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Abstract. Web Service technologies applied to distributed databases are considered. It is a natural usage, because Web Service technologies are appeared to be the today's base for distributed and decentralized systems. This paper aims to present Web service for searching and retrieval in distributed databases. This Web application is named "Bulgarian technical index for citation" and allows users to search and to extract information about fixed author, information how many times this author has been cited, to create a new item in the reference, delete at existing and modify items. This information is extracted in distributed databases. The paper examines application uses MySQL for storing references and uses PHP for displaying the content in HTML format.

1 Introduction

A lot of activities in today's dynamic world concern effective information exchange. A large amount of information in an organization leads to the need of making possible to extract the necessary data and to access them everywhere and any time. The conception Global Area Network is identifying with Internet and WAN as society in which functioning multitude of information services (e-services). These e-services conduct to effective functioning of systems and organizations. For realization of the e-services in Internet are developed several models. All systems work using client/server model. In this model the client want for service and server execute the service. There are several client/server models [1]:

- Two- hierarchical client/server model (I type information system).The client-server model is the basic model widely applied and it is notorious for all Internet based information systems. It is based on two-tier system modeling. The first tier is the client, which in general operates on a web browser environment. The server side is the place where the functionality of the information service is supported; the information service proceeds data and responds to user queries. The server side is implemented as a Web Server (Internet Information Server – IIS, Apache, Tomcat, Java Web Server – JWS), operating on different environments (Windows, UNIX, Sun, HP). In this model the

server give data to unlimited number of users by static's HTML pages on HTTP written statement.

- Three-hierarchical client/server model (II type information system). These class information systems realize model client/server with three- hierarchical levels: level of presentation, level of application and level for processing of databases. There is accent of dynamic generation and presentation of information. After user's request the server start processing program (ASP, CGI, PHP), which generate HTML page in real time and send it on the client. The processing program can realize connection with one or several databases. This allows realizing interaction between users and application. Collects data of the client, automatics update information and searching in database. In this new model writes and updates data, searches and generates on-line information. Database executes functions, procedures and other activities, connected with support and give of actual information from and for users on information systems.
- Fourth- hierarchical client/server model (III type information system).An information system of this model executes complex algorithmics processing of information. The systems and the algorithmic solutions, which cope the requirements of complex data processing and on-line system management, introduce new algorithmic level on the system structure of the information systems. This forth level performs the specific and complex data processing, performs complex mathematical evaluations, support on-line control functionality.

This paper develops one concrete decision for using information systems of three-hierarchical client/server model (II type information system).The functional part of the system is written on PHP server language, for database is used MySQL, for Web server is used Apache, but can be used various decisions: as Web server can be used IIS, TOMCAT, JWS; as program language - ASP, CGI; as databases - SQL, ACCESS databases, ORACLE, INFORMIX, SYBASE. There are a lot of protocols for search retrieval as Z39.50 [2], SOAP [3] and have many Web service architectures for distributed search in databases as XML, WSDL, UDDI [4]. There are also software programs allows easily integration of the system. These are products of free software (open source) that can work on various operating systems (as Windows, Linux and UNIX) and various Web Servers (as Apache and IIS). In the paper also are present software codes, which realize several types' interaction with database. By means of these codes are realized request and response, which are necessary for the functioning of the appropriate application.

2 Software Implementation

Any PHP script accessing a MySQL database does the following:

- Connect to the MySQL Database Server.
- Send the SQL query to the MySQL Database Server and get the result.
- Use the set of API's to get the data from the result that is returned in step 2.
- Generate the HTML page for displaying the contents.

In this paper is implemented a web - based technical index for citation application. This application allows users to search and to extract information about fixed author, information how many times this author has been cited, extract part of information or all given information for the paper of the author, to create a new item in the reference, delete at existing item and modify an item. The application uses MySQL for storing references and uses PHP for displaying the content in HTML format. The technical indexes for citation entries are stored in "Citation" table and this table is created in "BGcite" MySQL database by executing some SQL command. Each row in "Citation" table is uniquely identified by Rowid field.

2.1 Architecture of the application

On this scheme is present a simple architecture which is used for creating to the technical index for citation application.

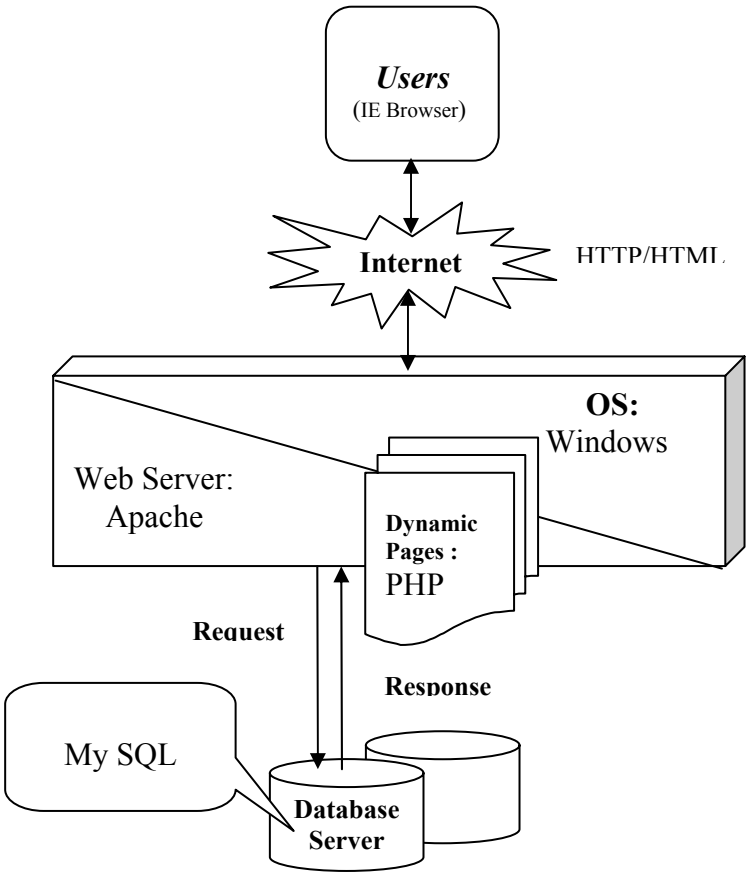

Fig.1. Architecture of the application

The implementation of application is done using the information systems of three-hierarchical client/server model. There are three tiers of implementation:

- First tier: web client – the user's browser
- Second tier: web server, CGI scripts and connection APIs for the databases – Apache with mod_php, supporting MySQL databases, and PHP scripts
- Third tier: the database server – MySQL server

2.2 Main page and basic codes of the application

Before looking at the code of the application, let's first look at a screenshot to get a feel of the application.

Fig.2. Main page of the application

This is the main page of the application. From here, user can search into the technical index for citation using one of the produce criterions, by clicking the SEARCH button.

For the creation and execution of the application are developed several software codes by means of PHP for realization of the applications. By means of these codes are realized SQL request and response, which are necessary for the functioning of the appropriate application. After SQL request has been received, MySQL database is searching for appropriate information. The data from database are processed and structured in HTML format with purpose SQL to respond. Searching into MySQL database, adding new item, updating or deleting of the existing information or items are developed the following software codes by means of PHP.(globals.php, add.php, search.php, modify.php, delete.php).

- Globals.php – this file contains the definition of environment specific variables that are used throughout the code. Before running the application, these variables should be changed to reflect your installation environment.
- Searsh.php - This file is executed after the user chooses one of the produce criterions and clicks on the "SEARCH" button on the main page.
- Add.php – This file is executed after the user enters the values for the attributes and clicks on the "ADD ITEM" button to create a new item.
- Modify.php - This file allows the user to specify new attributes for an entry. Having modified these attributes, the user clicks on the "MODIFY" button.
- Delete.php - This file is executed after the user clicks on the "DELETE" button to delete a needless item.

3 Basic Components and Standards

For implementation of the application are used following basic components and standards:
PHP [5], [6]: PHP (Hypertext Preprocessor) is an open-source server-side scripting language for creating dynamic Web pages for e-commerce and other Web applications. It is a widely-used general-purpose scripting language that is especially suited for Web development and can be embedded into HTML.
PHP offers a simple and universal solution for easy-to-program dynamic Web pages. As an open source product, PHP enjoys the support of a large group of open-source developers.PHP offers facile possibilities for execution of complicated mathematical computations, execution of network functions, possibility of processing on e-mail, working with usual expressions and many others. But indisputably the biggest power of this language is in possibilities working with databases. The connection and the work with databases allow easily creating effective and dynamic Web pages.
What happens to PHP pages?
When from users come in request for some page, the Web server complete following:

- Read the request from the browser.
- Find the page on the server.
- Perform any instructions provided in PHP to modify the page.
- Send the page back across the Internet to the Web browser.

MySQL database [7], [8]: MySQL is a small, compact and easy to use database server, ideal for small and medium sized applications. Extensive reuses of pieces of code within the software and an ambition to produce minimalist but functionally rich features have resulted in a database management system unmatched in speed, compactness, stability and ease of deployment. MySQL is the most popular SQL database with open code. It is software with open code, which means that everybody has possibility to use it and to modify. MySQL is a system of client/server type which is consists of more functional SQL server, some different client's programs and libraries, administrative implements and an all-embracing gamut of interface programs. MySQL does pretty well in terms of searching databases to service web-based queries.

APACHE server [9], [10]: The Apache HTTP Server Project is an effort to develop and maintain an open-source HTTP server for modern operating systems including UNIX and Windows NT. The goal of this project is to provide a secure, efficient and extensible server that provides HTTP services in sync with the current HTTP standards.
The Apache httpd server:

- is a powerful, flexible, HTTP/1.1 compliant web server
- implements the latest protocols
- is highly configurable and extensible with third-party modules
- can be customised by writing 'modules' using the Apache module API
- provides full source code and comes with an unrestrictive license
- runs on Windows NT/9x, Netware 5.x and above, OS/2, and most versions of Unix, as well as several other operating systems
- is actively being developed
- encourages user feedback through new ideas, bug reports and patches
- implements many frequently requested features

HTML [11]: HTML (Hypertext Markup Language) is the text markup language currently used on the World Wide Web. It is the not-so-behind-the-scenes markup language that is used to tell Web browsers how to structure and display Web pages. An HTML document is simply a text file that contains the information user want to publish. It also contains embedded instructions, called elements, which indicate how a Web browser should structure or present the document.
What happens to HTML pages?
When a request for a page comes from the browser, the web server performs three steps:

- Read the request from the browser.
- Find the page on the server.
- Send the page back across the Internet to the browser.

4 Conclusions

This paper develops one concrete decision for using information systems of three-hierarchical client/server model. Described model, in different degree, improve the property on submit of information on user and aims the quickly and dynamic to presenting information, speed in saving and searching of data, confidence of the operation. This application was implemented for realization of catalogues or library includes technical index for citation.
The essence and functional possibilities of the PHP scripting language and MySQL for writing web based database application were presented. Definite are applications for search and retrieval web services in web information systems. Web based technical index for citation application was implemented. As a future work is the problem for optimization of developed searching services.

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