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Cloud Business Intelligence Issues and Challenges

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Abstract: *Businesses constantly look for ways to improve their intelligence and gain a competitive advantage through the use of business intelligence (BI) solutions. How organisations manage data is a new business intelligence phenomenon. Cloud computing is one of the tools that can increase the accessibility of BI tools. Using BI in cloud computing, users can access data from all over the globe. To quickly and easily access business operations in the cloud, BI applications are available. Organisations face several challenges when implementing such technologies, including sensitive data security, organisational trends and demands, data latency, data integration, system performance, and a lack of skilled IT staff. After carefully analysing what type of analysis is required, organisations should be cautious in selecting the appropriate BI. Furthermore, before moving to the BI cloud, organisations must follow cloud computing best practices, focus on strong governance, and discuss possible concerns and issues. As a result, it is essential to anticipate current cloud BI technology challenges and issues. This paper discusses the issues and challenges of cloud BI and can be used as a source of data and information for leading cloud BI organisations and giving vendors a suggestion of what customers want from them when they go for implementing cloud BI systems. In this way, the chances of successfully implementing cloud BI technology increase. The issues that businesses currently face in BI using old approaches plus shifting technological trends are also discussed in this article. Additionally, it would offer innovative strategies for implementing cloud BI technologies in organisations.*

Keywords: Cloud Computing, Business Intelligence, Data-latency, Data Consolidation, Performance Bottleneck, OLAP.

1. Introduction

Over the last decade, the Internet, communications technology, Internet-of-things and Web-based, and integrated services have grown rapidly, with many organisations effectively implementing them, resulting in the creation of massive amounts of data (Patil & Chavan, 2020). Cloud computing is an extension of the concept of distributed computing, which is the process of running a programme or an application across a network of computers (Salem, 2021). The primary goal of business intelligence (BI) is to deliver information at the right time and in the right format so that the organisation can make the best decisions more quickly and accurately (Mussa et al., 2018). Cloud-based BI (or cloud BI) refers to the process of transforming data into actionable insights in a cloud environment, either partially or entirely.

Without the cost or hassle of physical hardware, cloud BI provides organisations with the information they need to make data-driven decisions.

Complex information can be handled and processed efficiently with cloud BI, and thus its value to a business organisation is unpredictable. Not only that, but it also assists organisations in increasing profits while remaining competitive. On the other hand, because there are so many cloud BI tools on the market, many organisations are having difficulty selecting the right cloud BI tools to solve short and long-term business requirements. Thus, the discussion of this paper is divided into two sections. The first section discusses the demand and challenges of cloud BI, followed by the attempts and methods for successful cloud BI projects and implementations.

2. BI Demands and Challenges

2.1 Industry Trends and Demand

Cloud BI system demand is currently increasing gradually in many industries, including the manufacturing industry (Elshibani, 2022). Companies and industries were forced into emergency mode as a result of the COVID-19 pandemic as they tried to understand the situation. Many companies were compelled to take a close look at their current cloud BI strategies. Companies realigned their budgets in order to make room for the transition to cloud BI and analytics platforms because on-premises solutions were unable to handle the demands of a workforce that was largely distributed.

As a result, there are numerous concerns that need answers from cloud BI systems. For example, how can we make better business decisions? How can machine downtime be reduced and production processes optimised? How can inventory turnover rates be efficiently controlled? How can supply chain management be improved? How do you keep your company's finances in order?

2.2 Data-latency

The duration takes a user to receive source information from a warehouse or BI dashboard is known as data latency in cloud BI. Many businesses prefer to use systems that provide real-time data and information (Patil & Chavan, 2020). In such a case, cloud BI should provide real-time data access. As a consequence, the analysis supported data that is frequently out of date by the time it is shared with top management to form decision-making. As a result, real-time integration should be on hand to enhance data.

2.3 Data Consolidation Challenges

Data consolidation or data integration is the process of physically combining data from various systems and storing it in one location (Sreemathy et al., 2020). Reducing the amount of data storage locations is the primary goal of data consolidation. It is a critical step before performing data analysis and displaying information in report form. It allows users to control various types of data from a single point of access and converts raw data into information that can be used to make business decisions.

2.4 Data Security Risks

Nearly 75% of Chief Information Officers and IT professionals rank security as the top risk associated with cloud BI integration when it comes to potential dangers (Kasem & Hassanein, 2014). Data is stored and accessed online using cloud computing. Organisations use BI systems to improve efficiency and the ability to obtain a large amount of information quickly. However, BI systems can expose organisations to a variety of data security risks, including loss of data. For example, for cloud-based BI tools, BI is heavily dependent on the security of third-party providers (Al-Aqrabi, 2021).

Many organisations used the Work from Home (WFH) method for their employees during the Covid-19 pandemic. Attackers may take advantage of this and gain access to sensitive company information. As a result, cybersecurity mesh architecture is one approach to assisting cloud BI systems in data security. Cybersecurity mesh is a type of security control that can be assembled and scaled. Its primary goal is to safeguard the digital assets that exist in cloud BI systems (Majstorovic & Stojadinovic, 2020).

2.5 Performance Bottleneck

When we use cloud BI systems to turn raw data into usable information, we anticipate that the information will be analysed, distributed, and reported to us in a neat and organised manner. In order to help us make wise decisions, the information must also be correct and presented in the proper format. The following list of techniques can be used to improve analytical performance (Nicholson et al., 2022; Armbrust et al., 2020; 2013; Aziz, 2014; Liu & Zhou, 2018):

- Techniques for online analytical processing (OLAP) caching to retain complex query results and OLAP processes in cache for optimum query performance
- Using in-memory analytics
- Data needs collaboration
- Democratisation of data
- Delete undesirable data after analysis.
- Leave out pointless information
- By merging data from numerous sources to create several dashboards, you may divide the work.
- Utilise the query and cache monitors
- A delta cache
- Use database layer computations instead of application layer calculations.
- Caching methods and Least Recently Used (LRU) algorithms
- Query execution using parallel processing techniques
- Utilise approaches for managing aggregation and data

2.6 Lack of expertise

Lack of expertise is the deficiency of people with the ability and knowledge in cloud BI and IT technical areas (Mishan et al., 2017). One of the problems organisations and businesses today face is a lack of expertise. Olszak and Ziemba (2012 as cited in Mishan et al., 2017) asserted that BI professionals are decisive because they are in charge of resolving and clearing up any technical issues. According to Mishan et al. (2017), organisations rely too heavily on skilled

individuals. Organisations are migrating to the cloud, and cloud technology is advancing quickly. Factors like the lack of expert employees make it difficult for businesses to keep up with technology and create a shortage of cloud experts. These difficulties can be overcome by educating and advancing IT personnel (Patil & Chavan, 2020). The ability of IS employees to use cloud BI capabilities is crucial, and in this case, expertise and knowledge are needed to confirm that an understanding of cloud BI could add value to the organisation (Madyatmadja et al., 2022).

3. BI Projects

We investigate the difficulties with cloud BI implementation that have been noted and discussed in the existing literature. Lennerholt et al. (2018) claimed that cloud BI is more than just a software programme. Organisations should instead plan how to guarantee easy access to and utilisation of data so that timely, accurate decisions can be made. The first thought that should cross the minds of cloud BI managers when they are establishing a brand-new cloud BI project, cloud BI migration, or cloud BI integration project is how to overcome cloud BI trends and challenges that are constantly changing due to many factors like technology advancement and so forth. The areas listed below should be given preference to ensure that cloud BI systems are effective and successful:

- Define the implementation's overall scope.
- JIT (Just in Time) modelling
- Calculate the overall risks for the cloud BI initiatives both within and outside.
- Architecture and technology should both be flexible.
- Use a bottom-up and top-down strategy.
- Iterations must consider the time involved.
- Plan the project budget carefully in advance.
- Conduct several tests as the projects progress.
- Keep all documents secure and organised.
- Adopt a standard for organisational development
- Think about the scope, timing, and cost considering the organisation's capabilities.
- Create a worldwide staffing strategy.
- Create progress-related milestones for the project.

4. Cloud BI Implementations

It's challenging for organisations to complete their BI initiatives because the majority of cloud BI software deployments fail. Currently, between 70% and 80% of cloud BI implementation projects fail as a result of various issues and challenges (Villamarín, et al., 2017). The following are a few crucial factors for a long-term adoption of cloud BI:

- Plan the implementation of BI.
- Specify the group in charge of adopting cloud BI.
- Decide on a Key Performance Indicator (KPI) that cloud BI will examine.
- Locate a trustworthy software supplier
- Select the best cloud BI tools.
- Think about the infrastructure.
- Prepare the data.
- Processing of migratory data
- Establish a feedback loop

- Broader implementation of cloud BI
- Worries about privacy and information technology (IT) security infractions
- Several data sources that should not be joined
- Business standardisation or analysis
- Several "Source Systems" being included in the SLA Management, Vendor, and Outsourcing Models
- Stakeholders can get access to current information

5. Conclusion

Businesses are looking for a platform that is cost-effective, quick, and efficient for gaining insight and enhancing the quality and pace of business decisions. Cloud BI is just the service that can provide such a platform to businesses. However, many obstacles and issues must be overcome before this technology can be implemented in various organisations and businesses. This article's discussion of problems and challenges will be helpful to readers. Cloud BI service providers are working nonstop to advance technology and provide a complete out-of-the-box solution with a range of methodologies and tools. One of the challenges of business intelligence is integrating data from various source systems. As the number of information sources expands, many organisations will need to gather data from a variety of databases, big data platforms, and enterprise applications to be analysed. Cloud BI is more than just software; it's a way to guarantee a real-time view of all relevant business information.

Adopting business intelligence has many benefits, from improved analysis to increased competitive advantages. The dependability of data clarity, improved customer usability, and an increase in employee satisfaction are just a few benefits of business intelligence. By contrast to 2021, it is anticipated that the size of the worldwide market for cloud BI tools would increase to millions by 2028 (Cloud BI Tools Market, 2022). Cloud BI gives predictive analytics infrastructures access to virtually infinite computer resources, storage space, and memory; it has an impact on how advanced analytics projects are managed. This study's findings could be very useful for future cloud BI innovation.

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