Chapter 7

Bridging Relational and NoSQL Worlds:
Case Study

ABSTRACT

The chapter presents a real case study of the integration of relational and NoSQL databases. The example of a real project related to vehicle registration, particularly to testing vehicles for compliance with environmental standards, explains how those two worlds can be integrated. Oracle database is used as a relational database, while MongoDB is used as NoSQL database. The chapter sustains that the COMN notation can be successfully used in the process of modeling both relational and nonrelational data. All three ways of integration of relational and NoSQL databases are tested. The native solution was tested by using of native drivers for communication with Oracle and MongoDB databases. The hybrid solution used a Unity product. The reducing-to-one option, in this case, SQL, was tested on Oracle database. The capabilities of Oracle 12c database to work both with relational and nonrelational data by using SQL were tested.

INTRODUCTION

NoSQL databases proved to be ideal support to the requirements of Big Data applications for storing large amounts of unstructured data. Relational databases proved their functionality and efficiency by providing all the

necessary conditions for functioning of transactional systems that require data consistency. Every NoSQL system has its own API and does not support SQL and the JDBC standard. Practice often leads to situations requiring a mixture of the two systems. Their integration and building of software solutions based on the integration require taking a special approach and making an extra effort. This chapter presents a case study of a real-world solution that imposed a mix of the two data organization concepts on the set requirements. This is the case of software that supports the procedures of testing vehicles for compliance with the requirements defined by environmental standards. Data modeling and analysis of user requirements confirm the situation that requires simultaneous use of relational and NoSQL databases. Methods of connecting the two conceptually different databases were analyzed in order to obtain a single programming interface. Analysis of the case, data modeling and an example of a method aimed at connecting the two database worlds are presented below.

CASE STUDY: VEHICLE REGISTRATION

Testing vehicles for compliance with environmental standards is a usual procedure within the vehicle registration process in Bosnia and Herzegovina. Until 1 January 2017, this part of vehicle inspection was not adjusted with international standards. However, since the beginning of 2017 new rules and tests have been introduced in order to harmonize the so-called vehicle environmental tests with new legal regulations, in accordance with international standards in this field. The main purpose of the eco-testing procedure is to create preconditions on the car market to make a selection of cars that can operate in road traffic, based on specified environmental standards. One of the tasks in the process of adjusting the existing environmental tests with international, primarily European, standards was to develop the appropriate software (i.e., EcoTest software). At the beginning, the client of the software design project defined specific guidelines for its development. Some of these guidelines were used in this case study:

- EcoTest is separate software that will record all data of an environmental testing procedure.

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