

# Panel on Next Generation Database Systems Won't Work Without Semantics!<sup>1</sup>

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## ABSTRACT

In the late '70s, while second generation DBMS products and technologies were entering the market, there was significant research activity whose aim was to make greater use of semantic information in database systems. The focus of that research was primarily on semantic data models and data modelling, including semantic query processing and integrity checking. However, few if any of the results of these efforts found their way in database technologies of the day, or database management practices. Instead, semantic issues were delegated to early phases of information system development (including requirements analysis and design), as well as application development.

Today's database system technologies perform admirably well with semantically trivial operations and representations. At the same time, these technologies are being challenged in virtually every area of data management, with new applications which demand ways of dealing more explicitly with the meaning of the data being managed. For example, interoperation between applications requires that the underlying databases *interoperate meaningfully*. This currently requires a mammoth manual reverse engineering effort that simply cannot be sustained or funded by any large organization. The same applies to data warehouses, since they too require the correct semantic merging of data from semantically diverse sources. Errors in merging these sources can lead to significant problems of interpretation and potentially of the functions that the warehouse is designed to deliver. The effectiveness of database technologies to web-related information gathering and management applications is likewise limited by the degree to which they can accommodate semantics of the information being sought. Along the same lines, the emergence of organizational knowledge management as the next major application of computing in organizations

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clearly offers a tremendous opportunity for database technologies. But, again, this opportunity begs the question whether such technologies can succeed if they continue to ignore semantic issues.

In summary, semantic issues were put aside by database technologies of the past. However, the database application challenges of the '90s seem to demand solutions to precisely such issues today. This panel intends to examine these long standing research issues on database semantics and their failures to penetrate database technologies. The discussion will also review emerging application areas and their need for mechanisms that deal with data semantics. Finally, the panelists will comment on relevant research tasks that need to be addressed in this long-ignored area of database modeling, management, access, and processing.

## Panel Questions

- What were the major attempts to enhance data management with semantic representations and processing and why did they fail ?
- What current areas of data management, access, and processing might benefit from more expressive semantic representations and processing capabilities?
- What are some of the research tasks that need to be addressed?

<sup>1</sup> The panel topic and structure were suggested by Michael Brodie (GTE Laboratories).