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**DYNAMIC WAP APPLICATION FOR INFORMATION  
SEARCH IN LEGAL DOCUMENTS**

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This paper presents interdisciplinary solution of an information system for a search of contents in legal documents through a mobile network. It is presented a solution of a data model, which describes a legal document. It is reasoned the choice of implementing the business logic in DBMS. The suggested solution can be used as a base for development of information search systems in an environment with limited abilities of the endmost devices.

**Introduction.**

- Document types – structured and non structured,
- Advantages and disadvantages – concerned to the search process

When we say “information” we mean the process of transmitting, receiving and storage of contents (reasonable or not). When we say, “document” we will understand piece of information, which has defined structure and hierarchy. There can be considered different types of documents depending on their way of access (public and private) and structure (with defined structure and documents in a free form). Therefore for the management of documents there is needed methodology to support the processes of creation, exchange, storage and ensuant search. The process of search and finding of document contents is complicated process and it relies on the way the information is stored. Most of the stored documents are in a free form, which hinder the search.

Advantages concerning the automated processing of the documents with predefined structure are: unified way of information storage, ability for automated search of contents, unified way of creation and visualization of documents, decrement of human errors connected with the creation and filling up of a document, the introduction of control on creation and storage of documents and so on. The main disadvantage for the automated processing of this type of documents is that for every different kind of documents there must be created appropriate information structure for the storage of the document.

Electronic processing of documents is an interesting task with solution facilitates the effort of many people with their search of information contents. Because of the impossibility of unified description of document structure we will focus on a particular solution, which assures automated processing of documents with predefined (from the legal organization) structure [2]. These are the legal documents and precisely laws.

On the other hand it is the question concerning the abilities to access the document contents. With the evolution of the information technologies it is important users to be

provided with resources to access information that is consistent with the new technological solutions. In the last few years the wireless communications arose big interest as well in the business circles as in the scientific ones. The attractiveness of the wireless communications is mainly due to: the possibility of development of new business segment and the possibility of creation of new technological solutions.

The aim of this article is to present an interdisciplinary solution for management and transmitting through a wireless communication network (WAP) of lawful information. As a secondary goal it is to make easier the access of the day and correct law content.

### Legal document

- Law structure

The need of automation of legal documents is due to the big and constantly increasing amount of law information. Its dynamic and aging makes its access and usage difficult. It forces the applying of quick and stable means for the storage and the processing of information.

The choice of automated access to the content of legal documents is caused by the assumption that the law documents have defined structure according to the normative organization. For the development of information system of set of legal documents it is chosen one kind of document – law. The structure of a law consists of hierarchical-arranged elements as it is shown on fig. 1.

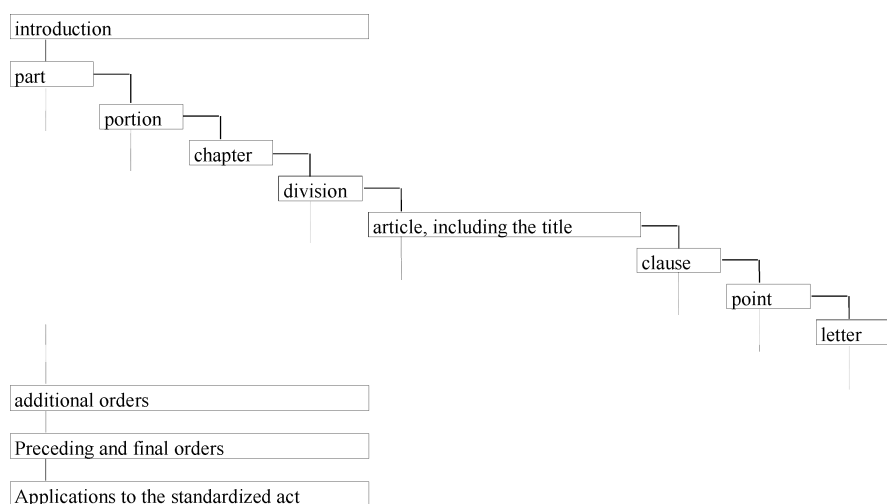


Fig. 1. Structure of a legal document

This structure of a legal document is suitable for creation of data model with defined hierarchy, by which it is possible to be described every legal law. It is created a relational database, which stores the presented hierarchy. The search of information in the database is organized by elements in which the information is stored and by meta data, which store the document structure.

### WAP – description of the architecture.

- Multy tired client server model.

**WAP** (Wireless Application Protocol) is standard developed and proposed by a consortium of leading manufacturers of mobile devices in 1997 [1]. WAP protocol assures the communication exchange through mobile digital networks and gives possibility for supply of information from Internet to mobile devices. The architectural model of WAP is based on the OSI model of ISO. **WAP** defines protocols for compatible work with Internet while the program model of WWW is kept. In this way Web servers can serve mobile devices too (Fig. 2).

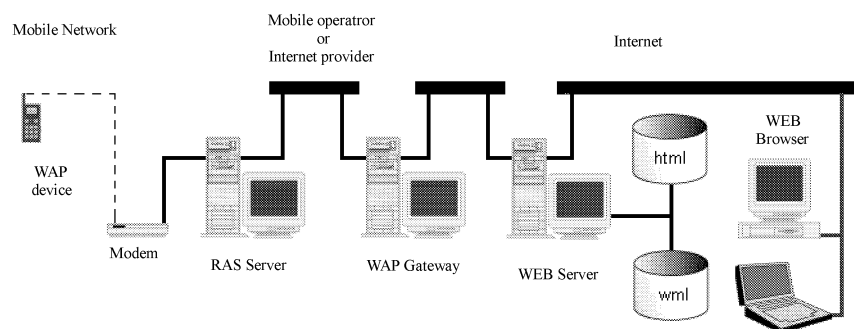


Fig. 2. Connection of WAP to Internet

In the shown scheme the scripting language ASP is used for a dynamic generation of WML decks as a result from the user's requests for retrieving of information from the database. The web server prepares the result form and it is sent only with WML code with the productive information.

#### **Search of information in normative document.**

- Database for storage of normative document
- Choice for the implementation of the business logic

Having only a few lines on the display and limited abilities for data input one good WAP site should present small amount of information but very sensible and to present simple ways of navigation [3]. The fragmentation to level of a grammatical paragraph of the information contained in a given legal document leads to acid enlargement of the hyper textual consistent. The normal practice is one document to be shown in one page as it is in HTML but even there it isn't always possible or reasonably a big document to be shown in one page. In this situation the user's navigation in the hypertext system for WML becomes suddenly complicated.

Another significant aspect of WAP access to the information content is the structure of the presented information. For the successful bolting of the informative amount it is necessary good categorizing of the information to be made in advance. To solve the mentioned problems it is created database and business logic which are used to extract and give to the endmost devices only the wanted information.

#### *Features of the database creation.*

For a successful search in a legal document it is necessary to be resolved the following tasks: creation and storage of the structure of a legal document in a database, storage in the time as part of the logic of a legal document, storage of hypertext links for a document.

The relational scheme of the database is consistent with the requirements for maintain in the time of document changes and assurance of hyperlink in the frames of separate words and/ or phrases in the document. The relational scheme of the database is shown in fig. 3.

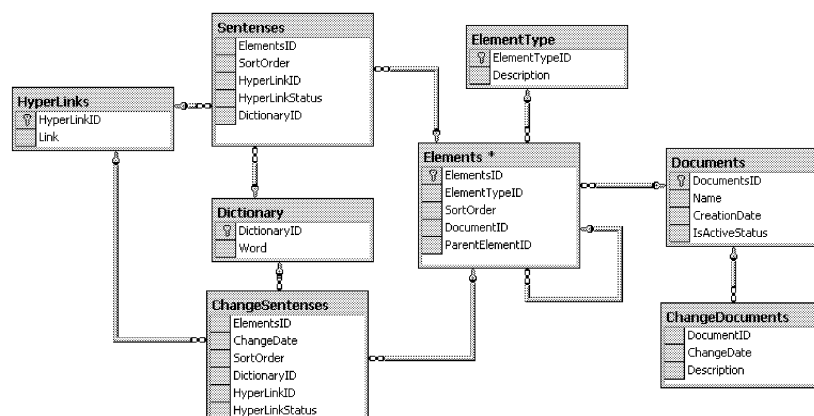


Fig. 3. Relational scheme of the database.

The structure and the hierarchy of a legal document are stored in a table called Elements. The text for every separate element and the changes in the time are stored in different tables. It is anticipated the possibility for defining of hypertext links on the level of word and/ or phrase.

*Choice of the place of the business logic implementation in the model*

For the concrete realization it is used 3-tired client/server architecture. The application business logic can be realized either in the DBMS or in the middle tier (through COM+ objects and/or in the ASP code, proceed by the Web server). In the present solution, the business logic is implemented in the DBMS.

The chosen solution is the business logic of the application to be implemented in DBMS. This is realized using stored procedures, views and triggers. The thin client/fat server model is used. This model allows the bigger part of the operation concerned retrieving and processing of data to be made by the DBMS server. This reduces the amount of transmitted information to the Web Server and the time for the processing of the retrieved data. The model provides retrieving and sending to the Web server only of the user searched information. This approach reduces the parasitic traffic between the DBMS and the Web Server. Also important reason is the time for the query processing. In the selected approach it depends on the time needed by the DBMS for data retrieving and processing.

**Conclusion.** In the presented interdisciplinary solution there are few interesting problems to which there are no discovered solutions.

- Creation of a database that should improve the process of searching and finding of information.

- Creation of hypertext links for separate words and/or phrases and their storage in a database.
- The storage of the process of evolution of a legal document.
- Generation of information contents from entire document intended for a mobile device with heavily limited abilities.

#### REFERENCES

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### ДИНАМИЧНО WAP ПРИЛОЖЕНИЕ ЗА ТЪРСЕНЕ НА ИНФОРМАЦИЯ В НОРМАТИВНИ ДОКУМЕНТИ

**Ваньо Г. Пейчев, Владимир Т. Димитров**

Докладът представя интердисциплинарно решение на информационна система за търсене на съдържание в нормативни документи през мобилна мрежа. Представено е решение на модел на данни, който описва нормативен документ. Обоснован е изборът за реализиране на бизнес логиката в СУБД. Представеното решение може да се използва като база за разработването на информационно-търсещи системи в среда с ограничени възможности на крайните устройства.