WEB-ENABLED APPROACH FOR MANAGING LIBRARY INFORMATION SOURCES [*]

Juliana Peneva, Georgi Touparov

In this paper a Web- enabled approach for managing library is proposed. This way give users the possibility of accessing virtually different sources according to their current needs. The architecture of the system and the delivered services are described and the corresponding data base is also presented.

I. Introduction. The World Wide Web became a new non-standard way for connecting computers for circulating data and for contacting people. There is a growing trend towards opening of existing databases to access data from the Web. Nowadays building Web-enabled information systems that exchange data using Web is regarded as an important application of information technology.

The database access through the World Wide Web via standard Web browsers starts with visiting the respective Uniform Resource Locator (URL). The URL itself is virtual i.e. it can be considered as a broker between the database and the client. Via the URL the document of interest location is determined. Actually application procedures stored on the database server are being executed. The structure of such a virtual link is:

http://<website>:<port>/<server_side_application><parameters>/

The user is completely unaware of data location and the database structure. A standard Web browser e.g. Netscape Navigator or Microsoft Internet Explorer is the only tool needed to provide navigation through the heterogeneous data sources. No additional software is required and this feature represents the main advantage of the Web based approach for exploring various databases. Using hypertext techniques the Web symbolize the available information resources giving the user the possibility to choose the proper one.

The main goal of our research effort is to apply this Web-based approach for managing library information sources. In this paper, we report our attempt to develop a Web-based library system that is to be implemented in South-West University of Blagoevgrad. The combination 'library-network-Web' leads to a new way of organizing library services [1]. This way enables users a virtual access to different data sources according to their current interests and educational needs. Using the World Wide Web they can easily query and explore various remote library catalogs thus obtaining customized information.

Up to now library sources are managed by special purpose tools. Our approach consists of applying relational database systems for remote Internet/Intranet data management. Although the core concept behind the Web, the hypertext is not a pure relational one, the relational model is dominating. A strong trend of bringing relational database systems to the Web is noticed. For this reason, Oracle 7.1 Workgroup Server for NT has been used to implement the underlying database [2]. The Web itself can be considered as a flexible three-layer client-server model. The user is connected to a Web server who executes the submitted queries. For the needs of Internet/Intranet management we exploit the Internet Information Server (IIS) for Windows NT due to its good performance.

The paper is organized as follows. Section 2 discusses architectural and interfaces issues. The delivered services are also briefly described. In Section 3, an E-R model of the library database is proposed. We also give the corresponding Oracle tables obtained by transforming this E-R model. Finally we summarize the results achieved up to now and present our future work.

II. Overview of the System Architecture. The library information system consists of three main components "Books", "Periodicals" and "Web Connector" (Fig. 1.). The first two handle library data while the "Web Connector" is a tool for accessing the library catalog through Internet/Intranet technology.
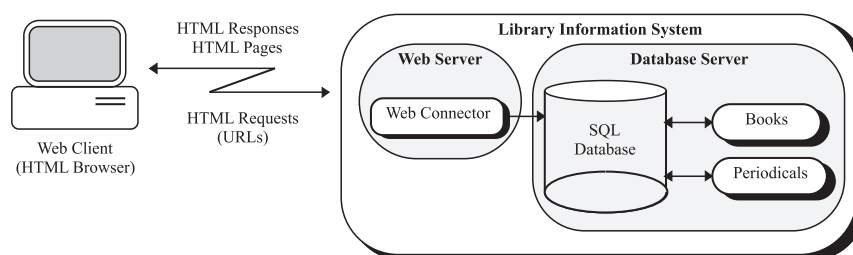

Figure 1

The "Books" database concerns data about the available books in the library. For each book title, author, subtitle, subject, number of pages, country, publisher, year, ISBN and signature number are available. Basic functions include:

- adding a new book in the database;

- editing data about the books;

- deleting books from the database;

- searching by applying different search criteria;

- service functions.

The "Periodicals" database supports data about available periodical issues in the library. More of the library systems offer no facilities to deal with periodicals. However in our opinion this issue is important and contributes for a better system functionality. For each periodical general information such as title, type, year, place and status of

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availability is presented. Moreover, for each issue we store date and day of print as well as the titles of articles. In addition for every article title, subject, annual number of issue, number of pages and name of author are also available. We keep this information within a given range of time, which depends on the concrete periodical. The basic functions are similar to those of "Books" database.

The "Web Connector" allows for various querying facilities according to the library issue. The user remains completely unaware of the database structure. A simple 'point-and-click' mechanism based on hypertext is provided. No knowledge on database manipulation languages, programming or HTML is required.

For books the following services are supported:

- searching by title;

- searching by author's name;

- searching by subject;

- searching by title and author's name;

- searching by subject and author's name.

For periodicals the querying techniques are more sophisticated and include searching by:

- issue title;

- title, year and annual number of issues;

- article's name;

- article's subject;

- author's name and article's title.

The results of each query are presented in an attractive way for the end user.

III. Modeling of Library Data. The E-R model of the underlying database is presented on Fig. 2. Objects are depicted as rectangles while relations – as rhombs [3]. The database is implemented with Oracle 7.1 Workgroup Server for NT. We employ several techniques to achieve good performance and to tune the database properly. In our opinion, achieving system performance is crucial being at the same time a very difficult task. The corresponding relational tables are given on Fig. 3.

Microsoft dbWeb has been used to develop the Web connections to the database (Fig.4). dbWeb is a tool for joining ODBC data sources with Web servers. So data sources become easily available through a standard Web browser and no special purpose client software is need.

Client query processing consists of the following steps:

1. The Web Server delivers the user query to the dbWeb client via the ISAPI interface of IIS.

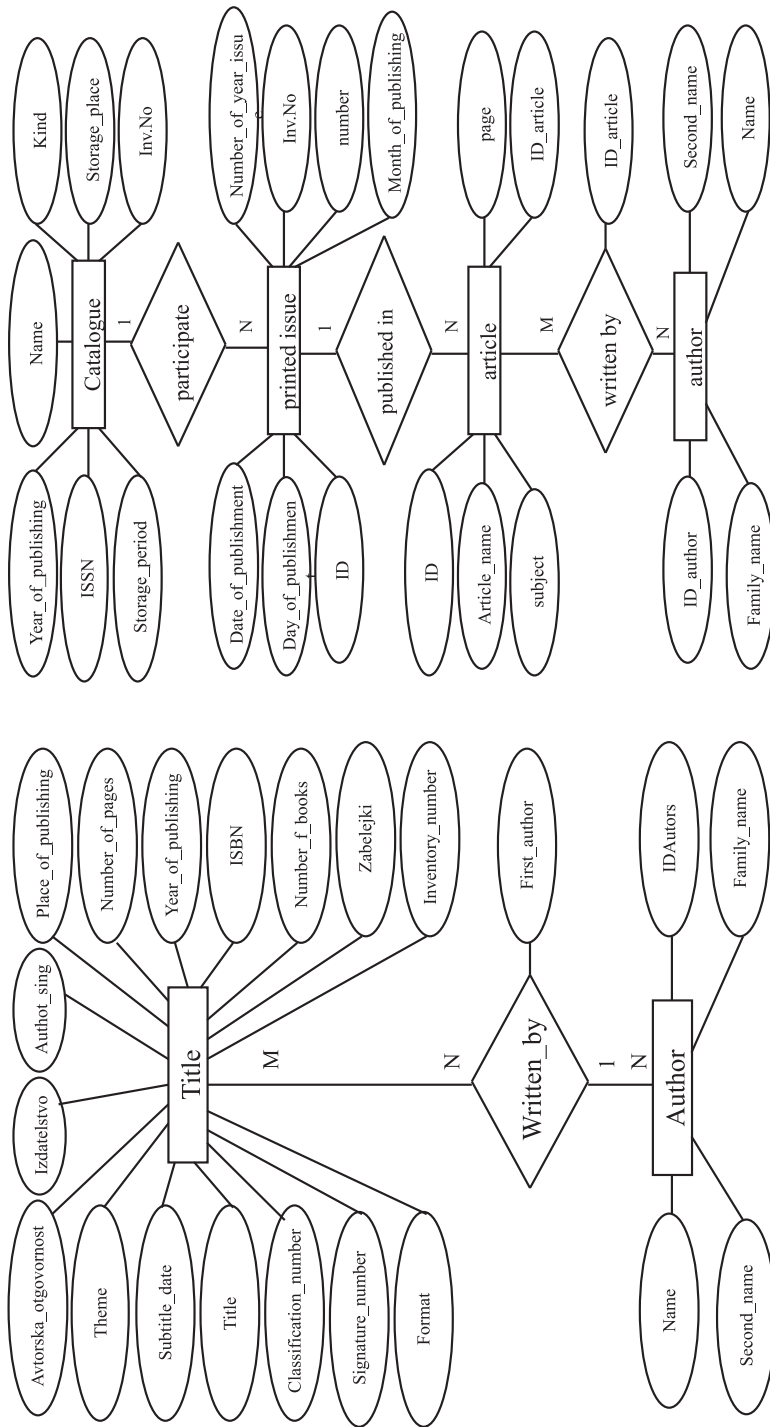2. The dbWeb Client sends the query to the dbWeb Service.
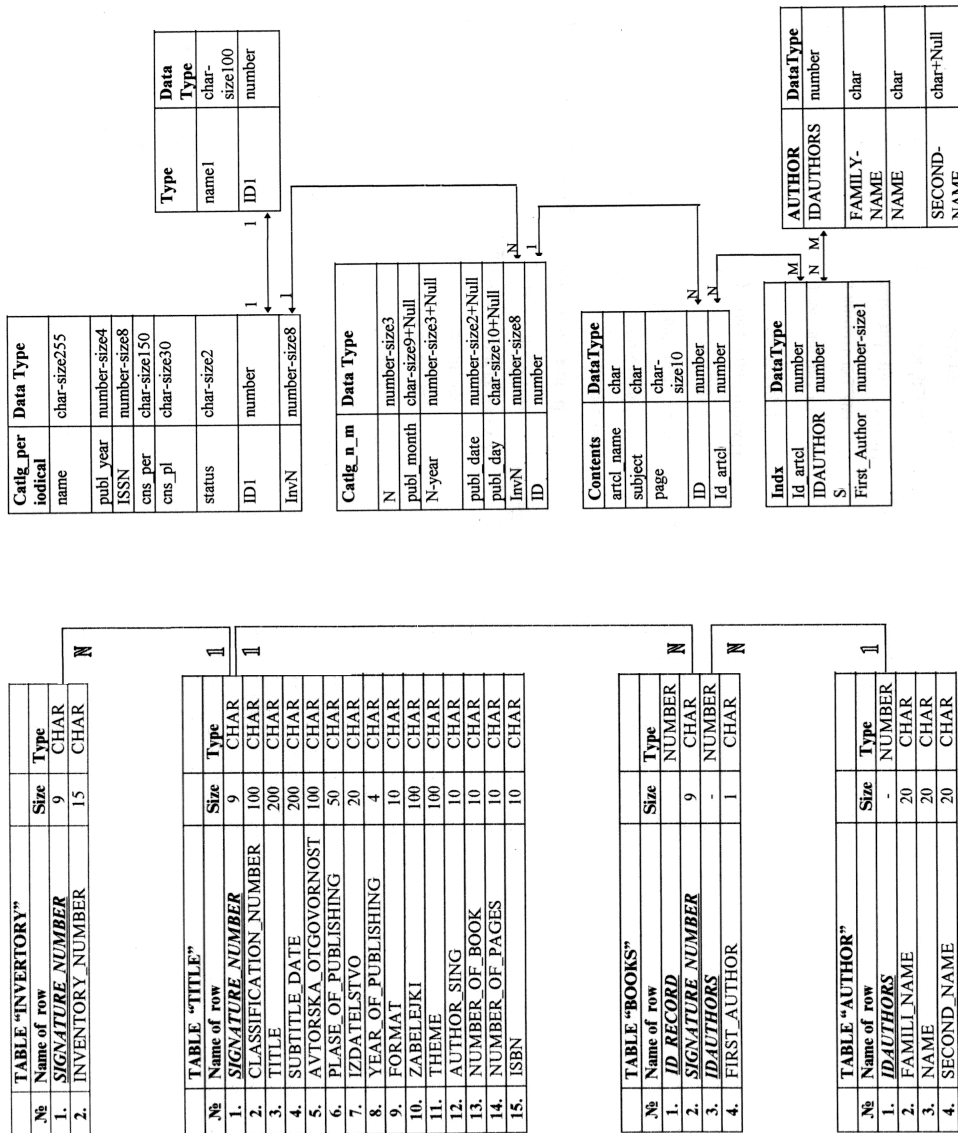
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Figure 2

Figure 3

TABLE "INVENTORY"			
№	Name of row	Size	Type
1.	SIGNATURE NUMBER	9	CHAR
2.	INVENTORY_NUMBER	15	CHAR

TABLE "TITLE"			
№	Name of row	Size	Type
1.	SIGNATURE NUMBER	9	CHAR
2.	CLASSIFICATION_NUMBER	100	CHAR
3.	TITLE	200	CHAR
4.	SUBTITLE_DATE	200	CHAR
5.	AVTORSKA_OTGOVORNOST	100	CHAR
6.	PLASE_OF_PUBLISHING	50	CHAR
7.	IZDATELSTVO	20	CHAR
8.	YEAR_OF_PUBLISHING	4	CHAR
9.	FORMAT	10	CHAR
10.	ZABELEJKI	100	CHAR
11.	THEME	100	CHAR
12.	AUTHOR_SING	10	CHAR
13.	NUMBER_OF_BOOK	10	CHAR
14.	NUMBER_OF_PAGES	10	CHAR
15.	ISBN	10	CHAR

TABLE "BOOKS"			
№	Name of row	Size	Type
1.	ID RECORD	9	NUMBER
2.	SIGNATURE_NUMBER	9	CHAR
3.	IDAUTHORS	-	NUMBER
4.	FIRST_AUTHOR	1	CHAR

TABLE "AUTHOR"			
№	Name of row	Size	Type
1.	IDAUTHORS	-	NUMBER
2.	FAMILI_NAME	20	CHAR
3.	NAME	20	CHAR
4.	SECOND_NAME	20	CHAR

Type	Data Type
name1	char-size100
ID1	number

Catlg_periodical	Data Type
name	char-size255
publ_year	number-size4
ISSN	number-size8
cns_per	char-size150
cns_pl	char-size30
status	char-size2
ID1	number
InvN	number-size8

Catlg_n_m	Data Type
N	number-size3
publ_month	char-size9+Null
N-year	number-size3+Null
publ_date	number-size2+Null
publ_day	char-size10+Null
InvN	number-size8
ID	number

Contents	DataType
artcl_name	char
subject	char
page	char-size10
ID	number
Id artcl	number

Indx	DataType
Id artcl	number
IDAUTHORS	number
First_Author	number-size1

AUTHOR	IDAUTHORS	DataType
	IDAUTHORS	number
FAMILY-NAME		char
NAME		char
SECOND-NAME		char+Null

3. The dbWeb Service searches its own scheme in the dbWeb Scheme's Store.

4. Using the scheme, the dbWeb Service delivers the query to the DBMS for further processing.

5. The dbWeb Service transforms the query results in HTML format and delivers them to the dbWeb Client.

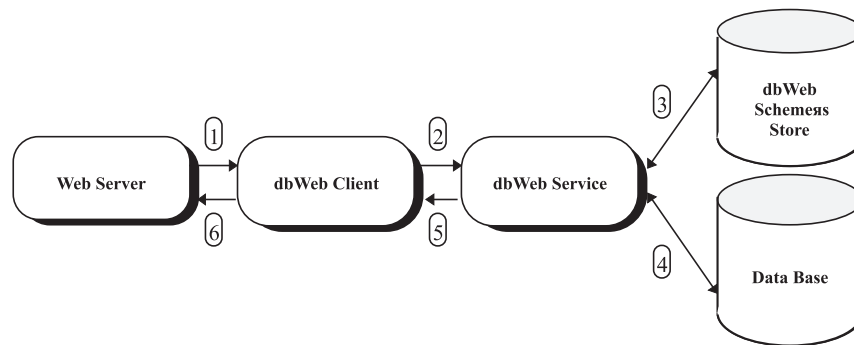6. The dbWeb Client delivers the HTML request to the Web Server.

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Figure 4

We also give some minimal system requirements:
Server Side

- IBM compatible personal computer with minimum Pentium 90 central processor, 32 MB RAM and 100 MB available disk space;

- MS Windows NT 3.51 Server (or higher) with Service Pack 4;

- MS Internet Information Server 1.0 b with Service Pack 3;

- MS dbWeb 1.1 .

Client Side

- IBM compatible personal computer with minimum Pentium 75 central processor, 8 MB RAM and 20 MB available disk space;

- MS Windows 3.x/9x/NT;

- MS Internet Explorer 3.0 (or higher) or Netscape Navigator 3.0 (or higher).

IV. Conclusion. The very rapid development of communication and software technologies permits their operation for delivering various services to end-users. In this paper we try to give brief introduction to the Web enabled approach for managing library information sources. We present a Web-based library system that is to be implemented in South-West University of Blagoevgrad. A significant advantage of this system is that both books and periodicals are being included in the database. The interface is developed by tools allowing for querying the database with simple Web browsers the users are acquainted. So, a very easy access in the manner 'point-and-click' becomes actuality.

Our further work consist of:

- optimizing the system performance;

- supporting of Web interface by Java and Java Script

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Juliana Peneva
Dept.of Software Engineering
Institute of Mathematics and Informatics
Acad.G.Bontchev St., bl.8
113 Sofia, BULGARIA
e-mail: peneva@banmatpc.math.bas.bg

George Touparov
Dept.of Computer Science
South-West University f Blagoevgrad
66 Ivan Mihailov St.
2700 Blagoevgrad, BULGARIA
E-mail: georgett@avala.bg

WEB- БАЗИРАНО ТЪРСЕНЕ В БИБЛИОТЕЧНИ ИЗТОЧНИЦИ

Юлиана Пенева, Георги Тупаров

С развитието на комуникационните технологии и предлаганите от тях възможности за комуникации и предаване на данни, се развиват и технологиите, прилагани в библиотеките, като особено внимание се обръща върху развитието на услуги за крайния потребител. В настоящата статия се предлага автоматизирана система използуваща Web- базирано търсене както на печатни, така и на периодични издания. Базата от данни съхранява информация за различните библиографски единици и е реализирана чрез Oracle 7.1 Workgroup Server за Windows NT. Интерфейсът е разработен чрез средства позволяващи бързо публикуване на бази от данни върху Web и осигуряващи връзки с базата на стандартни Web браузери. Използувайки хитертекст потребителите получават лесен достъп да нужната им информация на принципа "посочи-и-избери". По този начин се предоставя възможност за извършване на справки в Интернет/интранет среда.