

## Chapter 8

# Which Way to Go for the Future: The Next Generation of Databases

### ABSTRACT

*The chapter presents how relational databases answer to typical NoSQL features, and, vice versa, how NoSQL databases answer to typical relational features. Open issues related to the integration of relational and NoSQL databases, as well as next database generation features are discussed. The big relational database vendors have continuously worked to incorporate NoSQL features into their databases, as well as NoSQL vendors are trying to make their products more like relational databases. The convergence of these two groups of databases has been a driving force in the evolution of database market, in establishing a new level of focus to resolving big data requirements, and in enabling users to fully use data potential, wherever data is stored, in relational or NoSQL databases. In turn, the database of choice in the future will likely be one that provides the best of both worlds: flexible data model, high availability, and enterprise reliability.*

### INTRODUCTION

The last 10 years of database development were extremely dynamic: the huge number of new, primarily NoSQL databases emerged, new database languages and application programming interfaces (APIs) were developed,

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and new features related to distribution and high availability were added. At the beginning of this period, the differences between NoSQL and relational databases seemed clear and unambiguous and included the ACID/BASE approach, CAP theorem, high availability, distribution, work with unstructured data, and the like. But after 10 years of database development, all those who were expecting that two big clearly separated groups of databases—relational and NoSQL—would be established, today must admit they were wrong. Namely, during the last 10 years, the differences between relational and NoSQL databases continuously shrunk. The big relational database vendors (Oracle, Microsoft, and IBM) have continuously worked to incorporate NoSQL features into their databases, and NoSQL vendors tried to make their products more like relational databases (see Chapter 5). The convergence of these two groups of databases has been a driving force in the evolution of the database market; in establishing a new level of focus for resolving Big Data requirements; and in enabling users to fully use data potential, wherever data is stored, in relational or NoSQL databases. In turn, the database of choice in the future will likely be one that provides the best of both worlds: a flexible data model, high availability, and enterprise reliability.

## **NoSQL VS. RELATIONAL DATABASES**

The comparison between relational and NoSQL databases can be discussed concerning different features such as work with different data formats, use of data schema, joins, consistency, scalability, high availability, and so on. But, considering the process of convergence of these two groups of databases, questions related to the point of comparison can be issued. However, the differences between these two groups of databases still exist, although they are not so clear as they were 10 years ago. Here, two approaches are used to explain the differences and similarities between relational and NoSQL databases:

- Relational database answers to typical NoSQL features.
- NoSQL database answers to typical relational features.

Table 1 presents the typical NoSQL features (described in detail in Chapter 2) and how the three biggest vendors of relational databases (Oracle, Microsoft, and IBM) answer them.

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