished with a data warehouse, logical layer, and business rules that allow a data analyst to model the business relationships. These models use simple relationships between historical data (e.g. Project future closed revenue using a model of pipeline close rate based on sales stage and sales rep). They are not to be confused with Predictive Analytics models which a data scientist builds to predict future performance based on statistical relationships between data. The advantage of “What-if” modeling is that it can provide guidance and direction to a business analyst, without hard core data mining. It can also help a business user understand order of magnitude differences between different levers that can be used to have the greatest impact on business.

Why Care?

The primary reason to analyze historical data is to drive future decisions for better financial performance. “What-if” modeling and projection analytics do just this, and put the power in the hands of those who can use it, business leaders. For the example, empower the supply chain analyst to perform “what-if” analysis on supply chain levers so they know what options they have to increase on-time delivery without adversely affecting inventory levels.

When Don't You Need It?

1. You are analyzing data that cannot be used to model future occurrences. An example, would be a one-time event that will not be repeated by your business, such as emptying your bank account to pay \$4M for a super bowl ad.

Question 10: Do you need to perform in-depth analytics that relates data from seemingly unrelated sources or tables?

Business Scenario

The marketing director would like to perform a cohort analysis on subscription revenue to determine hot spots for retention and analyze this against recent social media and press releases from company. However, renewal data is in the ERP system and social media data is in flat files completely unrelated to the ERP data. This requires analyzing order date with renewal date and factoring in product across both of these dates—while adding business context to social media data.

Technology

Complex SQL, Multi-pass SQL, composite keys

Why leave this topic to #10? This topic may be the hardest to grasp, and least understood by BI vendors, implementers, and customers alike. Business users often need to see a relationship between two pieces of data, while the data itself has no technical data join. To solve this problem, a relationship needs to be created, that is correct analytically, while ensuring analysis can be done quickly. This requires establishing a shared dimension to join two tables that do not share a common column, a logical layer to create business meaning between the two different sources, and multi-pass SQL that allows a single question to be parsed into multiple questions against different data and bring together the answers logically. It sounds complex—and can be—however, a platform that supports these capabilities will do it without a user knowing. And, most importantly, it will do it in a way that answers are returned for these tough questions correctly and quickly. Platforms that mimic multi-pass SQL or infer relationships without shared dimensions/composite keys are subject to returning incorrect results and can cause more harm than good.

Why Care?

A business user should not have to worry about where the data lies or how it is structured. If a business user wants to understand how social media and press releases impact renewal rates, they should be able to do that without knowing how to spell composite key or Multi-pass SQL. A platform that correctly solves these issues, while shielding business users from complexity of data modeling can drive rapid business value. In the example, if analysis reveals that positive social media sentiment increases renewal rate, then the business now has a new lever to pull to improve financial performance.

When Don't You Need It?

1. If your analysis is simplistic and on a single data set.
2. If understanding how external factors impact your internal business is unimportant to grow your business.

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