NOSQL DATABASES: TYPES, ADVANTAGES, AND COMPARISON WITH RELATIONAL DATABASES.

INTRODUCTION

In the ever-evolving world of database management, the comparison between traditional relational databases and the dynamic landscape of NoSQL databases has garnered significant attention in research. Two key contributions to this ongoing conversation come from the works of Nayak, Poriya, and Poojray, and Behjat U Nisa. These articles delve into the intricate features, characteristics, and applications of NoSQL databases, offering valuable insights into their roles in today's data management and analysis. Both selected articles provide a detailed exploration of various types of NoSQL databases and a thoughtful comparison with traditional relational databases. Together, they contribute to our understanding of the diverse and evolving field of database technologies.

Paper 1: Type Of NOSQL Databases And Its Comparison With Relational Databases

The research paper thoroughly explores the landscape of NoSQL databases and compares them to traditional relational databases. It covers various types of NoSQL databases, including Key-Value Stores like Amazon DynamoDB and Riak, emphasizing their simplicity and scalability. Column-Oriented Databases, exemplified by Google's Big Table and Apache Cassandra, are discussed for their distributed storage capabilities, beneficial for data mining. Document Store Databases like MongoDB and CouchDB are noted for their flexibility in handling schema-less data, making them suitable for content management systems. Graph Databases, represented by Neo4j, are highlighted for their focus on graph structures, beneficial for intricate relationships. Object Oriented Databases, such as db4o, are explored for their amalgamation of object-oriented programming and database principles, suitable for complex object relationships, despite potential challenges in scaling and language dependency.

In this paper, the authors have included the comparison between NoSQL and RDMS.

-NoSQL DATABASES v/s RDBMS

NOSQL databases have both advantages as well as disadvantages over relational databases.

-Advantages of NoSQL over Relational

1.Provides a wide range of data models to choose from
2.Easily scalable
3.Databse administrators are not required
4.Some of the NOSQL DBaaS providers like Riak and Cassandra are programmed to handle hardware failure
5.Faster, more efficient and flexible

-Disadvantages of NoSQL over Relational

1.Immature
2.No standard query language
3.Some NOSQL databases are not ACID compliant
4.No standard interface
5.Maintenance is difficult

Paper 2: A Comparison between Relational Databases and NoSQL Databases

In the research paper authored by Behjat U Nisa, the focus is on the problems associated with relational databases, leading to the introduction of NoSQL databases as a solution. The issues highlighted with relational databases include limitations in scalability, high setup and maintenance costs, complexity in handling unstructured data with SQL, difficulty in data encapsulation, and challenges in sharing information across complex systems. The paper introduces NoSQL as a non-relational database model, emphasizing its horizontal scalability and ability to handle unstructured data. NoSQL databases, not adhering to ACID properties but guaranteeing BASE properties, use different data models like key-value stores, column-oriented databases, document stores, graph databases, and object-oriented databases. The advantages of NoSQL over relational databases include scalability, reduced administrative requirements, handling structured and unstructured data, and improved efficiency.

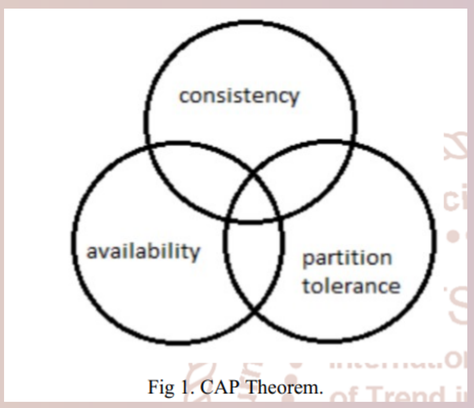

Fig 1. CAP Theorem.

Fig 2. NoSQL Symbolic Representation.

SUMMARY

Both research papers delve into the comparison between NoSQL and relational databases, highlighting their unique characteristics and applications. The first paper covers key-value stores, column-oriented databases, document stores, graph databases, and object-oriented databases, discussing their advantages and disadvantages. The second paper focuses more on the problems with relational databases and introduces NoSQL databases as a solution, providing a detailed overview of their types. Both papers emphasize the advantages of NoSQL, such as scalability, reduced administrative overhead, and flexibility, while the second paper additionally addresses the limitations of relational databases. Both contribute valuable insights into the evolving database landscape, with the first paper offering a broader overview of NoSQL databases and the second paper providing a more problem-centric perspective.

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