

# Chapter 1.31

## Data Warehousing Solutions for Reporting Problems

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### INTRODUCTION

Reporting is one of the basic processes in all organizations. It provides information for planning and decision making and, on the other hand, information for analyzing the correctness of the decisions made at the beginning of the process. Reporting is based on the data that the operational information systems contain. Reports can be produced directly from these operational databases, but an operational database is not organized in a way that naturally supports analysis. An alternative way is to organize the data in such a way that supports analysis easily. Typically, this method leads to the introduction of a data warehouse.

In the summer of 2002, a multiple case study research was launched in six Finnish organizations (see Table 1). The researchers studied the databases of these organizations and identified the trends in database exploitation. One of the main ideas was to study the diffusion of database innovations. In practice this meant that the researchers described the present database architecture and identified the future plans and present problems. The data for this research was mainly collected

with semistructured interviews, and altogether, 54 interviews were arranged.

The research processed data of 44 different information systems. Most (40%) of the analyzed information systems were online transaction processing systems, such as order-entry systems. The second largest category (30%) comprised information systems relating to decision support and reporting. Only one pilot data warehouse was among these systems, but on the other hand, customized reporting systems were used, for example, in SOK, SSP, and OPTI. Reporting was commonly recognized as an area where interviewees were not satisfied and were hoping for improvements.

This article focuses on describing the reporting problems that the organizations are facing and explains how they can exploit a data warehouse to overcome these problems.

### BACKGROUND

The term *data warehouse* was first introduced as a subject-oriented, integrated, nonvolatile,

Table 1. The case organizations

Organization/ Abbreviation used in this research	Line of business	Private/ Public	Turnover 2002 (Millions €)	Employees 2002
SOK corporation/SOK	Co-operative society (main businesses food & groceries and hardware)	Private	2998	4645
Salon Seudun Puhelin Ltd/SSP	Tele-communication	Private	28	121
Statistics Finland/STAT	National statistics	Public	52	1 074
State Provincial Office of Western Finland/ WEST	Regional administrative authority	Public		350
TS-Group Ltd/TS	Printing services and Communications	Private	69,7	2 052 (Consolidated corporation)
Optiroc OY/OPTI	Building materials	Private	149	388

and time-variant collection of data in support of management's decisions (Inmon, 1992). A simpler definition says that a data warehouse is a store of enterprise data designed to facilitate management decision making (Kroenke, 2004). A data warehouse differs from traditional databases in many ways. Its structure is different than that of traditional databases, and different functionalities are required (Elmasri & Navathe, 2000). The aim is to integrate all corporate information into one repository, where the information is easily accessed, queried, analyzed, and used as a basis for the reports (Begg & Connolly, 2002). A data warehouse provides decision support to organizations with the help of analytical databases and Online Analytical Processing (OLAP) tools (Gorla, 2003). A data warehouse (see Figure 1) receives data from the operational databases on a regular basis, and new data is added to the existing data. The warehouse contains both detailed aggregated data and summarized data to speed up the queries. It is typically organized in smaller units called *data marts*, which support the specific analysis needs of a department or

business unit (Bonifati, Cattaneo, Ceri, Fuggetta, & Paraboschi, 2001).

In the case organizations, the idea of the data warehouse has been discussed, but so far no data warehouses exist, although in one case, a data warehouse pilot is in use. The rationale for these discussions is that at the moment, the reporting and the analyzing possibilities are not serving the organizations very well. Actually, the interviewees identified many problems in reporting.

In the SOK Corporation, the interviewees complained that information is distributed in numerous information systems; thus, building a comprehensive view of the information is difficult. Another problem is in financial reporting. A financial report taken from different information systems gives different results, though they should be equal. A reason for this inequality is that the data is not harmonized and processed similarly. In the restaurant business of SOK Corporation, an essential piece of information is the sales figures of the products. It should be able to analyze which, where, and how many products have been bought. In the whole SOK Corporation, analyzing

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