On Control of Data Flows in Heterogeneous Enterprise Systems

Dusan Pavliak, Robert Vrabel

Abstract— **The efficient data integration and the control of data flows leading to formation of coherent integrated database has become a complex problem. The information of the enterprise include the functions from processing of offers, orders via computer design and from production to production management. Finally, the processed data are archived.**

Index Terms— **system integration, data flow, data import, heterogeneous enterprise systems, ERP.**

I. INTRODUCTION

From birth, a man is continuously forced to process a great amount of data in his mind. Exchange of the information with the surroundings allows us to keep our own existence. The data processing in our mind is permanent, constant but suggestible. Since the 20th century we have experienced information explosion. The world is facing the information overload. However, there are no people who would be able to process or even register the information.

II. CONTROL OF DATA FLOWS

Effective data integration and control of data flows leads to the formation of a coherent integrated data base that is becoming more and more complex problem. "Information of the enterprise include the functions from processing of offers, orders via computer design and production to production management. The size of integration is different in various companies, because business and production processes require different implementation. Therefore, there are efforts to integrate all these functions in order to increase process efficiency and responsiveness. The specialists agree that computer integration of production systems is relatively smooth, from technical point of view. The biggest problem is management of information technology support ,from their choice to application [1-3]. In other words, the focus of integration in manufacturing companies is currently changing from manufacturing systems integration to integration of the information obtained from consistent data which support and provide the meaningful use. Control of data flow is the transfer of data into the import system. Then the data are loaded into the appropriate data structure of importer storage interlayer. At this level it is possible to process data with the use of different ways of pre-processing operations. They may

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include transformations, cleaning, derivations, calculations, aggregations, disaggregation, coding, etc (Fig.1).

Data are maintained and transformed in order to meet the conditions and structure of data in the target system.
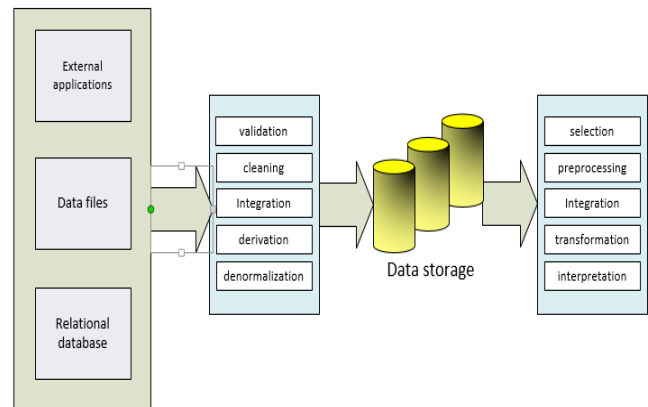

Figure 1. The transformation and data processing in OLAP

The difference between pre-processing and post-processing is that the pre-processing processes the source data into the form in order to combine the source data with the target data within the data transformation.
Post-processing carries out data transformation already combined with the target data. This kind of processing is necessary to create derived data values and data calculations [4-6].
In the next step, target data are loaded from import system. This step is necessary because, imported data are divided into categories according to whether the target records will be added, updated, or deleted.
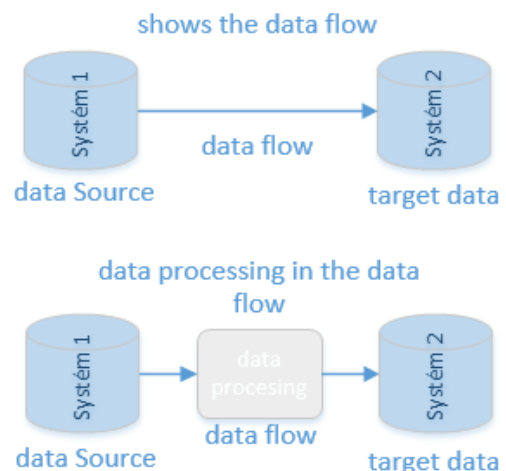

Figure 2. Processing data inside the data

This kind of data pre-processing significantly speeds up the import process, because the data in the source dose, which are

unchanged in comparison with the value of the target attributes, will be omitted from subsequent processing (Fig. 3).

At the end of the data processing, there is the validation of process results. If the result of importing is not validated, then control of the data starts.
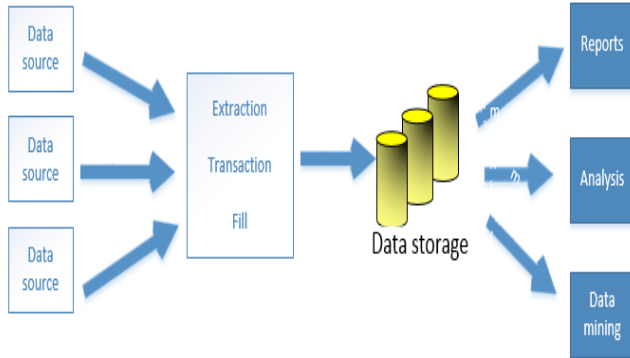

Figure 3 . Data processing in a data warehouse

Then control of the result of data processing will be extended to control of the amount of changes of individual attributes and their values. If we can precisely define the criteria of this control, its parts could be fully automatic. In some cases we cannot avoid human intervention in the process, for example, when we need to find the people responsible for the source data and the results of the inspection should be discussed directly with them. If there are made major changes in the source system (for example, Bulk update data), the amounts of imported attributes can be unexpectedly increased, but even the increased amount is shown to be valid for the import [5].

Parameters for validation are set for each import in advance and they prevent damage of the target data. For example, they include the boundary conditions for a number of processed records, or define valid values of attributes. If the results contain satisfying criteria, integration application can be started. The data that are identified as acceptable for further processing, are transferred to integration application. There is the transfer of individual records into the target system and their updating. The feedback, implemented within integration application can control values of individual attributes in the target system during the actual import. Data are imported into ERP system, which serves for operational activities (Fig. 4).

The feedback enables us to eliminate the errors caused by the change of data in the target system during import processing. If the system finds such records, that have changed values, and they do not meet the import conditions, this kind of information is recorded in the importer log structure. If the data satisfy the conditions, they are successfully imported into the target system and they are also recorded. The result of import is first recorded in the integration module of the target application and then all results are transferred back to the importer structure of data flow.
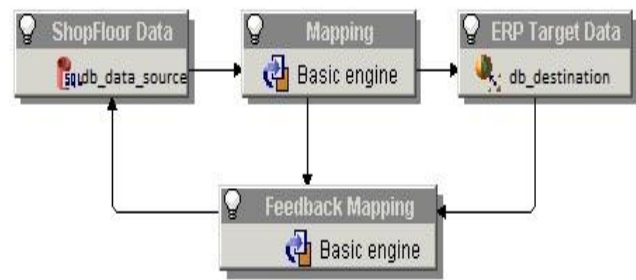

Figure 4 . Data mapping feedback

After completing and transferring all data, it is important to archive the data   from import system. Data archiving can serve for searching import errors or for various reports on the quality and quantity of integrated data (Fig. 5).
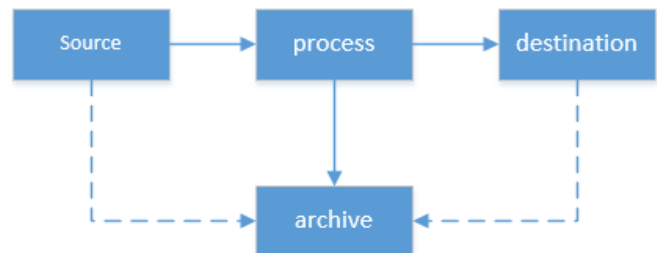

Figure 5. Data archiving

III. CONCLUSION

We were able to increase efficiency and speed in production by error control followed by the data flow adjustment before processing in the system.

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