

**Two-Cloud Secure Database for Numeric-Related SQL Range Queries with Privacy Preserving**

**Abstract:**

Industries and individuals outsource database to realize convenient and low-cost applications and services. In order to provide sufficient functionality for SQL queries, many secure database schemes have been proposed. However, such schemes are vulnerable to privacy leakage to cloud server. The main reason is that database is hosted and processed in cloud server, which is beyond the control of data owners. For the numerical range query (“>,” “<;,” and so on), those schemes cannot provide sufficient privacy protection against practical challenges, e.g., privacy leakage of statistical properties, access pattern. Furthermore, increased number of queries will inevitably leak more information to the cloud server. In this paper, we propose a two-cloud architecture for secure database, with a series of intersection protocols that provide privacy preservation to various numeric-related range queries. Security analysis shows that privacy of numerical information is strongly protected against cloud providers in our proposed scheme.