

The importance of databases in web programming

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Abstract – Databases are fundamental when working with web applications. The database is a place where the data which is necessary for the operation of a web application is entered, read, deleted and updated on a daily basis. The aim of this paper is to consider the benefits of database's implementation when it is used for data storage coming from a specific Web application. Hereof, in this paper are shown various advantages: starting from the exchange of data between the web application and the database, the security mechanisms available to the database, how to protect the data from the application stored in the database, how to confirm the identity of the user, data access etc. The subject of research in this paper is to regard more precisely the pros and cons of applying the database when it is used for storage of data coming from a specific Web application.

Keywords – Databases, Web Applications, Data Storage, Data Processing, Data Security

I. INTRODUCTION

The past years, starting from the period of the emergence of databases until the creation and creation of web applications, are a time interval of emergence, development and application of different models of programming languages. It is a period in which programming languages, their architectures, operating platforms, their processes and the way they are written are changing and renewing. Despite these activities, there are things where the structure, architecture and way of storing data cannot be changed. It refers to relational databases which continue to have the primary role and are used as a place where data is stored, processed and managed. One of the most important

advantages and values of databases is that they have the ability to store and protect huge amounts of data. From the point of view of web programming, their most important advantage and value refers to the facilitation of their operation. SQL is one of the first domain-based languages that is commercial and perhaps the most current. Its characteristic is that it is easy to learn, has simple grammar and simple syntax. The advantage that this language provides is the manipulation of structured data: it allows filtering of data, sorting them, creating unions, it is based on relations, grouping can be performed according to specific attributes or filtering can be performed according to some specific criteria. In addition to these advantages and features of the SQL language, there are still some certain limitations for

work and data manipulation. One of those limitations is that the SQL language is based on relational algebra that works exclusively with relational databases. On the other hand, a web application is an application where access is made possible by the Internet or an Intranet network. The Internet network is a public network where the principle of operation is based on TCP/IP (Transmission Control Protocol/Internet Protocol). The intranet, on the other hand, represents a private network of a specific institution where data is also transferred via TCP/IP and where access is only for internal networked devices. Web programming refers to the creation of a web application through the use of programming languages, depending on the wishes and needs of the user.

II. MATERIALS AND METHOD

A database is a set or collection of data that represents the activities of a particular organization. There are database management systems through which the user communicates with the application; through them to be able to perform data analysis or processing. The basic function of this type of systems is to enable data recovery, their import, export and their processing. There are several types of database management systems through which communication is carried out, namely: MySQL, Microsoft SQL Server, Microsoft Access, Oracle, SAP, IBM DB2 and others. Databases are not transferred from one place to another, and for that reason there are certain standards, such as SQL, ODBC, or JDBC, which allow communication of databases from different locations. In the design of databases there is a process of the so-called normalization of databases. The basic task of normalization is to obtain smaller tables, with well-defined relationships, from larger tables. At first glance, the term database refers to data and its support. The main task of the database is to perform various operations. A database management system is software that enables interaction between the user and the database. A database can store data entities such as people, products, prices, product quantities, or anything else. One of the main advantages of a database is that it does not have to be stored only in a computer. In database tables it is possible to perform sorting in a different order depending on the criterion that needs to be satisfied. The basic elements of a database are: field, record and field

name. Here it can be assumed that the table represents a database, the cell represents a field value, while the row represents a record, and the column names represent field names.

Web Programming

Web programming is a kind of complex art, that is, giving commands to the computer, with which it actually works. Programming provides written instructions in a logical manner and language for a computer to understand. Basically it can be understood as giving small steps of instructions, which the computer lists one by one and executes them.

Programming allows the creation of new software with which the computer will do something new. In essence, web programming is somewhat similar, except that here applications and web sites are created that are read by a web browser. The good thing about web programming is that creating a website can be easy. Web programming is the creation of applications that are processed by software and then loaded through a web browser. In essence, the work of web programming relies on creating, that is, writing code such as:

```
<html>
<head>
<title> My page </title>
<body>
<? Php
Print data ("d/m/y");
?>
</body>
</html>
```

When we access the desired web page with the help of our search engine, the server immediately analyzes the page, that is, reads the HTML code line by line, and if it is a programming language, then it also executes the code. In this case, the dates are written, and then the page is sent to our web browser.

III. DISCUSSION

Most database management systems on the web are not only places where users read new data, but also places where new data can be entered. There are more techniques for writing data to the database over the web than reading the data. In doing so, the problem of transactions and access of a larger number of users to the same data must be solved.

This section describes how to lock tables in a database, as well as ways to securely access multiple users at the same time.

Data Locking

Data locking proves to be a simple mechanism through which problems related to data transactions are solved. The first and foremost purpose of table locking is to solve the multi-user access problem. If the script writes the data to the database, but the writing operation itself does not take place in several steps and if no particular problem occurs with the writing, then there is no need for locking. When using simple scripts that add, delete and update data in only one row and that as a result do not use results of previous statements or data that the user has previously entered, in such cases locking is not required. It is necessary only in scripts where first the data is read from the database, and later the previously read data is written as it is or with modified values. A lock is never required for operations such as: add, update, delete in a table and so on. In practice, there are two types of table locking, namely:

- Lock for reading the content of the data – when the user establishing the lock enables only reading and
- Locking for reading and writing in the tables – when the user reads and writes data.

The following example shows the use of locking in an aggregate data calculation operation where locking is necessary. This is shown by the following example:

```
Mysql> LOCK TABLES items READ,
temp_report WRITE;
Mysql>SELECT sum(price) FROM items
WHERE cust_id=1;
Sum(price)
450.65
1 row in set (0.04 sec)
Mysql>UPDATE temp_report SET
purchases=450.65
WHERE customer id=1;
Mysql> UNLOCK TABLES;
```

In this example the temporary table temp_report is updated as a result of a SELECT operation on the items table. If we do not set a lock or block, the other user will be able to change the contents of the items

table, thereby changing the sum of \$450.65 that is used as input to the UPDATE operation. In this transaction, two locks are set, namely: the first of the READ LOCK type for the items table, because of which we do not want to change the content in the items table, but we also do not want any other user to make any changes in it. The other lock is a WRITE LOCK for the temp_report table because we don't want other users to read data from it or write data while changes are being made to the table.

Use of a database to identify a user

For Web applications that access databases, the username and passwords can be stored in tables instead of files. This is data that is stored about users and is located in databases, which can simplify the management of applications.

```
CREATE TABLE user (
user_name varchar(10) not null,
password varchar(15) not null,
PRIMARY KEY (user_name),
KEY password (password)
);
```

This table defines two attributes: user_name and password. The content of the user_name attribute must be unique, and in the table user is defined as the primary key. An index is necessary for the password attribute because the user's identity is checked in the script. In this table, it is not good to scale the password in the form of readable text. There are several ways to retrieve passwords from the database using good security mechanisms and policies on the website. Passwords stored in plain text are a security risk. In MySQL there is a password() function. The password() function can be embedded in SQL queries to update and append data:

```
$update query =
"UPDATE user
SET password = password ($password)
WHERE user_name = '$username'";
```

The MySQL function password () works in one direction, but is used simply because no initialization is required. One of the disadvantages of MySQL is that two identical passwords yield two identical encrypted values. Another disadvantage of using this feature is that the password is passed

between MySQL and the Web server in unencrypted form.

Encryption of other data in the database

The MySQL password() function can only be used to encrypt passwords, personal and identification numbers, etc. That function applies only to one direction when the original value of the password is encrypted and entered into the database, then it will no longer be possible to reconstruct it because there is no function that will correspond to the reverse process, i.e. decryption. That function cannot be used to store confidential data that the application works with. In order to store confidential data with which the application works, there must be an alternating function where the encryption and decryption of the data will be performed with the help of the secret key. One of the bigger problems with the secret key is how to protect it.

IV. CONCLUSION

There are different technologies to build an interaction between the user and the web application. In that sense, there are also different programming languages such as: ASP.NET, ASP, PHP, JavaScript, JAVA and others. On the other hand, the database represents a set or a set of data that represent the activities of a certain organization. There are so-called database management systems through which the user communicates with the application and through which data can be analyzed or processed. The basic function of this type of systems is to enable data recovery, their import, export and processing. The benefits of using a database are great. With it, it is possible to perform a variety of operations, starting from the operations of writing, reading, deleting data from the database, which are specific to the operation of a local server, all the way to operations of the type: data locking, blocking, identity verification, connecting the data from one table to another, checking the data and reporting errors from the application, encryption of the rest of the data that is static, checking the correctness of the data, etc. In the paper theoretically shows the main structures that should be paid attention to if a certain application is created and it is connected to a database. Also, all the necessary characteristics that we need to know when creating and managing a database are shown in detail,

starting from working with the data and ending with their security.
in the existing sector and in other sectors.

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