

A review and development of a warehousing design methodology, normative model, and solution algorithms

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Extended Abstract

While warehouses have become smaller, they remain a key component in the supply chain of most corporations. The requirements for the warehousing operations have significantly increased. Order accuracy, order response time, order frequency, and order size requirements are dramatically different than a decade ago. The advent of electronic commerce will introduce even more complications since a larger number of single customer, small orders will have to be processed on very tight deadlines.

There exists a significant gap between the design practice and methodology for warehousing systems of industrial practitioners and academics. We will briefly review, categorize, and summarize previous reviews of warehousing research. Most warehouse designs appear to be derivatives of earlier, successful warehouse implementations. A student in warehouse design typically has three types of sources for information: academic research literature, trade journal project descriptions, and simulation software vendors.

At this time we are not aware of the existence of a comprehensive and science-based methodology for the design of warehousing systems that can satisfy the warehouse operations requirements. We will report on the development of a design methodology, normative model, and design algorithm for warehousing. The results focus on an object oriented data centered view of the warehouse. The warehouse design is based on the functional flow network in the warehouse. We will also discuss initial computational experience and case study experience.

The design process uses a client-server paradigm where most of the data input and visual rendering of the design is executed on a client. Most of the database and the computationally demanding design algorithms are located on the server. The client and server communicate over the Internet. Initial results of the effort to design a block stacking storage systems are also demonstrated.

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