

# : *What is analytical processing?*

by Dan Power

Editor, DSSResources.com

Transforming data and summarizing it is a key task in many decision making situations. Once this task is complete, a manager analyzes and then tries to understand the information that was created. Analytical processing involves performing quantitative data transformations and mathematical and statistical summarization and generating decision relevant results. Processing refers to obtaining data and performing the analytical operations on the data. Analytical processing occurs in data and model-driven DSS and in special decision support studies.

Online analytical processing (OLAP) refers to software for manipulating multidimensional data from a variety of sources that has been stored in a data warehouse. The software can create various views and representations of the data. OLAP software provides fast, consistent, interactive access to shared, multidimensional data (Pendse, 2002). OLAP as part of a data-driven DSS is used to discover trends and perform statistical analysis. The term OLAP was introduced in 1993 by Dr. E.F. Codd.

Davenport and Harris (2007) define analytics as "extensive use of data, statistical and quantitative analysis, exploratory and predictive models, and fact-based management to drive decisions and actions. The analytics may be input for human decisions or drive fully automated decisions. Analytics are a subset of what has come to be called business intelligence (p. 7)."

Examples of analytical operations used in DSS and in special studies include: 1) cross tabulation, 2) summarizations like average, range and sum, 3) clustering, 4) regression, 5) goal seeking, 6) multi-variable analyses (multiple scenarios), and 7) calculations of percentages, deviations and differences.

Cross tabulation creates a 2 dimensional table showing the interaction of two variables. This type of analytical operation is easy to understand and is commonly implemented as a pivot table to provide easy changes in analysis. A pivot table is an interactive data summarization tool.

Clustering assigns data into subsets based on a criterion and distance measure. Clusters of data observations are hence similar in some way, e.g., frequent buyers vs. infrequent buyers.

## : *What is analytical processing?*

Regression is a statistical tool for analyzing relationships among data. The model has a data variable (dependent variable) that is determined or predicted by one or more other variables (independent variables). The most common type of regression is simple, linear regression. This technique assumes a straight-line, linear relationship between a dependent variable and a single independent variable.

More complex algebraic, mathematical programming and simulation models are used in model-driven DSS. Also, data-driven DSS often use structured query language (SQL) to retrieve and process data and analytical tools like pivot tables, drill down and dashboard displays. Special studies use a wide variety of quantitative and analysis tools. The processing is often driven by the human analyst preparing the study.

Much of computerized decision support is about providing managers with predetermined or ad hoc analyses. In some systems, managers have limited capabilities to change the analysis and in others the system provides extensive "what if?" capabilities. Analytical processing is a fundamental capability associated with computerized decision support.

### References

Codd, E.F., S.B. Codd and C.T. Salley, "Providing OLAP (On-Line Analytical Processing) to User-Analysts: An IT Mandate", E.F. Codd and Associates, 1993 (sponsored by Arbor Software Corporation).

Davenport, T. H. and J. G. Harris, *Competing on Analytics: The New Science of Winning*, Harvard Business School Press, 2007.

Pendse, N., "What is OLAP?", DSSResources.COM, 04/07/2002.

Author: Daniel Power

Last update: 2010-02-12 08:33