

DATABASE - SERBIAN LAKES AND RESERVOIRS “SELAR”

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ABSTRACT. Up to now more than 150 hydro reservoirs that have polyfunctional character have been constructed in Serbia, because of the poverty in water potential. There are 26 big reservoirs with the volume of 10 million m³ and more, 34 reservoirs have the volume that is less than 10 million m³ and there are about 100 so-called small reservoirs made by damming small water courses. [1]. Hydro reservoirs represent for Serbia the solution for water supplying and hydro energy, which is also the priority for their construction and they as such are necessary. A big problem is their preservation in time and space, since they are usually irrationally managed. Most reservoirs do not have adequate monitoring and ecological protection. One of the main aims of database for Serbian lakes and reservoirs project is to properly contribute to correct management, protection, sustainable exploitation and other aspects of using reservoirs and lakes in Serbia. It is supposed to enable modern access and insight in their state. SeLaR - database is the first one that provides systematized data of lakes and reservoirs condition in Serbia.

Key words: lakes, reservoirs, database, Serbia

INTRODUCTION

SeLaR - Database

Database for Serbian lakes and reservoirs is the idea and realization of the Faculty of Science in Kragujevac. In its initial phase it contains data for three major reservoirs in Serbia - Gruza, Vlasina and Grosnica. Data is taken from the researches of the Faculty of Science that have been conducted for years, as well as from the other available literal data [2], [3]. The contact with the organizations engaged in management of reservoirs in Serbia and quality of water that possesses valid data has been established.

Database for Serbian lakes and reservoirs SeLaR is based on principles of client-server architecture, more precisely on the triple layered model of client-server system. The important elements of this architecture are:

1. database server
2. application server
3. application client

Database servers form the first, application servers the second and application clients the third layer. The relation system for database management that supports parts or entire database of information system is on database server in this sort of system. Applications of information system are installed on application server, and application client contains the program for management of user interface application.

Database for Serbian lakes and reservoirs uses Microsoft SQL Server 2000 as database server, while the client application is realized by using Microsoft Access 2003, in other words, by using data bank pages for data access (Access Data Pages ADP).

One triple layered client-server application defined on a system of this kind of architecture contains the following elements: user interface service, business logic service and data services (Fig. 1), [4], [5].

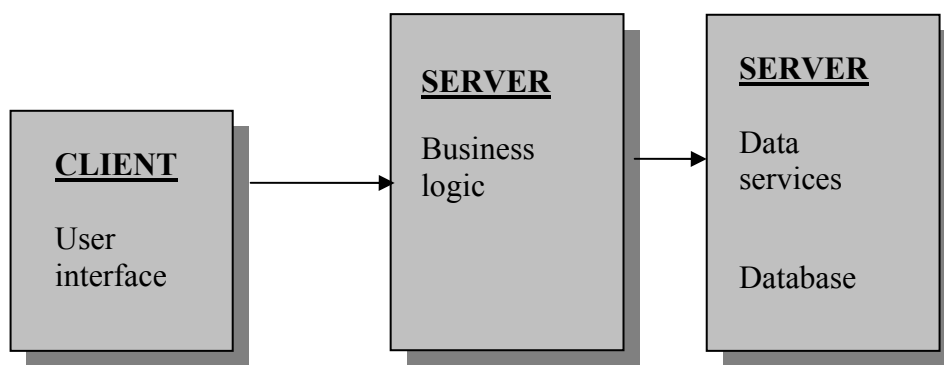


Figure 1. Triple layered client-server application

For the database for Serbian lakes and reservoirs it would be presented in the following way:

User interface is Access application (Selar.adp) that is responsible for data presentation, user actions and responses to these actions and all that is conducted through forms or reports.

Business processes include data processing and operations that are conducted. Here data are protected from direct access of clients i.e. the system security is increased.

Data services carry out the processes for data storage. They include database itself and the system for database management.

Boundaries between layers defined in this way are logical, so it is possible to put the entire system in one computer, which has been done in this initial phase. If services defined in this way would be distributed to physically separated computers, the system would assume the appearance of complete client-server system and then:- user interface service would be on application client,- business processes would be separated from user interface and would be on application service and- data services would be on database server.

Database for Serbian lakes and reservoirs SeLaR has as its aim the systematization of three major data groups:

1. Data about specific lake or reservoir

- general data about lake or reservoir
- data about dam
- location
- physical dimensions
- activities in surroundings
- physical and chemical parameters
- data about events related to lake or reservoir, which have directly influenced the state in it
- interventions in a lake or reservoir
- climate characteristics
- way of using soil in surroundings
- refinement of waste water
- data about rivers falling into and flowing out from lakes or reservoirs, as well as canals
- data concerning species and biological community that populate ecosystem

2. Data about biological communities that populate lake or reservoir, and for which limnological research have been carried out. They include:

- name of biological community that was examined on field (each biological community has its parameters which determine it and which are valid for it, and we find common attributes at all of them, listed below)
- date of research
- value
- location, river
- depth
- found species

3. Data about systematic categories. Systematic belongings have been given to each species found in lake or reservoir, starting from:

- species (including alternative name beside Latin name, such as folk name or code it is known or recognized by in scientific public)
- genus
- family
- genera
- classis
- phylum

In case of some species where complete specification is not known, its specification starts from the genera or some other systematic category. One species in database is connected with the name of lake or reservoir it is found in as well as with its systematic and biological community.

As it was previously said, database for Serbian lakes and reservoirs SeLaR is implemented by using:

1. Microsoft Access Project
2. Microsoft SQL Server 2000 (Fig. 2).

Microsoft Access Project enables efficient and relatively easy connection of Access application with Microsoft SQL Server, by using components of OLE DB architecture. The solutions include:

Forms - they are used for input, changing and erasing of database, organizing of data in shape legible and accessible for a user.

Reports - for summarizing information from one or more database tables. It is a good and practical way for presenting information in legible form, the most suitable for printing.

Data Access Pages - internet pages made inside of Access, they are connected with database and they enable data manipulation.

Macros - the set of activities performed sequentially after the start. It is the one of mechanisms of automation of processes that is repeated many times.

Modules - the collection of Visual Basic declarations, expressions and procedures. Microsoft Access contains two types of modules: standard and classic modules [6].

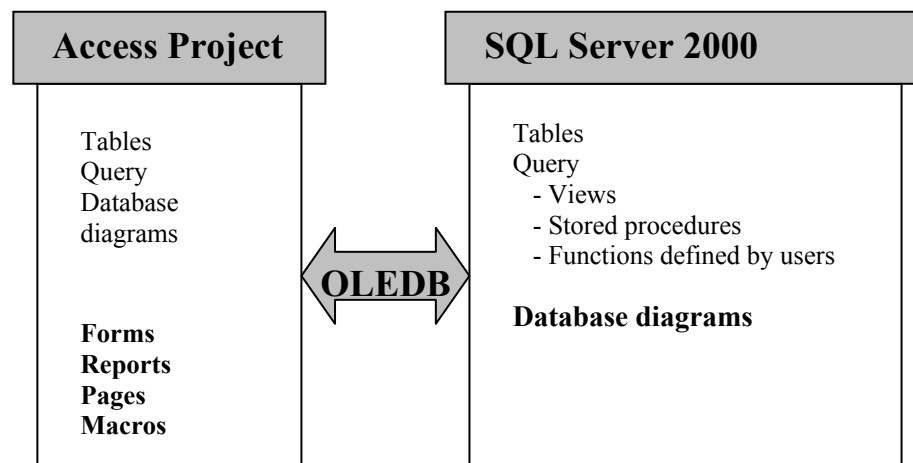


Figure 2. Implemented database by using Microsoft Access Project and Microsoft SQL Server 2000

Access project contains no data based on tables, diagrams, stored procedures and the like. These objects are created and kept in SQL database.

SQL Server 2000 supports extensive and important databases in various fields of use, which include processing of transactions over the net, data storehouses and e-commerce. It has a defined numbers of tools. SQL Server Enterprise Manager is graphic tool by means of which tables, query and database diagrams are created. It is the basic tool that is used for SQL Server 2000 administration [7].

CONCLUSION

The main characteristic of modern times is that knowledge and information are strategic resources of one society. Behavior and activity of people depend to a great extent on available information.

The development of information technology has enabled collecting, storage, processing, managing and exchanging of great number of information. The basic function of information system is keeping and transferring data about facts from system and its surroundings and their processing into information demanded by a user.

The aim of this work is creating one complete and appropriate system about Serbian lakes and reservoirs. Database for Serbian lakes and reservoirs provides relatively easy access and manipulation of scientific data about reservoirs. In future it is pictured with multiple extensions that will, beside previously mentioned possibilities, also enable some others that will include different predictions, modeling and the like.

The base is intended for users dealing with different researches in the field of biology, ecology and similar professions connected with water resources, and it is supposed to enable transfer of information and knowledge, and collaboration among participants in reservoirs management. Thus it should support all the aspects of management of water resources and sustainable exploitation in whole.

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