On the Recent Trend of Wireless Internet Game Protocols and WML Converters Based on WAP Game

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Key Words:Game Program, Wireless Internet Game Protocols , WML,

Abstract

The current paper maintain web pages described in HTML use cellular phone sets gain access to web pages WML the language that converts HTML-based documents service that, with the help of WML Game.

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I. Introduction

Thanks to rapid progress in the Internet technology since the 1990's, users now are able to easily obtain the information they seek wherever they have an access to personal computers(PC's) and network. However, The PC's enable us to gain access to the information on the web, but they are too heavy to carry and too complicated to use. As a consequence, the need for a smaller and smaller equipment to obtain information on the web anywhere has been on the increase. Wireless terminals such as cellular phones and PDA's(Personal Digital Assistant) are in great demand for the users to gain access to the information on the web. Especially, the emergence of WAP has satisfied the users' desire for the technology of wireless communication. Innovative technology has been being developed for the use on the internet. However, there is one drawback to be dealt with. HTML is a language used to describe web pages on PC's. It is natural that this language is designed to express information on big screens such as PC's. Therefore, it can not be an appropriate language for cellular phones and PDA's, since they do have limitations such as low bandwidth, small display screens and low electric power that do not pose any problems for PC's. Another type of language is in order. WML(Wireless Markup Language) presents an answer to this problem. WAP defines WML as a language that can well match the characteristics of wireless telecommunication equipments. As a consequence, we end up with a mission that we have to use a distinct language to express the same information due to distinct interfaces of input and output. This paper designs a system that can provide the service of converting HTML-based documents to WML-based ones on the cellular phones.

II. The present situation of wireless internet business

In the past, the wireless data service provided by mobile telecommunication companies centered on SMS(Short Message Service). Recently, many software developers, wire communication companies, and contents providers have entered into the industry. We would say that the full-scale wireless internet era has opend up.

According to a recent survey of ITU(International Telecommunication Union), more than 1 billion people now enjoy telecommunication service, wire and wireless. It is also expected that the number of mobile telecommunication users will surpass that of wire communication users this year. The growth rate of mobile

communication was not really significant before 1995. Encoupled with the development of the internet, however, we have seen an explosive growth since 1995.

Ⅲ. Wireless Internet Application Protocols and WAP Game

There are three types of internet protocols developed and used around the world: WAP(Wireless Application Protocol) developed in Europe, W3C(World Wide We Consortium) from Japan, and ME developed by Microsoft.

If we compare the WAP architecture with the current Web model, the figure 3-1 shows us that the web structure on the internet provides very flexible and powerful model of programming.

The contents are described in the standard data format of HTML and are processed by web browsers. By the request of data objects from clients, a web server responds and sends coded data to the clients.

The WAP programming model is very similar to the Web model, as illustrated in the figure 3-2. It employs a WAP gateway called WAP Proxy between a client(cellular phone) and an internet server. The major role of the gateway is to mediate a WAP protocol and an internet TCP/IP protocol. In other words, every call for internet service from a cellular phone is programmed to go through the Gateway. The Gateway, in turn, asks for the requested service to the internet server. It receives a response from the server and then send it back to the cellular phone.

The WAP contents and application programs are based on the WWW Contents format. The WAP contents use the Web

[Table3-1:StandardizedModels for Wireless Internet Access]

	WAP	ME	W3C
International	AT&T, IBM, Nokia,Motorola, Bell South200 firms	Microsoft, QualcomWireles s Knowledge	MIT, INRIAKeio Univ.300 firms/college s
Domestic	SK, LG TelecomSinsegi Telecom	KTF	---

[Figure3-1:The present WWW model of Game programming]
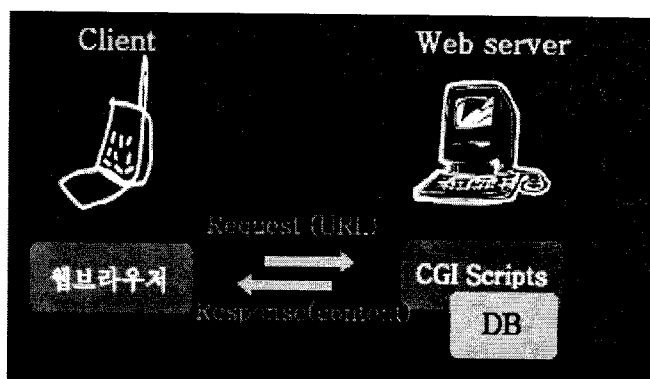
communication-based protocol WAP/WTP to send requests and receive responses. The output of the sent contents appears with combined efforts of the micro browser on the wireless terminal and the users' interfaces. HTTP serves to communicate between the WAP gateway and the web server.
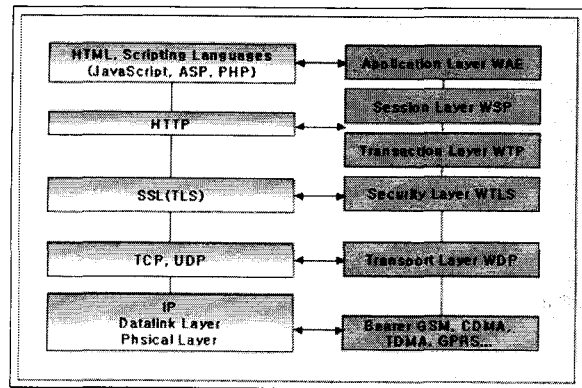
[Figure 3.2] WAP Programming Model

IV. Realization of Wireless Internet Service and Converter

Several languages are used for the production of contents: WAP-based
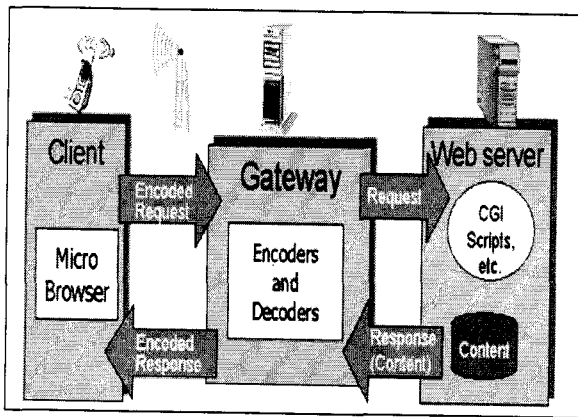
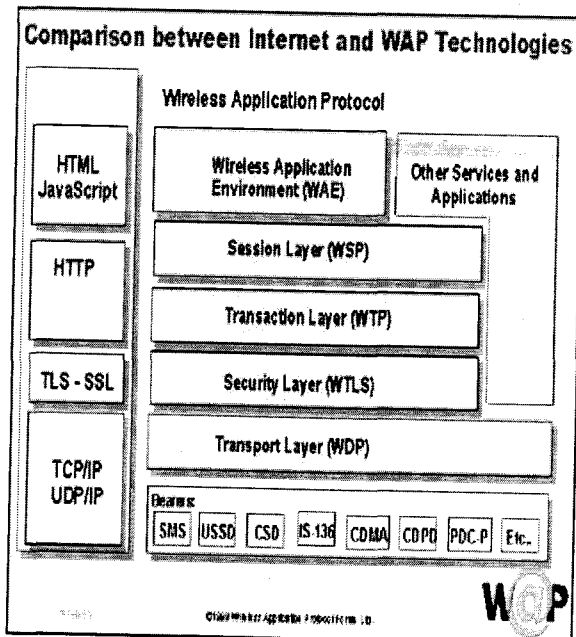[Figure 3.3] Comparison between Internet and WAP

[Figure 3.4] The Structure of WAP Protocol

WML(Wireless Markup Language), HDML(Handheld Device Markup Language), HTTP-based mHTML(mobile-HTML) and cHTML (compact-HTML).

HTML sites are difficult to be expressed on internet phones due to hardware restrictions. Therefore, WAP Forum chose WAP as the standard and WML and HDML as its languages for wireless internet phones.

[Table 4-1] Languages for Contents

	WAP-based	HTTP-based
Languages	WML, HDML	mHTML, cHTML
Base Technology	XML	HTML
Telecommunication Companies	SK, Sinsegi Telecom, LG Telecom	KTF, NTT

The language WML is based on XML(eXtensible Markup Language) whose format is very similar to HTML. However, unlike HTML, many tags in WML, are defined in such a way that they may function without using scripts. As a consequence, an animated page can be produced with simple tags. HDML is also based on XML and makes it possible to produce contents for wireless internet with fewer tags than WML.

4.1 WML(Wireless Markup Language)

WML is a markup language that is based on XML and is developed for the purpose of the expression and input on mobile terminals. This language is appropriate for mobile terminals that have such limitations as small screens, limited memory and CPU, low bandwidth, and long standby for access. It usually supports the size of 4*10 on a screen and also helps users input information using number and special keys.

[Figure 4-1] The relationship among different languages
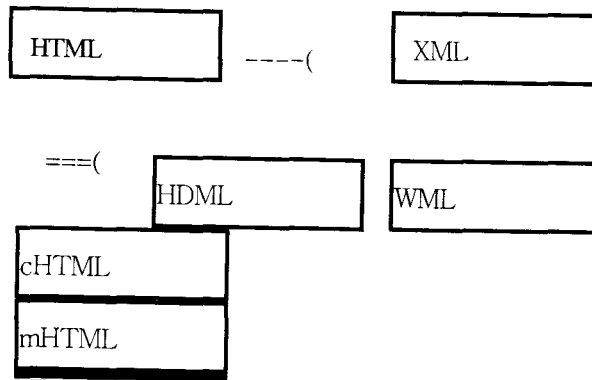
4.1.1 The characteristics of WML

The syntax of WML can be characterized by the following features. It uses letter sets, distinguishes small and capital letters, and declares XML documents. Its variable is similar to that of Unix's shell variable and special letters should be accompanied by &. The use of the syntax of WML requires that the format of contents be defined as "Content-type: text/vnd.wap.xml.

4.1.2 The syntax of WML

(1) Object

A WML text can contain numbers or indicated character objects. These objects define particular characters in the document character sets. An object must get out of WML or is used to define a character in a document character set which might be difficult to enter the text editor.

(2) Elements

Elements define structural information on the WML deck and all the markups. Factors consist of the beginning tag, contents and the final tag. They use either one of the following structures.

〈tag〉contents〈/tag〉 or 〈tag/〉

Elements containing contents are defined by the beginning and final tag and vacant elements use 〈tag/〉.

(3) Attributes

The attributes in WML provide additional information on the elements. They are always defined at the beginning tag, as shown below.

〈tag attr = "abcd/〉

(4) Notes

WML follows the style of XML. As illustrated in the example for a character object, the format 〈!--note--〉 is used. The notes are used by WML producers and are not seen to users' agents.

(5) Factors

WML cards and decks can be delivered by using factors. The following syntax is used to send factors.

$identifier

$(identifier)

$(identifier:conversion)

A parenthesis is used when a blank space letter does not appear at the end of factors. Factors are given top priority in WML and thus can be used anywhere in the syntax. The $ character represents the basis of factors.

4.1.3 The construction of WML

WML consists of cards and decks. A card is the basic unit of WML and it represents an interface between navigation and users. And a deck, in turn, is a collection of WML cards. Navigation between decks and cards expresses units of screen by cards and use such tags as 〈do, go, p〉 for the responses of action.

4.1.4 WML scripts

[Figure 4.2] An example of WML script

```
Fu Function is Valid(Data){
    var result;
    if (data){
    result "OK";
    }else{
    result "ERROR";};
    return result;
```

WML scripts are appropriate for the WAP architecture and provide improved user interfaces. They also help control accessorial equipment. It may call script functions, perform calculation using parameters from WML, and send the result back by the formula CALL BY VALUE, as shown below.

4.2 Converter

The major function of a converter is to extract texts from the HTML sources of the site under conversion and convert it to an adequate markup language for a client's terminal. The data format in the middle of conversion may vary among venders. An example would be the realization of a conversion tool with XML as the interim language.

4.2.1 The outline of Converter

It is technically difficult to make all the information in the cable internet available

[Figure 4.3] The concept of the operation of Converter

HTML source	Intermediate Format	Client Markup Language

→ : Extract

=→ : Generate
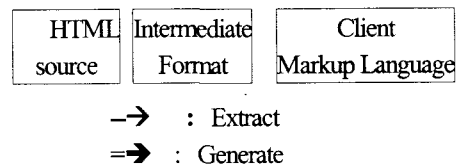
to the wireless terminals. Moreover, it does not make much sense in terms of efficiency of information, either. Various kinds of multimedia information including static images, animated images and sound are very tough to be expressed in the format of wireless internet contents due to several limitations. The limitations of the present technology of the current text-based internet might include limited network bandwidth, limited capacity of batteries, and/or inconvenience of interfaces.

Thus, the capability of converters play an important role to deal with the drawbacks mentioned above. In that sense, the success of converters depends on the performance of working tools that could choose the convertible contents from the internet sites, describe elaborated rules for conversion, and provide design functions. These should be significant properties for the converter's efficiency and flexibility.

4.2.2 The process of conversion

XSL is the language employed to express XML documents on the screens. There seem to be two major methods of obtaining presentations by applying XSL to XML

documents. First, we can use XSL's format function or, as an alternative, we can use XSL's conversion function. We could get presentations by the application of CSS(Cascading Style Sheets) to XML documents. The conversion function of XSL utilizes XSL and converts the source XML document to another markup language. This converted document is expressed in a markup language like HTML. As a result, we could get presentations of original XML documents. If we separate contents from expressions, it becomes possible to multiple presentations of a data file and a presentation of multiple data files as well. Especially, we could diminish network load significantly since it is now possible to change animated presentations on the cached XML data. If the information manger maintains data in the XML format, he or she can satisfy the clients' request by applying their desired styles of XSL. To support the standard browser, an efficient way would be for the server to apply XSL so that the result document could have HTML tags. The following is an example of a XML document and a XSL file with its presentations.

[Figure 4.3] Companies.XML

```
<?xml version="1.0"?>
<?xml-stylesheet      type="text/xsl"
href="Companise.XSL"?>
<Companies>
<Company>
<Name> Penta </Name>
<Product> Tamino </Product>
```

```
</Company>
<Company>
<Name> SoftwareAG </Name>
<Product> EntireX </Product>
</Company>
</Companies>
```

[Figure 4.2] An example of WML script

```
<?xml version="1.0" encoding="ks_c_5601-
1987"?>
< x s l : s t y l e s h e e t
xmlns:xsl="http://www.w3.org/TR/WD-
xsl">
<xsl:template match="/">
<HTML>
<HEAD><TITLE>      XML      Sample
</TITLE></HEAD>
<BODY>
<TABLE     BORDER="1"     COLS="1"
WIDTH="100%">
<TR BGCOLOR="WHITE">
<TD><FONT SIZE="5" FACE="Comic Sans
MS">
<CENTER> A Simple XSL </CENTER>
</FONT></TD>
</TR></TABLE>
<HR                     COLOR="BLUE"
WIDTH="100%"></HR>
<HR WIDTH="100%"></HR>
<TABLE     BORDER="0"     COLS="3"
WIDTH="100%">
<TR BGCOLOR="FFFFCC">
<TD><FONT SIZE="2" FACE="굴림">
<CENTER> 회사명 </CENTER>
</FONT>
</TD><TD>
<FONT SIZE="2" FACE="굴림">
<CENTER> 제 품 </CENTER>
</FONT>
< / T D > < / T R > <x s l : f o r - e a c h
select="Companies/Company">
<TR BGCOLOR="F0F0F0">
<TD>
```

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```
<FONT SIZE="2" FACE="굴림">
<xsl:value-of select="Name"/></FONT>
</TD><TD><FONT SIZE="2">
<A HREF="http://www.tamino.co.kr/">
Tamino </A>
</FONT></TD></TR>
</TABLE>
</BODY></HTML>
```

4.2.3 The benefits and drawbacks of the use of Converter

The realization of wireless sites and innovative technology by WML has both advantages and drawbacks. Load accompanied by the use of converter clearly exists. First of all, we should take cost into consideration. We simply can not ignore the fact that a converter solution is selling for hundreds of thousands of dollars. Even though a converter yields brilliant performance, the flexibility for improvement remains low. If an organization intends to incorporate cable and wireless internet by the introduction of a converter, it has to review its current environment and the converter's strength and weakness before it makes a final decision.

V. Concluding remarks and further research

The world now sees severe competition for the standarization of the technology for wireless internet access. Domestic companies should aggressively take part in the international standards organizations and support the standards that are more appropriate for the domestic environment. They should also exert every effort to enhance strategic cooperation with foreign major companies. The famous Japanese product i-node can be a model. In sum, they should be able to exercise the influencing power over the international market. We have seen an unprecedentedly rapid growth in the number of cellular phone subscribers in Korea for a very short period of time. As a consequence, keen competition among the telecommunication companies has focused on securing the standard technology. This gives us a golden opportunity for Korea to be the leading country in the filed of wireless internet technology. The present paper presents a discussion of the converter that converts a HTML document and displays it on a portable terminal without remaking the HTML document with the help of WML. A few manufacturers have launched such converters into the market. But, their performance is far from perfection. Some of them only show that they can convert particular web pages that the companies have designed for themselves. If we solve the problem and various types of limitations, we should be able to eliminate the inconvenience of remaking the web

documents, decrease the cost of maintenance and repair, and save a considerable amount of time, money, and workforce.

For the purpose of perfect filtering, we should be able to deal with scripts, images and CGI functions as well. The technology for the addition of these functions and features needs to be developed further. As mentioned at the beginning section about the overall structure of the conversion system, it seems essential that the system be connected with a micro browser.

A great deal of research has been in progress on various areas of wireless internet communication including software, hardware, and communication methods. The present paper deals with the subarea of software and presents an application program utilizing WAP. Further research in every subfield will lay a cornerstone of wireless internet communication which is itself an application of IMT–2000.

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