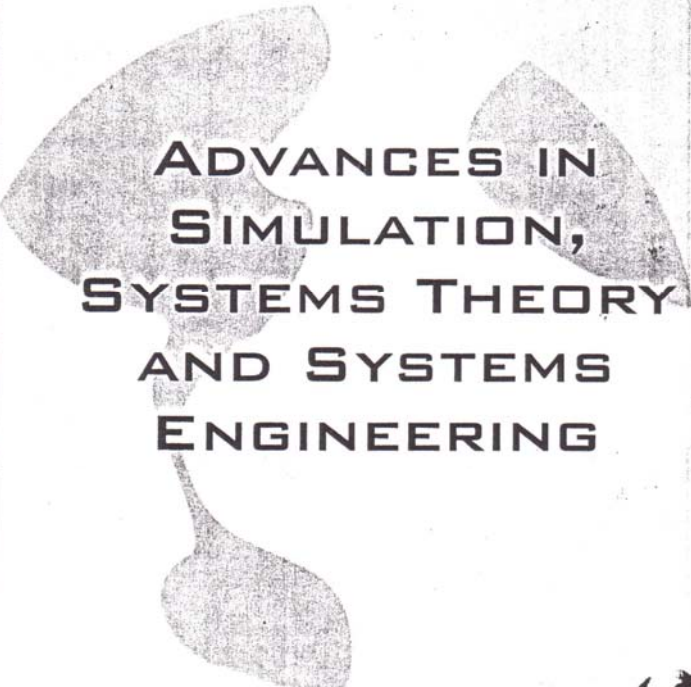


Electrical and Computer Engineering Series
A Series of Reference Books and Textbooks.



**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

Advances in Simulation, Systems Theory and Systems Engineering

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Advances in Simulation, Systems Theory and Systems Engineering



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DEVELOPMENT OF A SOLUTION FOR EDITING AND COMPILING OF WIRELESS INTERNET APPLICATIONS

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Abstract: - With the consolidation of average Internet as sharing information in the new society a new problem has been surged, related with building dynamic wireless Web applications and Web sites for the next generation of cellular telephones and Internet devices. For delivering content to WAP-enabled devices, convert existing Web pages to Wireless Application Protocol (WAP) using WML, a markup language for building functional applications for wireless handled devices some solutions has been developed. This paper shows how build dynamic Web sites for wireless, introduces the WAP (Wireless Application Protocol) and offers an explanation of XML (Extensible Markup Language). Finally, we present the main characteristics of a project developed in our institute, related with the study of the XML fundamentals of the WML language and the application on this principles in the develop of an integrated solutions for assist the process of edit wireless dynamic internet applications.

Key-Words: WAP, WML, XML

1 Introduction

More than a simple support mechanism by which to access the Internet via mobile devices, WAP consists of a protocol which allows one to satisfy various information and service needs from any place and at any time which, coupled with its high content and dynamic interactivity, constitutes an information service of great value for its users.

The dynamic applications for Internet may be viewed from two different perspectives: from that of the server and that of the client. The server sides' dynamism is attributable to the development of procedures which retrieve data from a database. On the client side, the technology is based on the capacity of the navigator to interpret scripts containing functionalities which avoid unnecessary information congestion on the net. This characteristic is also manifest in the wireless world.

In order to get client-side interactivity it is possible to use WMLScript, an event-driven language based on JavaScript and ECMAScript (standard ECMA-262). The generated code in this way can be accessed directly or through a WML document. It is acceptable to say that WMLScript is to JavaScript like WML is to HTML.

WMLScript permits the access to libraries that are precompiled and loaded in the memory of the devices. The WMLScript code must be compiled before it is executed by the virtual machine that includes the microbrowser over the device's operative system.

On the other hand, in the server side there are technologies like: ASP (Active Server Pages), PHP (Professional Home Pages), Servlets (Applets or Java Programs that can be executed at the server-side), JSP (Java Server Pages) and Cold Fusion. This scripting

technologies share a development way for database access in WAP

ASP is a Microsoft technology commonly used for web applications that interacts with databases, specially in Windows servers with a Web Server like IIS (Internet Information Server) or PWS (Personal Web Server).[6]

Besides, when more platform independence is required (for example a company that wishes to reuse applications for clients with different server platforms), the appropriated technological possibility are Servlets and JSP (Java Server Pages) of Sun Microsystems. These scripts can be recognized for Sun's Java Web Server and additional configuration tasks by other Web Servers.

The idea of creating an integrated environment for the development of dynamic applications for Wireless Internet arose from our participation in various projects which required WAP applications to interact with databases, whereby it was decided to create a problem-specific solution, based on the revision which was made of some available environments for the creation of dynamic WAP applications, with each independently having diverse elements of interest by which to resolve specific elements but which did not, of themselves, constitute an integrated solution to the problems which we were trying to resolve.

The main objectives of our projects were the following:

- Create applications which would have facilities to generate automated WML code and WmlScript (used for WAP pages).
- Make dynamic and interactive contents more easily.
- Error detection.
- Show code on WAP simulator.

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- Include functionalities related to language of the current devices and devices of next generation.

The following is a summation of the fundamental ideas most pertinent to WAP technology as well as a summation of the procedure which was followed for the development of the software program for the editing and compilation of dynamic WAP applications which was implemented.

2. The WAP Protocol

The Wireless Application Protocol (WAP) provides a universal open standard for bringing Internet content and advanced services to mobile phones and other wireless devices. WAP is an open, global specification that gives mobile users with wireless devices the power to access and interact with information and services instantly. WAP defines:

- A model of standard names for which URIs (Universal/Uniform Resource Identifier) are defined in the World Wide Web in order to identify local resources of the device and the URLs (Universal/Uniform Resource Locator) also defined in the WWW to identify the WAP content in information servers.
- A standard content format, based on the WWW.
- Some standard communication protocols, which allow for the communication between the mobile terminals microbrowser and the on-line Web server.
- The corresponding microbrowser found in the mobile terminal is responsible for coordinating with the gateway, which interprets the WAP and WEB request which, in turn, is processed and redirected to the appropriate information server. Once the information is processed, it is sent to the gateway which screens the information before sending it to the mobile terminal. In order for the Web server to generate content which can be understood in WAP domain, the right MIME type (Multipurpose Internet Mail Extensions) must be specified.
- The application level of the WAP protocol denominated WAE (Wireless Application Environment), includes the following functionalities:
 - A support for the WML language, similar to HTML but optimized for the inherent limitations found in mobile devices.
 - A script language, denominated WMLScript, similar in its syntax to JavaScript, which, on the client side, allows for the accomplishment of specific tasks such as validations.

The recent WML 2.0 specification has been designed in order to extend the syntax used in XHTML (Extensible

Hypertext Markup Language), which, in turn, has arisen as a proposed reformulation of HTML based on XML (Extensible Markup Language) and which constitutes one of the possible alternatives which, in the future, may support the technological unification in the development of fixed and wireless Internet. [5]

3. Technology and development

For the construction of the software prototype for the editing and compilation of dynamic WAP applications, a previous study of XML was realized (due to the fact that the WML markup language is based on the XML specification).

For the prototype development, object orientation methodologies were used and the design was specified with UML (Unified Modeling Language) using C++ as the program language. [1,4]

In the development are identified the following requirements:

- The main functionality of the software to develop is to assist to the generation of the user code.
- It must assist to the generation of the WML code (versions 1.1, 1.2 y 1.3), WmlScript, ASP, PHP, y JSP.
- The functionalities of the application have to be similar to the typical text editor.
- It must to be possible to edit several files and languages simultaneously.
- It is necessary a WML code analyst to indicate visually the errors on the code and a easy correction of them.
- It must exist the possibility of launching a simulator to show the results.

Furthermore, the following two requirements are important too:

- Translate WML code to the WML 2.0
- Assist to the generation of this new language.

A syntactic and semantic lexical analyst was designed with WML code which allowed for error detection during editing and a detailed description of same, which is of importance for the revision of new or pre-existing documents. Additionally, a translator was created which allows for the transformation of pages written in earlier versions of WML into the newer WML 2.0 format.

The microbrowsers found in mobile terminals have an interpreter for WML and one for WMLScript. The latter, also implements a compilation of libraries which permit the scripts to access certain services at the terminal. Moreover, it has the additional function of telephone communications by means of a WTAI (Wireless Telephony Application Interface) agent, through which it is possible to obtain access via the scripts to specific functions in order to realize tasks like: call initiation and access to telephone directories.

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The final software interface which was developed facilitated the editing of WML code and the inclusion of the tags presented in the technologies for the integration of Web applications and databases: ASP (Active Server Pages), JSP (Java Server Pages) and PHP (Hypertext Processor). To the aforementioned applications was added the ability to simultaneously edit multiple files. [2,3]

4 Conclusion

This paper summarizes the principle characteristics of the dynamic applications for Wireless Internet based on WAP protocol and the interaction of the different elements involved in the interaction between databases and scripts on the server side.

The final developed prototype allows the possibility for supporting technology in the development of dynamic scripts on the server side which interacts with databases by means of technologies such as ASP, PHP, JSP, and, additionally, of providing support for the conversion of documents to WML 2.0 and the facilitation of error detection.

With XSLT and server-side scripting technologies as ASP (Active Server Pages), JSP (Java Server Pages), and others we can customize applications for individual clients. While mobile access is possible using standard technology, more is needed to make mobile access truly seamless. The creation of a world standard for mobile Internet access and information access would ensure a rapid growth and a basis for all mobile communications users to interact.

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