

New Innovation in Approaches of DBMS

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Abstract

Database Management Systems (DBMS) are fundamental to modern information systems, enabling organizations to efficiently store, manage, retrieve, and analyse large volumes of data. With the rapid growth of cloud computing, big data, artificial intelligence, and distributed applications, traditional database approaches are evolving toward more flexible, scalable, and intelligent solutions. New innovations in DBMS include cloud-native databases, distributed database architectures, NoSQL and NewSQL systems, in-memory processing, autonomous database management, and AI-assisted query optimization. These approaches address the limitations of conventional relational databases by improving scalability, availability, performance, and real-time data processing. Cloud-based DBMS provides elastic resource allocation and reduces infrastructure management, while distributed databases support data processing across multiple locations. NoSQL databases offer flexible data models for handling unstructured and semi-structured information, whereas NewSQL combines the scalability of distributed systems with the transactional capabilities of relational databases. Furthermore, artificial intelligence and machine learning are being integrated into database systems to automate indexing, query optimization, anomaly detection, workload management, and security. Edge computing and real-time analytics are also influencing database architectures by bringing data processing closer to users and devices. This paper explores emerging approaches and innovations in DBMS, their applications, advantages, and challenges. These developments demonstrate how modern database technologies are becoming more adaptive, intelligent, scalable, and capable of supporting the growing demands of data-driven applications.

Keywords: DBMS, Database Innovation, Cloud Databases, NoSQL, NewSQL, Distributed Databases, AI in DBMS, Query Optimization, Big Data, Real-Time Data Processing.

