

A Term Paper on

Wireless Application Protocol (WAP) and
I-mode: An insight

Guided by:

Prof. Kevin Ryan

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Submitted by:

Amit Lakhani

SID# 157- 06-6960

Stevens Institute of Technology

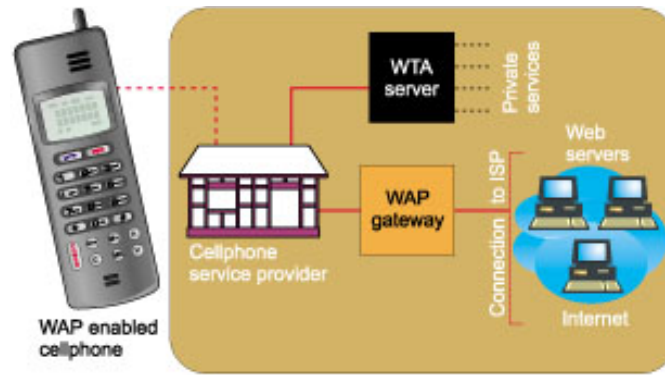
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Introduction:

One fine day, Mr. Dotcom millionaire is roaming around in his Mercedes. Suddenly, he remembers he has to buy a fast laser printer for his new office and luckily, there is a computer peripherals shop nearby. But before buying one, he wants to go through the printer reviews on a website. However, he doesn't have a PC or a notebook, a modem or a phone line in his car. What he always carries along is his small metal brown-colored cell phone. Does he give up saying "I can't get connected". For the dotcom millionaire of this world, who wants to connect to the Net from anywhere and everywhere, welcome to the unconnected world. Welcome to the world of WAP and I-mode!!!!.

WAP is meant to provide services to all small devices - cell phones, pagers, PDAs, etc. that you can carry along comfortably. It's meant primarily to access the information highway that is, the Internet through devices with low and inadequate resources like slow CPUs, less RAM, small displays, and low bandwidth and connection stability. The protocol builds upon existing wireless networks, like mobile or cell phone networks, and also provides some enhancements, like better user interface, to their standard services. It uses a markup language called WML, (wireless markup language) to access the pages and decode it. A simple transaction with the WAP server would look like this:



The mobile phone user; keys in a URL in the micro browser in his cell phone, say www.foo.com/foo.wml and connects to his mobile service provider. The request is encoded for transmission across the wireless network and is sent to a WAP proxy, which is most likely installed at the service provider's site. The WAP proxy constructs a standard HTTP request and contacts the Web server addressed. The Web server sends the requested WML or HTML page to the WAP proxy. If the page is a WML page, the WAP proxy encodes it for the cell phone network you are using, and simply forwards it to the micro browser running on the WAP phone. If it's a non-WAP page say an HTML page, the WAP proxy applies a filter to translate it to a WAP page, encodes it, and delivers it to the micro browser.

On the other hand, i-Mode, in which the "i" stands for information, is a service that was launched in February 1999 by a company NTT DoCommo, Japan's leading cellular phone operator. Instant access to Web sites compatible with i-Mode can be achieved at the touch of a button. You could receive e-mail, exchange photographs, receive news and stock quotes, shop online, receive weather forecasts, play online games and access music files online. Every subscriber is given an e-mail id, which is his or her cellular phone number @docomo.ne.jp.

Components required for i-Mode services are:

- An i-Mode cellular phone i.e. a phone capable of voice and packet transmission along with a browser installed
- A packet network
- An i-Mode server
- Content in c-HTML

Mode of transmission:

i-Mode uses a PDC-P (Personal Digital Cellular-Packet) method of data transmission over the existing PDC network used for ordinary voice traffic.

This mode of transmission where communication is broken into packets allows the same data path to be shared among many users in the network.

Thus, users can stay online throughout and yet not be charged for the time spent online. Rather, they only pay for the amount of data that they retrieve. This is in contrast to the circuit switched network like the regular voice telephone network where the communication path is dedicated to the callers thus blocking that path to other users for that period of time. Also, I-mode uses cHTML (compact HTML) as its markup language, which is a subset of HTML. So an i-Mode enabled Web site utilizes pages written in cHTML and being similar to HTML, it is easy for Web designers to create. This cHTML content needs to pass through a cHTML gateway before users can access it on their mobile phones using the i-Mode browser. When an i-Mode compatible wireless device

makes a wireless request, the gateway translates this to the server and back from the server to the wireless device.

This is how both of these protocols work respective to their networks.

Similarities and Differences:

Although there too less similarities between the two technologies, some of them have so much in common that there are ideas of converging both into one when I-mode sets up to conquer the world. One of the key similarity is the wireless access these protocol give to the IP-based services. Both of them support a markup language although different. But there is still too much differences between the two technologies as compared to their similarities just on networking basis that includes I-mode's gateway access which is much same as WAP's.

Considering the differences, they can be discussed on one to one basis:

1) The first important difference is the programming language used. WAP uses the markup language WML (Wireless Markup Language) while i-mode uses CHTML (Compact HTML).

Compact HTML has an advantage over WML in that a large majority of WML developers come from the "Web" world where they are used to HTML. However, the future of Internet content serving is XML, and from XML the step to WML is hardly noticeable. It's much more noticeable with Compact HTML or HTML.

2) The second important difference between WAP and i-mode is that i-mode is an always-on connection. This means that you do not have to 'dial up' to access a site and email is instantly sent to your phone. This uses GPRS technology and will be made available to us some time next year.

E-mail will become as instant as Short Message Service (SMS), and as phone technology advances, we will be able to send, receive and store large files on our wireless devices. This difference also pressures the billing rates imposed, that is while I-mode billing consists of how much you are as i-mode is based on a packet-data (9600bps) transmission system, subscribers will be charged according to the volume of data transmitted, not the time spent on line. With the 'always on' connection, this method is necessary as the time spent is unlimited.

3) Thirdly, I-mode can support a high amount of graphic on smaller displays while WAP, supporting hardly a small bmp standard (WBMP) is nowhere I-mode comparison. The proof of this is latest tie-up between NTT DoComomo and SEGA to provide online gaming to wireless users. This is because I-mode uses packet based data network as compared to WAP's circuit switched network.

4) An important point in WAP's favour is the fact that it is an open standard while I-mode is still thought to be a proprietary Japanese standard

Citing these major differences, a table of all differences can be made as follows:

<u>Sr.</u>	<u>Factor of difference</u>	<u>Wireless Access Protocol</u>	<u>I-mode</u>
1	<i>Developer</i>	Developed by NTT DoCoMo, Japan	Developed (evolutionised) by WAP Forum
2	<i>Network</i>	Circuit or packet Based	Packet Based
3	<i>IP protocol used</i>	TCP/IP	WDP, WTP, WCOMP
4	<i>Markup Language</i>	Wireless markup language (WML)	CHTML (compact HTML)
5	<i>Status</i>	Open Market standard	Japanese proprietary standard
6	<i>Number of sites</i>	1,000 WML sites	More than 20,000 unofficial sites
7	<i>Number of subscribers</i>	Over 5-6 million WAP phones activated	More than 12+ million subscribers
8	<i>Type of display</i>	Monochrome	Monochrome / color LCD display
9	<i>Billing</i>	Based on time of being "online"	Based on data being transferred
10	<i>Number of accesses / day</i>	Over 10 accesses / day	Less than 1 access depending on region

The present and the future:

At present the world's wireless internet users are distributed approximately as follows:

- Japan: 20 million wireless internet users (imode and WAP)
- Korea: 2-3 million wireless internet users (WAP)
- Europe: 1-2 million wireless internet users (WAP)
- USA: 0.5 million wireless internet users (WAP and PALM)

Observing these figures, it becomes much clear that while I-mode is a *de-facto* standard in Japan it is still unable to make its mark in America and major part of Europe. The reasons are many, firstly, users have to upgrade their networks to enable packet switching and install i-mode gateways to process data requests, secondly, content providers need to i-modify their content. Thirdly, and most importantly, content providers need to be convinced on how exactly the revenue pie will be sliced.

In contrary, WAP has not lived to the expectations in so many ways nor it can compete equally with I-mode. The basic reason for this is it uses WML, which is like a filter to the HTML coded web sites and needs to be re-furbished in order to use in mobile devices. However, it is largely supported by industry across the world. Also, it does not support graphics and animations and so looses content-wise battle on cHTML.

But on the whole no comparisons can be specifically made because of the fact that both of them are in the evolving stage and each has its own merits and demerits.

It is very difficult to predict the future: who would have correctly predicted the relative development of WAP-implementations and imode 3 years ago? Future development depends on user/consumer choices, operators' choices and commercial decisions, technical limitations, and there are even health issues, which keep being raised(like SAR). Therefore unexpected developments are not to be excluded. Who would have predicted imode's success a few years ago? Of course this does not prevent intelligent guesses about the future - but they may well turn out to be wrong. A large factor impacting change will also be the introduction of broadband wireless (3G, UMTS etc)

services. These will impact the business models, the types of services offered, user acceptance, cash flow models etc.

A major school of thought that has recently developed is the convergence of these two technologies into one. Theoretically, WAP can ride over I-mode. DoCoMo and the WAP Forum are looking to bring the technologies together to allow global access to all content. According To an active member of WAP forum the convergence starts with the growing standard for wireless language, xHTML that's a mixture of HTML and WML. With the evolution of this language, it is quite possible that we can look forward for dual-mode wireless mobile phones.

Conclusion:

Observing all these points and growing demand for wireless IP-based service, the matter of WAP and I-mode's importance is a forerunner. Both schools of thought will have to decide on a common work strategy to bundle up the benefits of both the worlds.

Moreover, Problems such as limited bandwidth and latency should be dramatically reduced over the next several years, driven by the deployment of 3G wireless data technologies that should offer transmission speeds of 384 kbps to 2 mbps. As companies continue fill in holes in their networks, issues such as intermittent network coverage should be reduced. As a result, the need for WAP and i-mode transmission protocols will likely be reduced. However, given the small screen sizes, data entry issues, and limited computing power of wireless devices, I believe there will continue to be the need for a language beyond standard HTML for developing content intended for

wireless devices. And that's where cHTML or xHTML is going to play a major part in the future years. But as pointed out earlier too, the standards needs to be open rather than being proprietary. WAP or I-mode both are going to emerge in their own way, but to emerge successfully and fully advocate the mobile IP system, a hand-in-hand combination would be what is and will be required.

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