Object-Relational Database Systems:
Principles, Products, and Challenges
(Tutorial)

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Overview

Object-relational database systems, a.k.a. "universal servers," are emerging as the next major generation of commercial database system technology. Products from relational DBMS vendors including IBM, Informix, Oracle, UniSQL, and others, include object-relational features today, and all of the major vendors appear to be on course to delivering full object-relational support in their products over the next few years. In addition, the SQL3 standard is rapidly solidifying in this area. The goal of this tutorial is to explain what the key features are of object-relational database systems, review what today's products provide, and then look ahead to where these systems are heading. The presentation will be aimed at general SIGMOD audience, and should therefore be appropriate for users, practitioners, and/or researchers who want to learn about object-relational database systems.

Plan of Attack

This "tag team" tutorial will attempt to provide a broad range of information about object-relational database systems, including an overview of the technology, a survey of products and standards, and some thoughts about the engineering and research challenges that need to be addressed to bring object-relational database systems to the same level of maturity that relational systems enjoy today. Time permitting, the following questions and issues will be addressed:

1 Basics

Why do we need object-relational database systems? What are they likely to be good for, and why? What do they offer, feature-wise, beyond the functionality provided by relational systems, and how do they differ from "true" object-oriented database systems? (I.e., how would I recognize an object-relational DBMS if I were to bump into one in a dark alley, and should I run the other way if I do?) The first part of the tutorial will provide answers to each of these questions.

2 Details

Abstract data types, user-defined functions, row types, references, inheritance, subtables, collections, triggers—just what is all this stuff, anyway? The second part of the tutorial will provide a technical overview of the features commonly associated with object-relational database systems, presenting examples drawn from existing products and the SQL3 draft standard.

3 State of the Art

How real is this technology? The third part of the tutorial will discuss the state of the industry in terms of available and near-term products, discussing the features and architectures of systems such as Illustra, UniSQL, DB2 Common Server, Oracle, Informix Universal Server, and Microsoft SQL Server (with OLE objects). It will also talk about the pre-packaged solutions that are growing up around these products for managing data types such as text, image, and spatial data.

4 Challenges

How can I help? The final part of this tutorial will discuss areas where work remains in order to provide database system users with mature, scalable, high-performance, object-relational database systems. Areas to be touched upon include query optimization and processing, access methods, parallelism, distribution (i.e., middleware), and tools.