OLAP: A Fast, Easy, Affordable Executive Information System—Finally!

by Henry M. Stewart

Online analytical processing (OLAP) has emerged as a “breakthrough” technology that can provide the foundation for EIS solutions. Using OLAP, senior managers are able to view hundreds of graphic and tabular displays that present a visualization of their institution’s business process.

If you have attended SIG meetings on executive information systems during the last four years, you know the story: with very few exceptions, developers have found that technology constraints have inhibited colleges and universities from meeting the ever-changing EIS needs of senior management. By the time EIS answers are created, the questions have changed! The few EIS systems that have survived are usually based on static data from fact books, data that are less interesting to management when they are pursuing answers to pressing, momentary business needs. Take heart, EIS visionaries—technology has finally caught up with your expectations.

The University of Rochester has been experimenting with online analytical processing (OLAP), and the results have been startling. During the spring of 1995 we began demonstrating the service to senior management and other IS staff members. Their reactions were all very similar—spontaneous, short bursts of uncontrolled laughter. They couldn’t believe what they were seeing! OLAP technologies have enabled us to develop special-interest EIS systems very quickly. These systems feature fast response, graphic, and tabular displays, drill-down/drill-up between levels of detail, and an easy screen interface featuring drag-and-drop and point-and-click technologies.1

OLAP technology

How does it work? OLAP technology consists of two major components, the server and the client. Typically the server is a multi-user, LAN-based database that is loaded either from your legacy systems or from your data warehouse. You don’t need a data warehouse in order to implement OLAP, but if you have historical data, OLAP’s visualization will reveal patterns of your business process that are hidden in the data.

The server

Think of OLAP databases as multi-dimensional arrays or cubes of data—actually cubes of cubes—capable of holding hundreds of thousands of rows and columns of both text and numbers. The current terminology for these database servers is multi-dimensional databases (MDDs). The MDDs are loaded from your data source (legacy or warehouse) according to an aggregation model that you define. Fortunately, defining the model and loading the database can be very easy; for some OLAP products, no programming is required to build the model or to load the data.

The client

The client component for several OLAP products presents a spreadsheet-type interface...
OLAP vs. data warehouse

You may ask, “Doesn’t a data warehouse provide us with all we need for queries, reports, analysis, and answers to EIS queries?” The answer is, “yes and no.” A data warehouse is an excellent data structure for queries and reports, especially if those queries and/or reports request data for a specific point in time. But if your query needs to summarize, total, or aggregate data from a year or more (i.e., analysis), response time can change from seconds to hours! A well designed data warehouse should provide good response to queries/reports. It probably will not provide good response for analysis.

The only way in which a warehouse will provide rapid response to analysis is if database administrators create summary tables within the warehouse. This approach may work for a few of the most common summaries, but it could easily consume your valuable DBA’s time. No matter how fast your DBAs work, they won’t be able to outguess the creative minds of senior management. The summary table they didn’t create will be the one that management needs. Our suggestion is to allow OLAP to create those summary tables, charts, and tabular reports. That’s what it is designed to do, and it does it fast and dynamically, according to the wishes of the manager who is controlling the mouse.

Summary

Although at the University of Rochester we were not seeking a solution to EIS specifically, we believe that OLAP technologies can serve as a foundation for the elusive EIS systems that CAUSE member schools have sought over the last few years. Best of all, these products can be very affordable. Prices will vary between vendors, but very good solutions are available for as little as $500 per workstation. When comparing OLAP functionality and cost to the EIS products of the 1980s, OLAP emerges as a “breakthrough” technology, capable of providing rich functionality and ease of use at a price that we can afford.

If your campus is ready to begin experimenting with information visualization, a good place to begin is by researching recent OLAP articles such as those listed below.

For further reading:
