Data Warehousing for Business Intelligence
Course 4: Business Intelligence Concepts, Tools, and Applications

Module 2 Bonus Materials

Lesson 2: BI Platform Capabilities

Don't forget: the course textbook is your best bet for supplemental materials. We've arranged for students in this MOOC to purchase at a very low cost digital versions of chapters 1, 2, and 4 of the authoritative textbook *Business Intelligence and Analytics: Systems for Decision Support*, 10th edition, 2015 by Sharda, R., Delen, D., and Turban, E. See the optional text book link under course overview to purchase (US$4 for one chapter, US$10 for all three; the regular price for students is $15 per digital chapter).

For a quick overview of business intelligence platforms, check out http://datawarehouse4u.info/Business-Intelligence-Platforms.html.

Remember that the BI platform sits between data sources and end-users. The BI platform provides a user interface in one (or more) "styles" of BI. Bill Collins of Decision Path has a three-part series on understanding and applying these styles to BI solutions. Link to part one of his analysis here, http://www.decisionpath.com/2011/04/12/understanding-and-applying-the-styles-of-bi-part-1/, and then navigate to parts 2 and 3. This series gives a sense of the importance of designing BI solutions with the end-user's needs in mind, to be able to provide not just the information needed, but to provide information so the user can "understand it, interact with it, and apply it to the business problem" at hand.

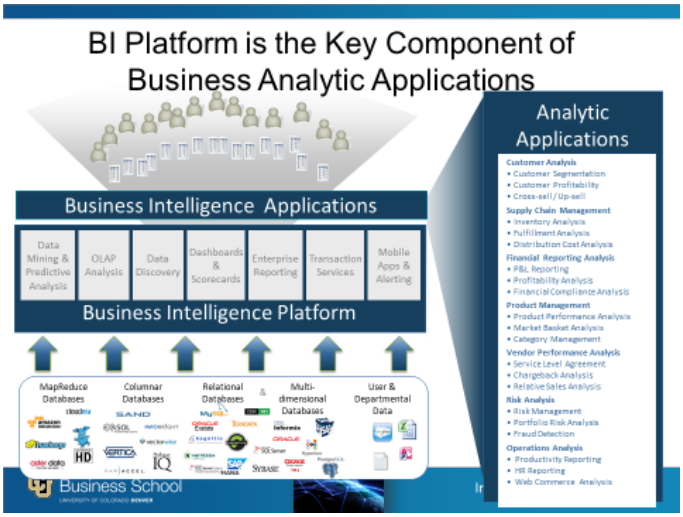
See BI platform capabilities:

A BI system is composed of several key components. The BI platform sits between business users you see at the top of this slide who consume the information, and all of the data sources you see at the bottom. The role of the BI platform is to interpret and harmonize all of the complex data across all of the different databases so that users and IT personnel can design reports and interact with data without requiring that they have any knowledge of the underlying technical complexities and inconsistencies that might exist in the databases.

- The BI platform provides a user interface to business people with which they can interact with their company's data in any of 7 different ways – which we call the 7 Styles of BI. The seven styles of BI are listed in the diagram and include: Reporting, Dashboards, OLAP Analysis, Advanced or Ad-hoc Analysis, and Pro-active Alerting. Many BI tools support one or two of these styles of BI within the same architecture, but with the MicroStrategy architecture, you can get all 5 Styles of BI within the exact same user interface and all built on the exact same building blocks (called metadata).

- And at the right you see that the real value of a BI platform is that it allows companies to create and deploy very many BI applications composed of reports, dashboards, and other analytic workflow… some of which are created by IT professionals, some are created by analysts, but ideally, the majority are created by average business people in the normal process of doing their various jobs.

- MicroStrategy presents its solution at a Platform-as-a-Service (PaaS). It is offered either on premise or in the cloud. Cloud platform services enable subscribers to build and deploy any BI application with complete customization and control, database, and ETL infrastructure.



The BI system should allow you to analyze, monitor and act on the information it presents to you. A significant technology that has become a key player in descriptive analytic area is data discovery and visualization. Using the latest visualization tools in the marketplace, we can now develop powerful insights into the operations of our organization.

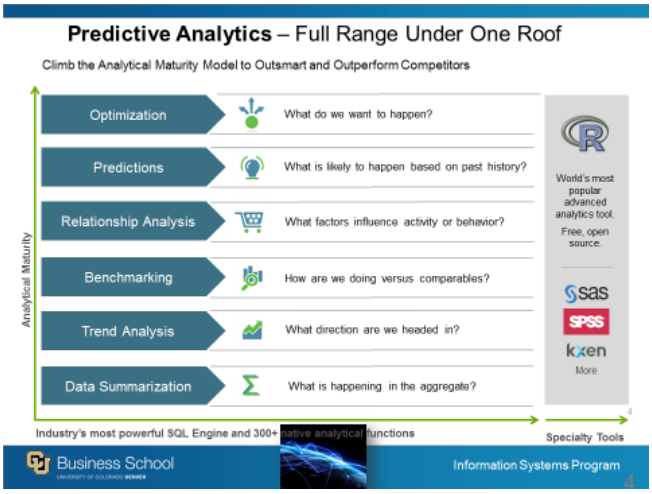
Traditionally, BI involves delivering the right information in the right format to the right people at the right time for more informed decision making. BI decision-support applications facilitate many activities, including: multidimensional analysis, for example, online analytical processing (OLAP); click-stream analysis; data mining; forecasting, business analysis; balanced scorecard preparation; visualization; querying; reporting and charting (including just-in-time and agent-based alerts); geospatial analysis; knowledge management; enterprise portal implementation; mining for text, content, and voice; digital dashboard access; and other cross-functional activities.

According to Sharda, R. Delen, D. and Turban, E. (2015), Business Intelligence and Analytics: Systems for Decision Support, 10 ED, Chapter 1,

- **Predictive analytics** aims to determine what is likely to happen in the future. This analysis is based on **statistical techniques** as well as other more recently developed techniques that fall under the general category of data mining. The goal of these techniques is to be able to predict if the customer is likely to switch to a competitor (“churn”), what the customer is likely to buy next

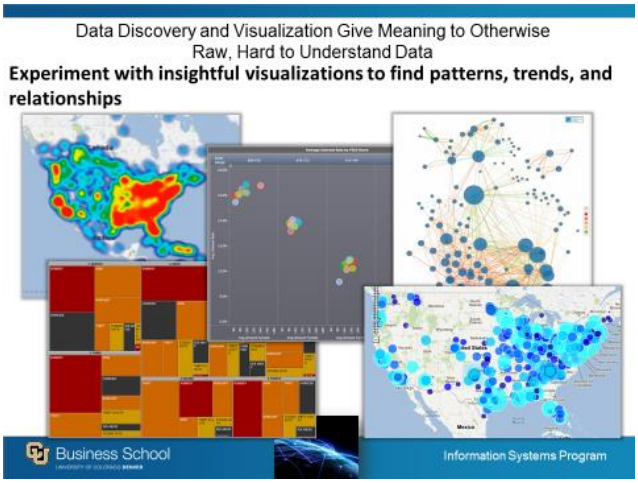
and how much, what promotion a customer would respond to, or whether this customer is a creditworthy. **Clustering algorithms** for segmenting customers into different clusters to be able to target specific promotions to them. A number of techniques are used in developing predictive analytical applications, including various **classification algorithms**. Statistical analysis techniques to predict or provide certainty measures on facts.

- **Prediction** is the act of telling about the future. It differs from simple guessing by taking into account the experiences, opinions, and other relevant information in conducting the task of foretelling. A term that is commonly associated with prediction is *forecasting*. Even though many believe that these two terms are synonymous, there is a subtle but critical difference between the two. Whereas prediction is largely experience and opinion based, forecasting is data and model based.
- **Classification** is analyzing the historical behavior of groups of entities with similar characteristics, to predict the future behavior of a new entity from its similarity to those groups.
- **Clustering** is finding groups of entities with similar characteristics.
- **Association** is establishing relationships among items that occur together. The fundamental differences are: (1) Prediction (classification or regression) predicts future cases or conditions based on historical data, (2) Clustering partitions pattern records into natural segments or clusters. Each segment's members share similar characteristics, and (3) Association is used to discover two or more items (or events or concepts) that go together.



- Predictive Analytics: See IBM's series http://www.ibm.com/developerworks/library/ba-predictive-analytics1/
- OLAP Analysis: See this tutorial on OLAP operations http://www.cis.drexel.edu/faculty/song/courses/info%20607/tutorial_OLAP/operations.htm
- Data Discovery and Visualization (including heat and tree maps, geographic maps, scatter plots and other special-purpose visuals): See this top-10 list of interactive visualizations to be inspired in your BI work http://blog.visual.ly/the-top-20-interactive-visualizations-of-2013/

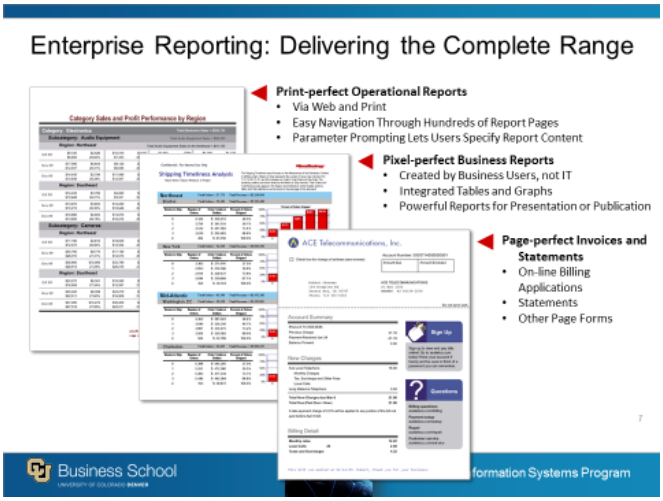
Free-Form Interactive Exploration: Enables the exploration of data via the manipulation of chart images, with the color, brightness, size, shape and motion of visual objects representing aspects of the dataset being analyzed. This includes an array of visualization options that go beyond those of pie, bar and line charts, including heat and tree maps, geographic maps, scatter plots and other special-purpose visuals. These tools enable users to analyze the data by interacting directly with a visual representation of it.



BI platforms need to Provides the ability to create highly formatted, print-ready and interactive reports, with or without parameters. Business reporting and visual analytics (a collection of tools for manipulating, mining, and analyzing the data in the data warehouse.
Enterprise reports are the very detailed reports that are the mainstream of reporting applications today. These highly structured, densely populated, multi-page reports are designed to convey large amounts of operational performance data. These reports are often organized hierarchically and may use banding to make them more readable.

The need to be Print-perfect so business people can take them to meetings. They need to be pixel-perfect so any format and be achieved as is especially the case with business reports. And they need to be page-perfect so that they are ready for high production printing such as with bills and statements.
Managed Metric Reports.

MicroStrategy customers are also now beginning to distribute specialized reports call “managed metrics” reports. They are like dashboards, but with greater emphasis on comprehensive lists of metrics that let diverse people monitor the metrics that matter to their own contribution to the organizational goals.

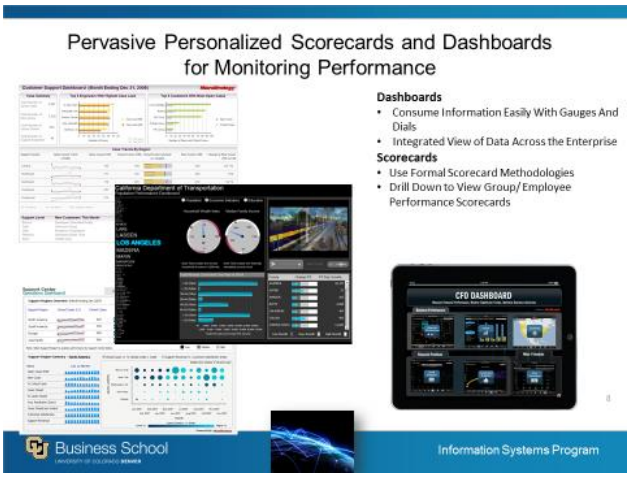


Dashboards: IT-authored or centrally authored dashboards are a style of reporting that graphically depicts performance measures. This includes the ability to publish multi-object, linked reports and parameters with intuitive and interactive displays; dashboards often employ visualization components

such as gauges, sliders, checkboxes and maps, and are often used to show the actual value of the measure compared with a goal or target value.
Dashboards can represent operational or strategic information. The most basic business monitoring tool today are the scorecards and dashboards – typically generated for managers and executives who need an overall view of business performance.

That really takes us to a more detailed look at MicroStrategy's capabilities for system of record business intelligence. System of record BI is all about managed delivery of data and key performance metrics at scale. It's the idea that once you've created meaningful analytics, you want to be able to operationalize them, to drive them into the organization, to effectively align the organization behind those numbers, enable better decision making, and as a result, elevate performance across the organization.

- **Dashboards:** Dashboards allow users to consume a large amount of information at a glance. Dashboards contain rich visual elements like the gauges and dials along with graphs and tables. Dashboards provide an integrated view of business performance by consolidating the data from across the enterprise
- **Scorecards:** Scorecards often adhere to any of the major scorecard methodologies, like Balanced Scorecards, Activity Based Costing, 6 Sigma, or others.
- Dashboards and Scorecards: This quick read has definitions of strategic, analytical and operational dashboards: http://canworksmart.com/three-types-of-dashboards/. Information about different types of scorecards can be found here http://balancedscorecard.org/Resources/About-the-Balanced-Scorecard (for balanced scorecards), here http://www.ctglobalsolutions.com/articles/linking-abc-and-the-balanced-scorecard-3 (for a rationale to link activity-based costing and balanced scorecard methods), and here https://www.clearpointstrategy.com/six-sigma-vs-balanced-scorecard-what-you-need-to-know/ (for a comparison of Six Sigma and Balanced Scorecard).

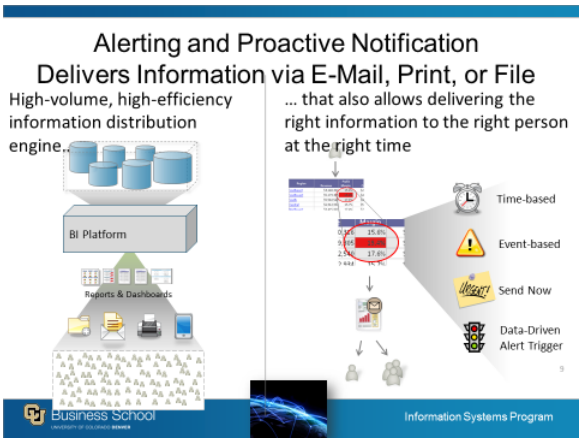


- **Mobile Application and Alerting.** Real time BI for the real time distribution of metrics through email, messaging systems and/or interactive displays. High volume, high efficiency engine allows to distribute the information to many people. In order to avoid spamming users with reports every day or every hour, **alerts can be configured** so they are notified whenever there is something that requires their immediate attention

A BI service can support two types of requirements:

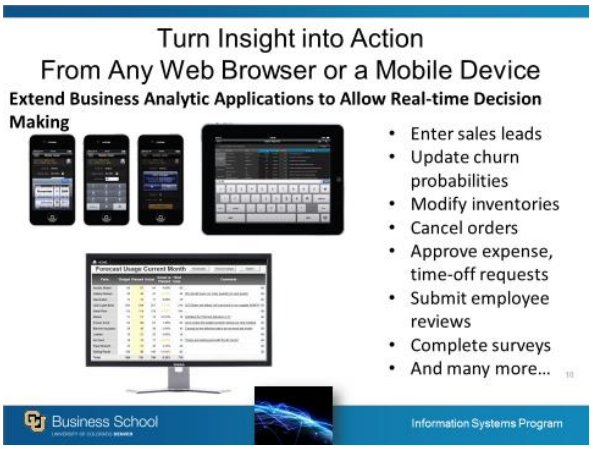
- **The first is on behalf of a specific business activity**. This could include checking a transaction for potential fraud, retrieving an individual's lifetime value metric for call routing in a customer support center, or reformatting a customer address to meet data standards. In some cases, this may be done in conjunction with traditional BI.

- **The second type of BI service monitors** and evaluates the performance of a business process. In this case, event data is passed to the BI service from multiple points in the process workflow. These events are then consolidated and evaluated, and event metrics are produced for delivery to an operational dashboard or other business process. The event analytics can be stored in a data warehouse for subsequent use.
- **Event analytics** determines the efficiency of a complete business process and identifies performance bottlenecks that are affecting operations. Call center performance and order processing typify these types of processes. **Stream analytical applications** that employ complex event processing technologies to analyze in-flight events with sub-second response times offer a more extreme example. Financial institutions and Web retailing companies use this type of high-volume processing.
- With some projects, traditional BI cannot meet operational decision-making requirements. Data volumes may make it impossible to update the data warehouse and analyze information quickly enough to satisfy agility requirements. For some applications it is not practical, or even necessary, to propagate data from operational systems into a data warehouse. **Sensor and hardware alerts,** network interactions and messages, stock market trading operations, and RFID tag scanning, for example, could be handled by **embedding the BI in the business processes and analyzing the data as it flows through these processes**.



Please note this slide is to talk about **Transaction Services**, not Mobile. Mobile Business Analytics Revolutionizes How, When, and Where Information Is Consumed
Mobile: Enables organizations to develop and deliver content to mobile devices in a publishing and/or interactive mode, and takes advantage of mobile devices' native capabilities, such as touchscreen, camera, location awareness and natural-language query.

- Alerts: Check out the “Services” section in the “Critical Agility” article by Colin White to learn about two types of alerts that BI systems can support http://www.teradatamagazine.com/critical_agility.aspx
- Transactions: Read this review of MicroStrategy tools to gain an understanding of what transaction services are all about https://www.bizone.se/microstrategy-unleashing-the-power-of-transaction-services/



To learn more about the competitive landscape for BI tools, read this 2015 Gartner report http://www.gartner.com/technology/reprints.do?id=1-2AJGAKH&ct=150225&st=sb. The report includes Gartner's Magic Quadrant for Business Intelligence Platforms and includes an excellent discussion of the current shift in the BI landscape. According to Gartner analysts, "a wider range of business users are demanding access to interactive styles of analysis and insights from advanced analytics, without requiring them to have IT or data science skills."

According to Gartner 2015 report, "Traditional BI market share leaders are being disrupted by platforms that expand access to analytics and deliver higher business value. The BI and analytics platform market is undergoing a fundamental shift. During the past ten years, BI platform investments have largely been in IT-led consolidation and standardization projects for large-scale systems-of-record reporting. These have tended to be highly governed and centralized, where IT-authored production reports were pushed out to inform a broad array of information consumers and analysts. Now, a wider range of business users are demanding access to interactive styles of analysis and insights from advanced analytics, without requiring them to have IT or data science skills. As demand from business users for pervasive access to data discovery capabilities grows, IT wants to deliver on this requirement without sacrificing governance. This is important for companies as they invest in BI and Analytics platforms. BI leaders should track how traditionalists translate their forward-looking product investments into renewed momentum and an improved customer experience….."