

Multidimensional or Relational How to Organize an On-Line Analytical Processing Database?

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In the past few years, the number of On-Line Analytical Processing (OLAP) applications increased quickly. These applications use two significantly different database structures: multidimensional and relational. One can show that the traditional model of relational databases cannot differentiate between these two structures. Another model is necessary to make the most important differences visible.

One of these differences is the speed of the system. It can be proven that the multidimensional database organization results in shorter response times. And it is crucial, since a manager may become impatient, if he or she has to wait say more than twenty seconds for the next screen.

On the other hand, here as well as in many other cases, we have to pay for the speed with a bigger database size. Why does the size of multidimensional databases grow so quickly? The reason is the sparsity of data: The multidimensional matrix contains many empty cells. Efficient handling of sparse matrices is indispensable in an OLAP application. One way to handle sparsity is to take the structure closer to the relational one. Thus the database size decreases, while the application gets slower. Therefore, other methods are needed to eliminate the empty cells from the matrix.

This paper deals with the comparison of the two database structures and the limits of their usage.