Open Object Database Management Systems

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Abstract

Object database management systems (OODBs) are providing the data management solution for applications in computer integrated manufacturing, office information systems, and multimedia. Object services architectures and object-relational database systems are two major emerging trends in the systems software industry. An object services architecture (OSA) is a software architecture consisting of a collection of independent (orthogonal) software services, all of which interoperate via a software backplane or message passing bus. An OSA may potentially allow large software systems (including DBMSs) to be configured as a collection of open, independent, and interoperable services rather than as large monolithic systems. Object-relational DBMSs are systems that attempt to combine the best features of today's extensible relational and OODB technologies. Object-relational DBMS, which may become the next plateau in database technology, may be built by extending existing OODB products with robust relational capabilities (e.g., SQL queries, transaction management), by extending existing relational systems with object support, by composing services in an OSA, or by building them ex-nihilo.

This tutorial presents an overview of the concepts and issues involved in the design of open object DBMSs including object-relational DBMSs. Topics to be covered include the motivation for object data management and open architectures; a comparison of three object data management approaches: persistent programming languages, extended relational DBMSs, and extensible toolkits; an overview of concepts and implementation issues including persistence models, object query processing, storage management, versioning models, and schema evolution; a discussion of the challenges in building object-relational DBMSs for each of the four approaches described above; an overview of object services architectures (e.g., OMG) and DBMSs architected as OSAs; a comparison of existing products and research systems; and a look at ODMG-93, SQL3, and OMG CORBA and OSA standards.