Multidimensional data model for the analysis of information of productive, scientific or service processes

Palominos F.E.

Duran C.A.

Córdova F.M.

Technological development and software engineering have been provided by companies and diverse types of organizations with the ability to manage virtually all of their production processes and services in computer systems, generating, as a result, the need to store and analyze huge datasets. As a consequence, the intensive use of software has caused an exponential growth of the amount of data, making the analytical use of information an arduous task through traditional software development techniques. On the other hand, for many years, software producers have taken advantage of the simplicity and capacity of relational systems for the development of OLTP applications; however, this strategy, by itself, has not been enough to face the challenge of dealing with growing amounts of data stored. This work presents a particular approach of the multidimensional data model, with its own rules, restrictions, and operators, where the indicators of the productive processes of organizations, based on representative data obtained from their information systems, have been managed efficiently, privileging the speed of response. In this way, it is possible to analyze production processes or services, as well as to manage the information derived from different types of scientific experiments. By simulating the simplicity of the relational data model, a set of operators that represent the fundamental OLAP operations have been included, which can then be easily implemented in SQL. In addition, the multidimensional designs based on this model can be implemented in a ROLAP context, in any relational database engine. Finally, since the representation of the operators is inspired on the classical relational algebra, it is easy to assimilate, turning this model into a great potential for training specialists in multidimensional modeling. Consequently, the proposed model allows the use of multidimensional databases, in a simple and friendly context.

data model

multidimensional model

OLAP

Algebra

Application programs

Data structures

Personnel training

Relational database systems

Software design

Multi-dimensional model

Multidimensional data modeling

Multidimensional database

OLAP

Relational data models

Scientific experiments

Software development techniques

Technological development

Information use