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Issue In Real Time Data Management System

Gurpreet Kaur

Assistant Professor, e-mail id: gurpreetkaur9094@gmail.com

Abstract:

Real-time data management systems have become an essential component of modern businesses, enabling timely decision-making and improved responsiveness. However, these systems also come with a variety of challenges that need to be addressed to ensure effective management of real-time data. This research article aims to identify and analyze some of the key issues faced by organizations in this regard and propose potential solutions. The article specifically focuses on the challenges of data latency, data quality, scalability and performance, security and privacy, and data integration and interoperability. By understanding these challenges and implementing appropriate solutions, businesses can optimize the performance and effectiveness of their real-time data management systems.

1. Introduction:

The advent of real-time data management systems has revolutionized the way businesses collect, process, and analyze their data. These systems enable organizations to make timely decisions and respond quickly to critical events. However, as with any technology, real-time data management systems also come with their fair share of issues and challenges. This review article aims to highlight some of the key issues faced by businesses in effectively managing real-time data and propose potential solutions.

1. Data Latency:

Real-time data management systems are designed to process and analyze data as it is generated. However, latency can occur due to several factors, such as network congestion, system bottlenecks, or data volume overload. This latency can undermine the system's ability to deliver timely insights and responses. To mitigate this issue, organizations should invest in robust infrastructure and scalable solutions that can handle the increased data volume in real time.

2. Data Quality:

In a real-time data management system, the quality of incoming data is of paramount importance. Incomplete or inaccurate data can lead to faulty analysis and flawed decision-making. Ensuring data quality requires implementing data validation techniques, such as real-time data cleansing, anomaly detection, and duplicate removal. Regular monitoring and data governance practices should also be in place to maintain data integrity.

3. Scalability and Performance:

Real-time data management systems must be capable of handling a massive influx of data while maintaining optimal performance. Often, these systems need to process data from various sources simultaneously. Scalability issues can arise when the infrastructure cannot handle the increasing data load, resulting in system slowdowns or crashes. Investing in cloud-based solutions and distributed processing frameworks can provide the necessary scalability and improve system performance.

4. Security and Privacy:

Real-time data management systems deal with sensitive and valuable data, making security and privacy a primary concern. Data breaches, unauthorized access, and data leaks can have severe consequences for businesses. Implementing robust authentication protocols, encryption techniques, and regular security audits help safeguard data integrity and protect against potential threats.

5. Data Integration and Interoperability:

Organizations typically utilize multiple systems to collect and store data, leading to challenges in integrating and interoperating data across different platforms. Real-time data management systems should support seamless integration of data from various sources and provide standard APIs and protocols for interoperability. Implementing a robust data integration strategy can enhance data completeness and timeliness.

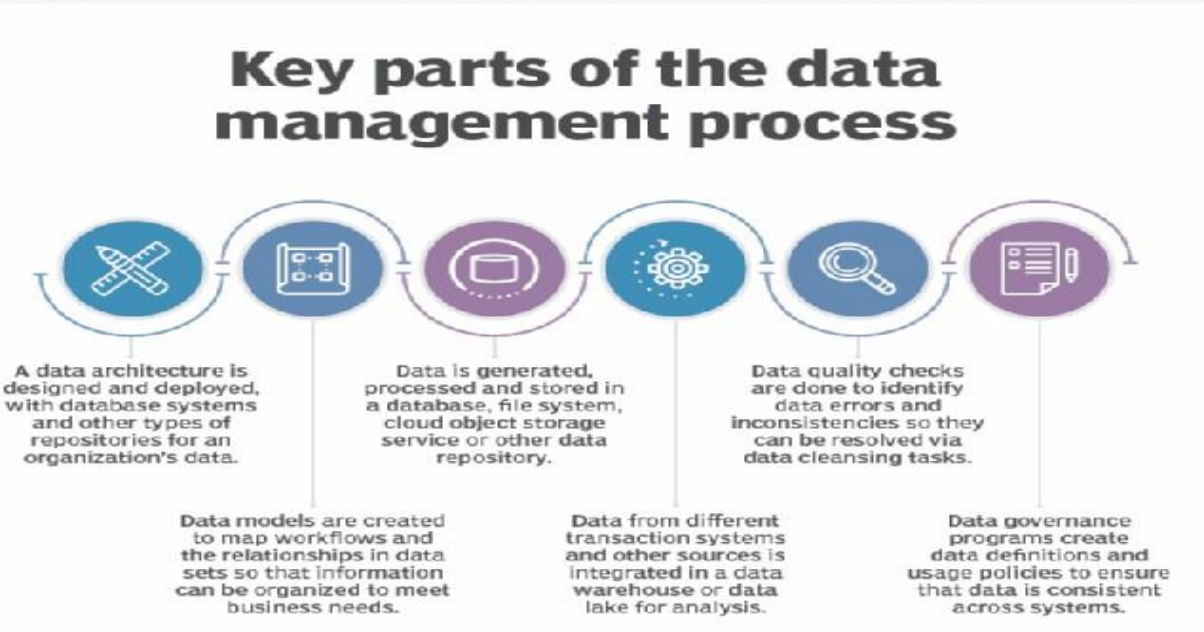
Types of data management functions

The separate disciplines that are part of the overall data management process cover a series of steps, from data processing and storage to governance of how data is formatted and used in operational and analytical systems. Developing of data architecture is often the first step,

particularly in large organizations with lots of data to manage. A data architecture provides a blueprint for managing data and deploying databases and other data platforms, including specific technologies to fit individual applications.

Databases are the most common platform used to hold corporate data. They contain a collection of data that's organized so it can be accessed, updated and managed. They're used in both transaction processing systems that create operational data, such as customer records and sales orders, and data ware houses , which store consolidated data sets from business systems for BI and analytics.

That makes database administration a core data management function. Once databases have been set up, performance monitoring and tuning must be done to maintain acceptable response times on database queries that users run to get information from the data stored in them. Other administrative tasks include database design, configuration, installation and updates; data security; database backup and recovery; and application of software upgrades and security patches.



The primary technology used to deploy and administer databases is a database management system, which is software that acts as an interface between the databases it controls and the

database administrators (DBAs), end users, and applications that access them. Alternative data platforms to databases include file systems and cloud object storage services, which store data in less structured ways than mainstream databases do, offering more flexibility on the types of data that can be stored and how the data is formatted. As a result, though, they aren't a good fit for transactional applications.

2. Benefits of Database Management Systems

It is worthwhile to recall the benefits of DBMS technology. Some benefits are not obvious, many have nothing to do with real-time computing per se, and all may get lost in the detailed discussions.

Database management systems provide central control of the data in a system. This centralization of control permits:

- Controlled elimination of redundancy. When data description is not centrally controlled, different applications or application segments maintain their own versions of the data. This not only wastes storage space, but, more importantly, may introduce inconsistencies as the various versions diverge. • Maintenance of integrity constraints. The DBMS can protect the database from some classes of application errors: impossible data values (400 hours worked in a week), conflicting data (duplicate keys), etc.
- Publication of the data description as a resource.

3. **Data management systems and applications face several challenges, including:**

1. **Data Security:** Ensuring the confidentiality, integrity, and availability of data is crucial to prevent unauthorized access, data breaches, or loss. Overcoming this challenge involves implementing strong security measures such as encryption, access controls, and regular security audits.
2. **Data Quality:** Data can be flawed due to errors, inconsistencies, or inaccuracies, affecting the decision-making process. Overcoming this challenge requires implementing data validation processes, data cleansing techniques, and data governance frameworks to ensure data accuracy.

3. **Data Integration:** Organizations often have data spread across multiple systems and sources, making it challenging to integrate and consolidate data. Overcoming this challenge involves implementing data integration strategies such as Extract, Transform, Load (ETL) processes, data mapping, and data normalization.
4. **Data Privacy and Compliance:** With data privacy regulations like GDPR and CCPA, organizations need to ensure they handle personal data appropriately. Overcoming this challenge requires implementing privacy and compliance measures, including anonymizing or pseudonymizing data, obtaining consent, and following data retention and deletion policies.
5. **Scalability and Performance:** As the volume and complexity of data continue to grow, data management systems must handle large data sets efficiently and provide fast query responses. Overcoming this challenge involves optimizing data storage, using distributed systems, and implementing performance tuning techniques such as indexing and caching.

To overcome these challenges, organizations can:

1. Invest in robust data management tools and technologies that provide built-in security features, data quality controls, and integration capabilities.
2. Implement data governance frameworks and establish data management best practices to ensure data quality, privacy, and compliance.
3. Train employees on data management practices, security protocols, and privacy regulations to enhance data handling and minimize human errors.
4. Regularly monitor and audit data management systems to identify vulnerabilities, ensure compliance, and address performance issues.
5. Collaborate with IT and security teams, as well as external consultants, to implement industry best practices, stay updated with the latest technologies, and continuously improve data management processes.

References

1. Abbott, R. and Garcia-Molina, H. Scheduling Real-time Transactions: a Performance Evaluation. Proceedings of the Fourteenth International Conference on Very Large Data Bases, Very Large Data Base Endowment, 1988, pp. 1-12.

2. Abbott, R. and Garcia-Molina, H. Scheduling Real-time Transactions with Disk Resident Data. Proceedings of the Fifteenth International Conference on Very Large Data Bases, Very Large Data Base Endowment, 1989, pp. 385-396.
3. Abbott, R. and Garcia-Molina, H. Scheduling I/O Requests with Deadlines: a Performance Evaluation. Proceedings 11th Real-Time Systems Symposium, December 1990, pp. 113-124.
4. Batory, D. S., Leung, T. Y., and Wise, T. E. "Implementation concepts for an extensible data model and data language". ACM Transactions on Database Systems 13, 3 (September 1988), 231-262.
5. Bernstein, P. and Goodman, N. "Multiversion Concurrency Control - Theory and Algorithms". ACM Transactions on Database Systems 8, 4 (December 1983), 465-484.
6. Buchman, A. P., McCarthy, D. R., Hsu, M., and Dayal, U. Time-Critical Database Scheduling: a Framework for Integrating Real-Time Scheduling and Concurrency Control. Proceedings of the Fifth International Conference on Data Engineering, 1989, pp. 470-480.
7. Burns, A. and Wellings, A.. Real-Time Systems and their Programming Languages. Addison-Wesley Publishing Company, Wokingham, England, 1990.
8. SofTech Inc. Proposed Military Standard Common Ada Programming Support Environment (APSE) Interface Set (CAIS) (Revision A). Naval Ocean Systems Center, as agent for Ada Joint Program Office, Waltham, MA, 1988.
9. Carey, M. J., Dewitt, D. J., Richardson, J. E., and Shektia, E.I. Object and File Management in the EXODUS Extensible Database System. Proceedings of the Twelfth International Converence on Very Large Data Bases, Very Large Data Base Endowment, August 1986, pp. 91-100.
10. Carey, M. J., Jauhar, R., and Livny, M. Priority in DBMS Resource Scheduling. Proceedings of the Fifteenth International Conference on Very Large Databases, 1989, pp. 397-410.
11. Chastek, Gary, Graham, Marc H., and Zelesnik, Gregory. Notes on Applications of the SQL Ada Module Description Language (SAMeDL). Tech. Rept. CMU/SEI-91-TR-12, Software Engineering Institute, June 1991.

12. Chung, J-Y. and Liu, J. W-S. Algorithms for Scheduling Periodic Jobs to Minimize Average Error. IEEE Real Time Systems Symposium, 1988, pp. 142-151.
13. Dayal et al. "The HiPAC Project: Combining Active Database and Timing Constraints". SIGMOD Record 17, 1 (March 1988), 51-70.
14. DeWitt, D. J., Katz, R. H., Olken, F., Shapiro, L. D., Stonebraker, M. R., and Wood, D. Implementation Techniques for Main Memory Database Systems. Proceedings of the ACM SIGMOD Conference on Management of Data, 1984, pp. 1-8.