Web Architectures for Database Access

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Abstract: Starting from may 1998 the “Istituto per lo Sviluppo della Formazione Professionale dei Lavoratori” (ISFOL), at the request of the Italian Ministry of the Environment, begins to render accessible via Web the results of a nation-wide census on the teaching and training activities pertaining to environmental themes carried out at Italian universities, secondary schools and professional training centres. The paper documents in brief the technical solutions adopted in implementing that part of the Web accessible information system relative to querying the database via the WWW. The system has been realised using currently available Java technologies such as applets and servlets interfaced to the database system through the JDBC. The paper also introduce the evolution of the system.

Introduction

The rapid growth of the Internet in recent years has brought about a considerable increase in the structural and organisational complexity of the data accessible and distributed via the Web, thus engendering a huge enriching of the information available. Great impetus towards a global information system came mainly through two factors: the integration of Web data with database management systems (DBMS) and the development of "intelligent browsers", enabling local execution of mobile code. Nowadays, the combined exploitation of these two characteristics is ever more frequent in high information-content Web sites. The chance to test out the technologies for Web access to DBMS in actual use was afforded in the framework of the project "Development and distribution of an information system on environmental training" [Aloia et al. 98].

The ANFORA Information System

The project's ultimate aim was to render more accessible the results of a nation-wide census on the teaching and training activities pertaining to environmental themes. From the computer-science perspective, the goal we established for ourselves was to set up a system which would be independent
of the specific hardware or software characteristics. The architecture opted for was a three-tiered system. The interfaces for formulating data searches are made up of a number of Java applets that enable users to specify suitable filters in a friendly way. Interaction with the DBMS takes place on the server by means of servlets, which builds the queries and executes them through the JDBC driver [Hamilton et al. 98], then passes the results over to the Web Server, which formats and transmits them to the client. In order to improve server-side performance, we adopted a solution that consists of activating a pool of connections, each of which is managed by a single thread (connection broker). Because of the 'persistent' nature of the servlets, the connections will be shared by subsequent DBMS invocations. The system performed well in several tests using different DBMS, as well as different JDBC drivers, with no source code modifications whatever.

**Next Step: INFEA an Open Hypermedia System**

A new phase of the project, supported by the Italian Environment Ministry, is in progress and is named INFEA. The aim is the development of an Open Hypermedia System in which the users become actors in the management of the information related to environmental issues. The needs for co-operative work and distance learning are important requirements of the new system. Our main goal is the implementation of a Web Based Information System that integrates the DBMS technology with new tools available on the Web, such as those for the Computer Supported Co-operative Work (CSCW). The architecture of the system we adopt is multi-tier. Thin client realised by means of Java applets, and/or XML, communicates with the application server using CORBA and/or Java RMI [Orfali et al. 98]. The application server implements the business logic using the Enterprise Java Beans technology and manage the interaction with the DBMS.

**Bibliography**

