Efficient Data Modeling and Storage Solutions with SQL and NoSQL Databases in Web Applications

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Abstract*: In today's web application landscape, efficient data modelling and storage solutions are essential for ensuring scalability, performance, and user satisfaction. SQL and NoSQL databases have emerged as prominent technologies, each providing unique benefits for managing structured and unstructured data, respectively. SQL databases offer a stable, ACID-compliant environment suitable for applications requiring transactional integrity and complex querying, whereas NoSQL databases provide a flexible, schema-less architecture designed for horizontal scalability, high availability, and handling large volumes of diverse data. With the rise of data-centric applications, a hybrid approach that combines SQL's strong consistency and NoSQL's adaptability has become increasingly common. This paper examines the architectural distinctions, performance trade-offs, and integration strategies of SQL and NoSQL databases in web applications, providing a comprehensive analysis of their roles, benefits, and limitations. By understanding these aspects, developers and data architects can make informed decisions in selecting or combining SQL and NoSQL databases to meet the dynamic requirements of modern digital platforms*.

Keywords: Data modelling, SQL and NoSQL databases, ACID Compliance, Web Application Architecture