

# Design and Performance Analysis of Hierarchical Large-scale Inhomogeneous Databases

**Zsigmond Máriás**

Department of Information Systems  
Eötvös Loránd University  
e-mail: zmarias@inf.elte.hu

## **Abstract**

In this paper, large-scale databases are discussed that contain inhomogeneous elements, which are treated on the basis of the same principle. Obvious examples for this are large product databases without global product scheme. In these applications, there are only a few common attributes, and the database is divided into classes (product categories) that have various attributes with each class defining the scheme of the elements (products) that belong to them. The hierarchy of classes realizes inheritance taxonomy.

The main goal of the discussed systems is to provide detailed and effective searching facilities. Furthermore, the user should also be capable to define and manage the hierarchical schemes and the elements. E-commerce systems or corporate document warehouses are typical examples for this. Our study specifies the required functions to create and query these schemes and elements.

In our paper, two different design approaches are presented that implement the described system with relational database. In the first one, the system is stored in a decomposed database. The different attribute types are stored in separate tables, and the elements are obtained by multiple queries. In the other realization, the elements are stored in tables that are generated „on the fly”. In this case, the queries are kept simple, but the creation and modification of the schemes require database alterations. Our study concentrates on empirical performance analysis and proposes optimal algorithms in both cases.

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