

# KRISYS - a KBMS Supporting the Development and Processing of Advanced Engineering Applications

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## **Abstract**

*In order to support non-standard database applications and, in particular, advanced engineering applications, enhanced DBMSs have to supply not only semantically enriched data and knowledge modeling concepts, but also means for constructing an application model in a stepwise, incremental way. The Knowledge Base Management System KRISYS, which is presented in this paper, has been developed along these lines. We give an overview of the system architecture and the individual components, illustrate the application design methodology supported by the system, and demonstrate the applicability of KRISYS in an advanced CAD framework. Additionally, we emphasize the need of refined concepts for efficient application processing in workstation/server architectures and sketch a processing model for such an environment.*

## **1. Introduction**

In the last years, substantial research efforts in the area of Database Management Systems (DBMS) have been conducted to support advanced or so-called non-standard database applications. As a representative of this application class, one can consider engineering applications like computer-aided design (CAD) systems. Such applications pose strong requirements w.r.t. data modeling and management facilities, which are additionally increased by current activities to develop better and more flexible (so-called advanced or intelligent) CAD systems [AtHV89, GR89, YG89]. Such systems should

- be capable of controlling the overall design process including multiple design steps,
- provide system-enforced checking of complex integrity constraints even across design steps, as well as
- exhibit some kind of active system behavior and a more intelligent user interface which support the design work in various ways, for example by
  - providing appropriate design hints for the design engineer,
  - deriving conceivable (or relevant) problem solutions, and
  - delivering adequate diagnostic information at all stages of the design process.

Clearly, database technology should be used to support such advanced CAD systems, because

- CAD applications are typically data-intensive,
- control of design steps at a fairly detailed level requires a sufficiently precise system model of the design object which supports uniform handling of all aspects of object representation, and
- a unique and non-redundant representation of design objects serves as an effective way to integrate all components participating in a CAD system and to preserve integrity constraints during the entire design.

Of course, there are more arguments in favor of the use of a DBMS such as management of persistent data, failure recovery, concurrency control in a multi-user environment, etc.

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