TU Clausthal

Kolloquium zur Masterarbeit

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„Relevant Data Migration from Relational to Graph Database: Case Study of Oracle HR Schema to Neo4j"

Relational databases have and continue to occupy a place of choice in data management and are still being used despite many innovations in this area. The reasons for this dependency or preference are multiple: on the one hand, companies have difficulty to adapt to new technologies because this would mean to completely change the existing infrastructure. There is also a cost issue, which is not limited to the new infrastructure, but also includes staff training. Despite their continuous use in current applications or their contribution to the needs of data-intensive domains, the maximal use of optimal capacities in relational databases remains obsolete in view of the quantity and size of the data generated nowadays. Besides all this, there is a problem of data type. The management of hierarchically connected data with high integrity for example is a hard task not only for the management system but also for the user because the data access will require a long series of JOINs which unfortunately will not produce the best results as it is the case for our study. Studies have been conducted to overcome these problems by offering an easy and flexible method of storage, management, and data access, more efficient and more agile to meet the requirements of current data. This is how graph databases or NoSQL emerged.

In this article, we want to present our contribution to solve the migration problem of hierarchically connected data from a relational to graph database. The approach presented here consists in transforming the complete relational structure of our Schema in graph structure and then using the latter to build the graph database. As relational structure implementing SQL, we use Oracle in a virtual environment and Neo4j as NoSQL structure. The analysis data chosen for this study is the one contained in the Oracle HR schema for the company "Kommunal- und Unternehmensberatung Robert Roller". While studies done so far deal with this issue individually, namely, migration to document-oriented databases, transformation of SQL queries, migration of CMS to the Cloud, our approach presents how to solve this migration issue in a general way by relying only on the structure of the relational Schema to create a Graph that can be exploited on any NoSQL platform. The experimental results between Oracle and Neo4j obtained so far, rightly confirm the feasibility and efficiency of the approach because we have been able to faithfully reproduce our relational database to the graph using this structural analysis of the relational schema. Beyond this feasibility, the results of the mutual analyses justify the necessity of such a migration because either in terms of response time, complexity of the queries or results interpretation, the results are largely in favor of the analysis on a graph DBMS.

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