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ADVANCES IN SIMULATION, SYSTEMS THEORY AND SYSTEMS ENGINEERING

Nikos E. Mastorakis, Vitaliy V. Kluev, Djuro
(Editors)

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Preface

This book contains some new results in Simulation, Electronics, Nanoelectronics, Electromagnetic Compatibility, Systems Theory, Control and Robotics. It contains the latest developments and reflects the experience of many researchers working in different environments (universities, research centers or even industries), publishing new theories and solving new problems in various branches of computer technologies.

The main objective of the book is the interconnection of diverse scientific fields, the cultivation of every possible scientific collaboration, the exchange of views and the promotion of new research targets as well as the further dissemination, the dispersion, the diffusion of the scientific and engineering knowledge.

We are sure that the efforts of the authors to provide high level contributions will be appreciated by the relevant scientific and engineering community.

We are convinced that the book will be a source of knowledge and inspiration for all academic members, researchers and practitioners working on the topics covered by the book.

We cordially thank all the people of WSEAS and WSEAS Press for their efforts to maintain the high scientific level of conferences, proceedings and post-conference books.

We feel very much indebted to them for their invaluable help to keep this level at the high standard that our scientific community has grown accustomed to expect from it.

The Editors

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CONTENTS

Adapting Content In a Portal Of Academic Information Based On XML and PHP

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Abstract: - With the consolidation of Internet as a means to share information in the new society and the need to access such information from mobile devices, such as cellular telephones, PDAs, WebTVs, Playstations, and others, we are now facing the problem of making some extra work in projects that generate contents for the Internet and that are to be visualized in traditional browsers and in devices with a small size and memory available. The present paper deals with the problem of content generation for traditional browsers taking an academic point of view. The paper also tries to explain the strategy used and the technologies of public dominion that gave support to the work that has been carried out in the last year for the development of a dynamic application that can be executed from PCs with Web browsers and from mobile devices. The framework that was being designed is based on the different models of cellular telephones with Internet capabilities available in Colombia..

Key-Words: WAP, XML, WML

1 Introduction

Problems related to the lack of standardization in presenting Internet contents and of alternatives available in hardware as well as in software have been present from the beginning of the Internet [5]. For software, for example, it has been observed that the different navigators that have been used to access the contents of the Web did not support the same markup tags used in the different HTML (Hipertext Markup Language) versions. Content developers have had to face the difficulty of offering designs that made it possible the adaptation both to the different screen resolutions of their possible visitors and to the variety of navigator versions. Content developers even have had to give the following message: "Web site optimized for navigator x, version and resolution z ".

The idea of accessing the Internet without having to use a PC has been a reality thanks to mobile devices with technologies, such as WAP (Wireless Application Protocol), Imode, and Palm [7,8]. A language called WML (Wireless Markup Language) based on XML (Extensible Markup Language) has been used for WAP and CHtml (Compact Hypertext Markup Language) for Imode. Both of them have being defined taking into account the limitations of the devices and the limited bandwidth initially available. A new challenge in the homogenous development of interfaces was to overcome the differences in visualization between the Web browsers and the micro-browsers present in mobile devices

The presence of the XML standard has allowed to separate presentation from content while, at the same time, organization has been improved. But the XML standards has also made it possible the exchange of data between new sites, although there still exists a drawback regarding other versions in the navigators. The W3C consortium has suggested the use of XHTML (eXtended Hypertext Markup Language), so a document codified in XHTML can be seen from mobile devices and personal computers, taking advantage of HTML, cHTML, WML and XML, while maintaining compatibility with mobile devices. In a recent specification of the W3C, a series of modules that identify subgroups of the complete language have been indicated, simplifying the identification of the particular functionalities that a device has. The development of XHTML has been thought so as to have a unique markup language for devices with small screen and low processing capacity. For that purpose, it is necessary to have devices that carry a minimum number of the XHTML modules [10,11].

As an academic experience, it was decided to deal with the problem of compatibility in spite of the few cellular telephones models that allow access to the Internet in Colombia. The project was implemented with a view to considering the development of new projects related to the presentation of contents for the Internet in the future. The present paper summarizes the experience developed in the construction of a dynamic application for the Internet that allowed access to an existing database from different models of mobile devices and from Web browsers and clients with support for XHTML, avoiding the rewriting of the application for each type of client. The evaluations was then carried out to check on the type of client that made the request and accessed the data of an XML document associated to the data of the database. The format of presentation was only varied bearing in mind the client's characteristics.

2. Description of the development

The test portal that was developed allows to enter the Virtual Education Services [9] that the University Autonoma de Bucaramanga offers to the students who, as a basic level users, can check the information on board and the results of their exams. The interface of the database maintenance directed to the administrative level user was only made available through the Web interface, due to the troublesome work that implies the intensive editing of data from mobile devices. The strategy used consisted in having access to the data from a Web server using a technology that gave support to the development of dynamic applications and the XML standard in order to obtain the separation between content and presentation. The visualization format of the same document was defined by means of XSL, which also made it possible to filter the information to be visualized in agreement with predefined criteria [12].

It is possible to codify XSL using suitable techniques, such as XSLT (Extensible Style Language Transformations), which permits to transform the structure or the content of an XML document into almost any format and to define the visualization style. In order to obtain a transformation, it is necessary to take data codified in XML, a suitable XSL style sheet, an XML analyser and an XSLT processor, the last two working at the same time. The XSLT processor produces a transformed XML document, a document codified in HTML, in XML or in any other markup language. The data are then used by some application with specific purposes, such as a Web navigator and a WAP micro-navigator.

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3. The Solution

For the development of the prototype, an object-oriented philosophy was used as the approach of analysis and design of software. The application was designed using UML (Unified Modeling Language) [1,4].

The technologies employed to develop the nucleus of the project were:

- Operating system: Linux, Redhat version 7,1 (kernel 2,4,2-2)
- Server HTTP: Apache v 1.3.19
- - Database Management System: MySQL v. 3.23.37
- Development of dynamic applications Web: PHP (Hipertext Processor) v 4,0,6 , with extensions for support to XML.

The client/server database management system selected was MySQL, a server multithread based on the standard SQL, (Structures Query Language). This system, although it does not allow an appropriate support for developments on a great scale due to its limitation in handling stored procedures, it is nevertheless an appropriate option for test developments.

PHP acts as a high level interpreted language, whose scripts can be embedded in documents codified in a markup language and executed in the Web server. PHP is shaped as a module of the Web server Apache through the CGI (Common Gateway Interface) gateway which allows interaction with different database management systems [3]. The PHP funtionalities can be increased by means of extensions, that is, groups of functions that can be activated when settling or by means of directives that are defined in the associated configuration file. In the case of interaction with XML, it is required an extension to interpret and validate documents codified in XML. For that purpose, XML analysers were used, available in some distributions of Linux. In order to develop transformations of documents codified in XSL, an additional extension was employed.

4. Operation of the Solution

When the application is loaded, scripts written in PHP execute the dynamic queries to the database and codified data are spawned in XML, which are later presented in the appropriate format by means of XSL archives (transformations for each one of documents in WML, XHTML and HTML formats). One of the main processes consists in identifying the client who makes the request. This is obtained by making an evaluation of the environment variable $HTTP_ACEPT, which contains the value of the MIME (Multipurpose Internet Mail Extensions) contents that accepts the client. If it is identified that the client has support for WML, the environment variable HTTP_USER_AGENT is examined, which differentiates the navigator or emulator used. In a

different case, the same variable that identifies if the navigator used is compatible with XHTML is evaluated. If this so, the data will be transformed into XHTML or into HTML.
For the period of time when the project is being developed, only the browser compatible with HTML 4.0 capabilities can open information codified in XHTML 1.0, due to the fact that specifications of the latter still preserve the elements of the last version of HTML 4.0. To carry out the test, both Web browsers with support for XHTML as well as emulators of mobile devices were employed.

4 Conclusion

In this paper, the problem of generating content adaptable to a variety of clients has been approached, using technologies of free distribution and presenting the main standards associated. We also provide guidelines on how to extend the existing web applications to use XML for content generation and show examples of how to expose data stored in a relational database in XML.

XML as a markup language is seen as the best format used for the exchange of data among applications and components of applications. It is necessary to carry out a permanent evaluation of the alternatives available for the development of contents adaptable to the client. An important point is to develop manufacturer independent solutions to access databases that can be integrated in an single portal development, no matter if it is done for wired o wireless Internet.

From the tests made the objective sought was reached. It implied obtaining a high degree of scalability in relation to managing interfaces and the possibility of giving support to the format that is supported by new devices. In spite of the success, a new difficulty was observed in relation to the real potential of the user's concurrence in the process XML documents dynamically generated.

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