ABSTRACT

APPLICATION OF TRANSPARENT DATABASE ENCRYPTION METHOD ON SQL SERVER DATABASE TO INCREASE DATA SECURITY

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Data security has become crucial in the digital era to prevent potential breaches that can result in significant losses for organizations. This research aims to implement Transparent Data Encryption on SQL Server to enhance the security of stored data. The research method involves analysis before and after the implementation of Transparent Data Encryption , including testing data integrity and security, as well as measuring database performance. Testing is conducted through scenarios of data access, encryption and decryption, as well as backup and restore processes. The research results indicate that the implementation of Transparent Data Encryption on SQL Server successfully maintains data confidentiality by encrypting data at rest. Transparent Data Encryption does not significantly affect daily database operations, although there is an increase in Central Processing Unit usage by about 1-2% during the encryption and decryption process. The percentage difference between encryption and decryption in TDE256 and TDE128 databases reaches 2.5%. In terms of performance, the total percentage impact on the duration of database processes using Transparent Data Encryption compared to those not using Transparent Data Encryption shows that the backup process only experiences a time difference of less than 1%, with the database without Transparent Data Encryption being faster. Conversely, for the restore process, the database without Transparent Data Encryption is slower, with a percentage difference reaching 17%. Through the conducted tests, the impact of using Transparent Data Encryption is still within acceptable tolerance limits to maintain a higher level of security. Therefore, Transparent Data Encryption is an effective and efficient solution to enhance data security in an SQL Server database environment without significantly disrupting daily operations.

Keywords: ***Data security, Transparent Data Encryption , SQL Server, database encryption, data integrity, database performance.***