

Conceptual model of ManSerIS system

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Abstract. *This article is described conceptual model of system to work with different databases like with one instance which called ManSerIS system. ManSerIS system provides work with different kind of databases which are controlled by different database management systems. All data are stored in inner database. On logical level interaction between databases is executed by the project, which can include of different number of databases and application servers. Software model is based on client-server architecture. This model may be realized with usage object-oriented programming language Java version 6 with Enterprise Java Bean, JDBC, JSP&Servlets technology.*

Keywords

Database, application server, client-server application, conceptual model, physical model, logical model, dataflow.

1 Introduction

Influence of computer systems which use database is difficult to overestimate. Sometimes those systems too much complicated and they use different number of databases for doing different function. In that case often developers are making individual environment for work with databases. This way is very important to solve issue how to work with different databases like with one instance. Drivers, such like ODBC and JDBC developed by Microsoft and Sun corporations, can't solve this problem. That's why need to design special system to complete these problems.

2 General part

Suppose that simultaneously system uses Oracle and FireBird database management systems, which physically located on different computers. To solve problem of user's interaction with those databases management systems is proposed to use application servers and server of ManSerIS system. Application servers coordinates interaction users with databases, but server of ManSerIS system provides monitoring of structure of databases, controls configuration and status application servers. All data are stored in inner database. Interaction (on physical level) between servers, databases, client's applications and database management systems represented like at figure 1.

On logical level interaction between databases is executed by Project, which can include of different number of databases and application servers. Application servers are controlled by client's part of ManSerIS system. Also each project has own set of columns mapping. This set is the rules how application has to handle query to different data bases in project simultaneously. All projects could be in three conditions. There are New, Usable, and Unusable. The workflow of New project consists of five main steps.

First, server connects to data base and scans it. It scans data base for tables, columns and relation between them and stores all information in own inner database. Then, administrator configures mapping between tables from different databases. Application may creates some supporting views in non main database. Then server uses this information for writing Entity Enterprise Java Bean for controlling data in database and Stateless Enterprise Java Bean for controlling access to and management this data.

Then it may compile it, build the archive and send the signal for request for a readiness to receive data to client. Then client, if they are ready, receives data and deploys it. A workflow diagram is represented below on figure 2. The workflow of Usable project is performed through API which allows work with different databases. The query separated on sub-queries between all databases, which take part in this query. Then, all information may be picked up in result of query and sent to the user. Workflow diagram is represented on figure 3 below.

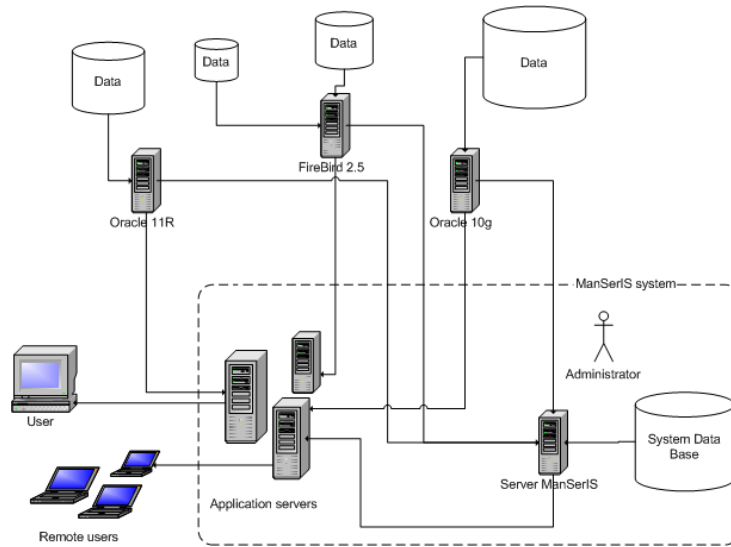


Fig.1. Physical model of the ManSerIS System

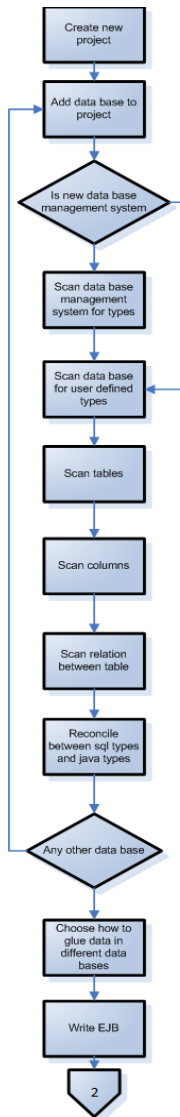


Fig. 2. Workflow diagram for New Project

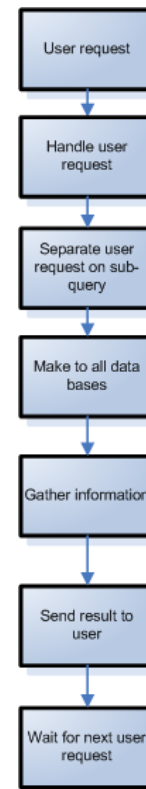
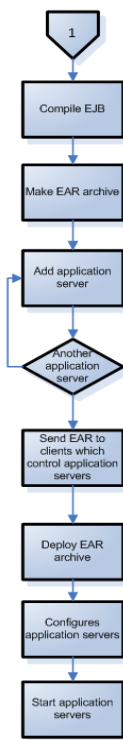


Fig. 3. Workflow diagram for Usable Project

Software model is based on client-server architecture. This model may be created with usage object-oriented programming language Java version 6 with Enterprise Java Bean, JDBC, JSP&Servlets technology, which add to product important characteristics as: cross-platform, scalability, flexibility, mobility and standardizing, based on standard JAVA 6 Enterprise Edition.

Server interacts with outer databases through API, which based on JDBC driver. With this API server analyses databases structure: structure of tables, their relationships, data types which store in databases. After analyses of databases, server of ManSerIS system writes, compiles and builds in archive programming modules for interaction application servers with databases. Client's part of ManSerIS system deploys programming modules, configures, starts, stops, reboots of application servers. All processes controlled by administrator of ManSerIS system.

This Software allows improving storage, administrating and synchronizing workflow of few databases which are under control different database management systems. JSP, JSF and Servlet technologies are allowed to connect this service across web-browser. This approach makes the client thinner and not so required for hardware and software. The tiers schema consists of four tiers. On the first tire are found databases. On the second tire are found Enterprise Java Bean. On the third are found JSP/JSF and Servlet. On the fourth – web-browser. Tiers of schema are represented below on figure 4.

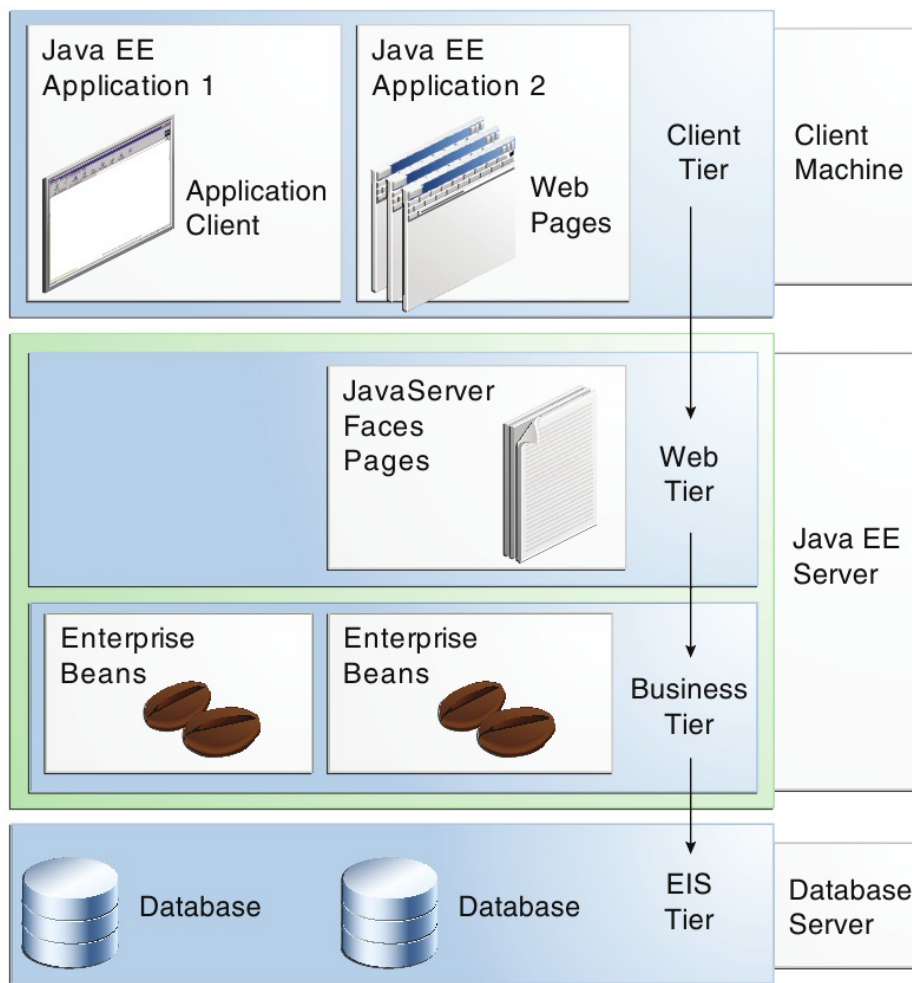


Fig. 4. Tiers schema

Inner database consist of 16 tables, which separate on those group, which describe project structure, structure of databases, configuration data for application servers, databases and columns mapping rules.

The entity PROJECT has relation one to many for entities DATABASES and APPLICATION SERVERS, which means that in one project can exist different number of databases and application servers. The entity DATABASES stores version and vendor name database management system. The entity APPLICATION SERVERS stores data about its name, type of server and reference on main node system of application servers (if more than one exist in cluster). The entity CLIENTS

stores name and reference to application server, which is controlled by it. The entity PARAMETER has list of all available parameters of application servers, databases and client's part of ManSerIS system. The entity PARAMETER'S VALUE has references on parameter and instance to which this parameter attach, also has the value of this parameter either in strings or numbers format.

The tables SQLDATATYPES and JAVADATATYPES are support and store information for validation data inside of system. The entity COLUMNS and TABLES describe structure tables in databases and their relation. The entity MAPPINGTYPES stores types of mapping between tables from different databases. COLUMNSMAPPING is entity which stores mapping between columns of tables. The COLUMNSMAPPINGRECORDS servers store data about what columns from what tables from what database, mapping through type from the COLUMNSMAPPING entity.

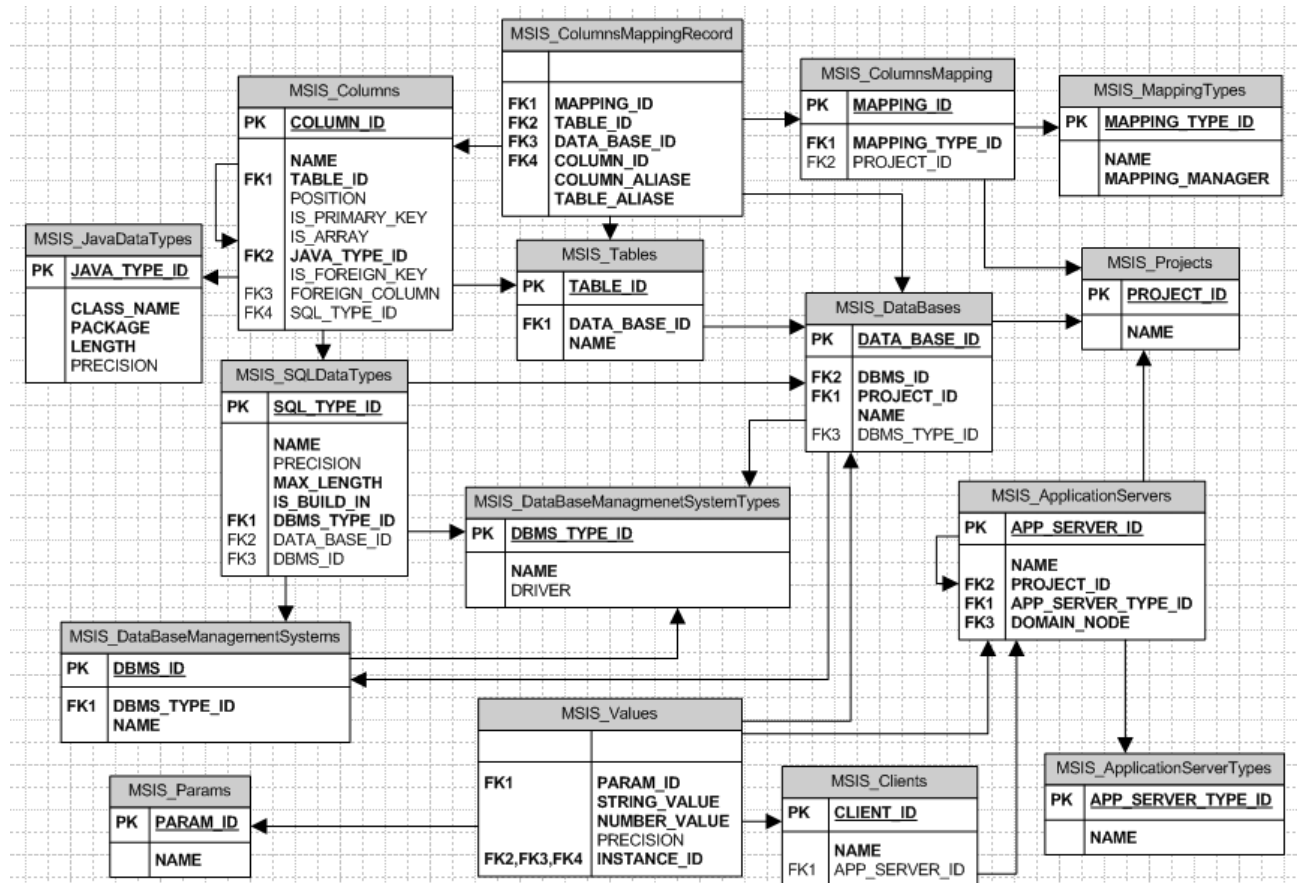


Fig. 5. Inner database

3 Conclusion

The conceptual model, which is represented in this article, has all needed characteristics for develop universal system for interaction between different databases.

In this stage of research the proposed software is able to work only with Oracle and FireBird database management systems. close time product implements modules to work with other data base management systems. Further research in this area will aim to glue tables from different databases such as MySQL, PostgreSQL, MicroSoft SQL Server and MicroSoft Access, and other. Also program module for reconciliation data between databases is considered.

References

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