

Analysis & Optimization of Business Intelligence Query System's

T.Raghavendra Gupta¹, T Sri Yeswanth², R.S.V. Sowmya³ & Anita Kumari Sahu⁴

^[1] Department of Computer Science, HITAM, raghu.ht@gmail.com, +91-9030751521

^[2] Department of Computer Science, HITAM, tadimallayeswanth@ieee.org, +91-7842220000

^[3] Department of Computer Science, HITAM, rudrarajusowmya80@gmail.com,+91-9492986872

^[4] Department of Computer Science, HITAM, anitakumarisahu04@gmail.com,+91-8121193837

Abstract

An important principle in managing any business is ‘What can't be measured, can't be managed’. The complexity of businesses today means that in order to measure business performance one needs to perform considerable analysis of data gathered in vast quantities on a regular basis. Therefore, Data & Business analysis is at the heart of decision making in all business applications. There is, however, a significant degree of manual intervention in preparing, presenting and analyzing business data. However, it is becoming clear that business success requires such data analysis to be carried out in real-time, and that actions in response to analysis results must also be performed in real-time in order to meet the rapid change in demand from customers and regulators alike. Hence, this study focuses on how business intelligence system work and how it can be designed, to see if there can be an improvement in the rate of decision making for the end user. This paper includes research on the industry needs and the requirements that a good BI platform should be able to satisfy and it also suggests a few specific areas and components that the proposed BI System should be able to satisfy.

Keywords: Business Intelligence (BI), Data analysis, Extraction, Transformation, Loading (ETL)

Introduction

History of BI

The earliest known use of the term "Business Intelligence" is in Richard Millar Devens' in the ‘Cyclopedia of Commercial and Business Anecdotes’ from 1865. “Throughout Holland, Flanders, France, and Germany he maintained a complete and perfect train of business intelligence. (Devens et al 1865)).

The term used by Devin to describe how, Sir Henry Furnese, gained profit by acting upon and receiving information about his environment, prior to his competitors. The capacity to collect and respond accordingly based on the information collected, an ability that Furnese excelled in, is today still at the very heart of BI

Data discovery is a keyword in BI for using and creating interactive reports and exploring data from different sources. The market research firm Gartner promoted it in 2012. Data discovery is a user-driven process of searching for designs, repetitions or specific items in a data set. Thus, extracting data out receives most attention from organizations. This activity is commonly referred to as BI, consists of business users and applications accessing data from the data warehouse to perform enterprise reporting with analysis, querying, OLAP and predictive analytics. (Chugh, R & Grandhi et al 2013)

Introduction of BI

Getting data in delivers limited value to an enterprise; only when users and applications access the data and use it to make decisions does the organization realize the full value from its data warehouse. (Dedić N. & Stanier C et al 2016)

Thus, extracting data out receives most attention from organizations. This activity is commonly referred to as BI, consists of business users and applications accessing data from the data warehouse to perform enterprise reporting with analysis, querying, OLAP and predictive analytics.

Existing System

After reviewing and going through various BI systems the conclusion reached is that, the best Business Intelligence Platforms Software products are determined by customer satisfaction (based on user reviews) and scale (based on market share, vendor size, and social impact) and placed into four categories on the Grid: Products in the Leader quadrant are rated highly by G2 Crowd users and have substantial Market Presence scores.

A few High Performers are: Easy Insight, Halo, JReport, Phocas Software, Dundas BI, Treasure Data. High Performers are highly rated by their users but have not yet achieved the market share and scale of the Leaders.

Few High-Level Contenders have significant Market Presence and resources but have received below average user Satisfaction ratings or have not yet received a sufficient number of reviews to validate the solution.

Drawbacks in existing System

While most organizations recognize the importance and benefits of Big Data analytics, there are challenges or problems arising from the nature of Big Data and limitations of existing technologies that need to be considered. (Kimball *et al.*, 2008)

- a. BI systems promote the view that decisions can be made based on data alone. The danger in such a view is that it overlooks social, emotional, intuitive and qualitative factors that can and should influence decisions.
For example, a sales representative may have qualitative information regarding sales prospects that cannot be inferred from the data. Such information should be factored into the sales action plan providing the representative can justify it or is willing to stand by it.
- b. Another tacit assumption made by users of BI systems is that the information provided is relevant to the decisions they have to make. However, most BI systems are designed to answer specific, predetermined questions. In general, these cannot cover all possible questions that managers may ask in the future.
- c. More important is the fact that the data itself may be based on assumptions that are not known to users. For example, our sales manager may be tempted to incorporate market forecasts simply because they are available in the BI system.

However, if he chooses to use the forecasts, he will likely not take the trouble to check the assumptions behind the models that generated the forecasts. Users of BI systems tend to look upon them as a source of objective truth. One of the reasons for this is that quantitative data tends to be viewed as being more reliable than qualitative data

Problems Faced by Industry and Clients

Organizations today are confronted with the challenge and the opportunity of data growing at unprecedented rates. This data comes from multiple sources – ERP systems, Social Media, Mobile devices, Sensors, Data Warehouses, Website logs, Web Services, etc. - in various forms – Semi-structured, Structured and Unstructured. “Big Data” is the catch phrase for this rapidly changing field. (Kern, Justin et al 2013)

Most organizations recognize the benefits of Big Data analytics, but there are numerous problems arising from the nature of Big Data and limitations of existing technologies that need to be considered. Many firms in today's fast paced industrial scenario are not patient enough to wait for the execution of Business intelligence in their organization. It usually takes around 18 months for data warehousing system to completely implement the whole system.

Hence, it becomes vital for the firms to give due thought to the business intelligence aspect. Due to the intricacy of these systems, the BI system can create an existence of their own in the firm. It must be understood by the firm that storing data in the business intelligence system just for the sake of it does not increase its worth but results in vice versa effect.

A significant majority of the IT effort expended in a BI project is consumed by data integration issues. Designing a repeatable process by which data is acquired from operational systems, transformed, integrated and delivered to the data warehouse is technically challenging.

In addition to issues of data security, ownership and quality, the proper selection of technology for data integration is critical, but not obvious. Project teams continue to employ different tools for the task, centering around extraction, transformation and loading (ETL) tools and application integration suites. In delivering the data foundation for their BI initiatives, project teams focus on finding the data they need, extracting it from its sources and delivering it to the data warehouse or other analytic structures.

They tend to overlook the quality of that data, a major reason for the failure of BI and data warehousing projects, and a significant operational challenge for large enterprises. Hence, we are right now researching the efficiencies of various ETL transformation techniques to improve the rate of decision making for the end user.

These shortfalls can be overcome by providing software tools that are customized for end business users and deliver business insights in real time at the point of a decision. However, current BI solutions still fall short of what is desired. They still require specialists to run a statistical analysis, or a data mining process, and set up reports that can then be accessed by business users — they do not enable actions to be propagated back into business processes. Another issue with BI products is that they rarely support user selectable data sources and real-time data integration, since almost all current BI products depend on pre-built data warehouses. There are almost no sets of real-time business performance data available because business activity monitoring is still outside the BI domain. Due to these irregularities in the BI infrastructure and manual interventions by analysts, end business users or clients do not typically have real-time access to analyzed data and cannot change processes in real time based on insights obtained from BI reports.

Proposed BI System

Real-time business intelligence (RTBI) is a theory describing the process of delivering business intelligence (BI) or information analyzed about the business operations as they occur. Real time means near to zero latency and access to information whenever and wherever it is required. The speed of today's processing systems has allowed typical data warehousing to work in real-time. The result is real-time business intelligence.

Business transactions as they occur are fed to a real-time BI system that maintains the current state of the enterprise. The RTBI system not only supports the classic strategic functions of data warehousing for deriving information and knowledge from past enterprise activity, but it also provides real-time tactical support to drive enterprise actions that react immediately to events as they occur. As such, it replaces both the classic data warehouse and the enterprise application integration (EAI) functions. Such event-driven processing is a basic tenet of real-time business intelligence.

Some features that a good BI tool should be able to provide are:

1. Financial analyses that involve reviewing of costs and revenues, calculation and comparative analyses of corporate income statements, analyses of corporate balance sheet and profitability, analyses of financial markets and sophisticated controlling
2. Marketing analyses which involves analyses of sales receipts, meeting sales targets, time of orders, actions undertaken by competitors, sales profitability, profit margins and stock exchange quotations;
3. Customer analyses that concern time of maintaining contacts with customers, customer profitability, modelling customers' behavior and reactions, customer satisfaction, etc.;
4. Analysis of Production management makes it possible to identify production 'bottlenecks' and delayed orders, thus enabling organizations to examine production dynamics and to compare production results obtained by departments or plants, etc.;
5. Logistic analyses that enable to identify partners of supply chain quickly;
6. Analyses of wage related data including wage component reports made with reference to the type required, reports made from the perspective of a given enterprise, wage reports distinguishing employment types, payroll surcharges, personal contribution reports, analyses of average wages, etc.;
7. personal data analyses that involve examination of employment turnover, employment types, presentation of information on individual employee's personal data, etc.

Conclusion

In today's competitive environment, analyzing data to predict market trends and to improve enterprise performance is an essential business activity. Thus, we need to come up with a system where even a customer can be able to perform the basic ETL Transformations to assess or analyze his business operations. In this paper we have Identified the needs that any BI system needs to satisfy for it to meet the industry requirements. We have also proposed a method through which it can be achieved (via Adhoc ETL Operations). To conclude a good Business Intelligence system should be one which allows Data Analysis to be carried out in real-time with the specified constraints and needs and those actions in response to analysis results must also be performed in real-time in order to meet the rapid change in demand from customers and regulators alike.

References

Miller Devens, Richard. *Cyclopedia of Commercial and Business Anecdotes; Comprising Interesting Reminiscences and Facts, Remarkable Traits and Humors of Merchants, Traders, Bankers Etc. in All Ages and Countries.* D. Appleton and company. p. 210. Retrieved 15 February 2014.

Kern, Justin (2013-06-07). "Data Discovery, SaaS Lead BI Market Review". *Information Management*. Retrieved 2017-07-06.

Dedić N. & Stanier C. (2016). *Measuring the Success of Changes to Existing Business Intelligence Solutions to Improve Business Intelligence Reporting.* *Lecture Notes in Business Information Processing*. **268**. Springer International Publishing. pp. 225–236.

Rud, Olivia (2009). *Business Intelligence Success Factors: Tools for Aligning Your Business in the Global Economy.* Hoboken, N.J: Wiley & Sons.

Golden, Bernard (2013). *Amazon Web Services For Dummies.* For dummies. John Wiley & Sons. p. 234. ISBN 9781118652268. Retrieved 2014-07-06.

Chugh, R & Grandhi, S 2013, 'Why Business Intelligence? Significance of Business Intelligence tools and integrating BI governance with corporate governance', *International Journal of E-Entrepreneurship and Innovation*, vol. 4, no.2, pp. 1-14.

Kimball- "[How Companies Are Implementing Business Intelligence Competency Centers](#)" (PDF). *Computer World*. Archived from [the original](#) (PDF) on 28 May 2013. Retrieved 1 April 2014.