W@P

wireless application protocol

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About the Tutorial

WAP is an international standard establishing how mobile devices can access information on the Internet.

It is a widely used set of protocols used on wireless devices such as mobile phones and PDAs. This tutorial helps you in understanding WAP technology starting from its basics.

Audience

This tutorial is designed for all those individuals who are looking for a starting point of learning WAP and we cover topics suited for both a total beginner and an advanced user.

Prerequisites

Before proceeding with this tutorial, it is advisable for you to understand the basics concepts of TELECOM.

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1. WAP – INTRODUCTION

WAP is the *de facto* worldwide standard for providing Internet communications and advanced telephony services on digital mobile phones, pagers, personal digital assistants, and other wireless terminals - *WAP Forum.*

WAP stands for **W**ireless **A**pplication **P**rotocol. The dictionary definition of these terms are as follows:

- **Wireless:** Lacking or not requiring wires for radio transmission.
- **Application:** A computer program or piece of computer software that is designed to do a specific task.
- **Protocol:** A set of technical rules about how information should be transmitted and received using computers.

WAP is the set of rules governing the transmission and reception of data by computer applications on or via wireless devices like mobile phones. WAP allows wireless devices to view specifically designed pages from the Internet using only plain text and very simple black-and-white pictures.

WAP is a standardized technology for cross-platform, distributed computing very similar to the Internet's combination of Hypertext Markup Language (HTML) and Hypertext Transfer Protocol (HTTP), except that it is optimized for:

- Low-display capability
- Low-memory
- Low-bandwidth devices, such as personal digital assistants (PDAs), wireless phones, and pagers

WAP is designed to scale across a broad range of wireless networks like GSM, IS-95, IS-136, and PDC.

Who is behind WAP?

The Wireless Application Protocol (WAP) is a result of joint efforts taken by companies teaming up in an industry group called WAP Forum (**www.wapforum.org**).

On June 26, 1997, Ericsson, Motorola, Nokia, and Unwired Planet took the initiative to start a rapid creation of a standard for making advanced services within the wireless domain a reality. In December 1997, WAP Forum was formally created and after the release of the WAP 1.0 specifications in April 1998, WAP Forum membership was opened to all.

The WAP Forum now has over 500 members and represents over 95 percent of the global handset market. Companies such as Nokia, Motorola, and Ericsson are the members of the forum.

The objective of the forum is to create a license-free standard that brings information and telephony services to wireless devices.

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Why is WAP Important?

Until the first WAP devices emerged, the Internet was an Internet and a mobile phone was a mobile phone. You could surf the internet, do serious research, or be entertained on the Internet using your computer, but this was limited to the computer only.

Now with the appearance of WAP, the scene is that we have the massive information, communication, and data resources of the Internet becoming more easily available to anyone with a mobile phone or communications device.

Because of being open and secure, WAP is well suited for many different applications including stock market information, weather forecasts, enterprise data, games, and many more.

Despite the common misconception, developing WAP applications requires only a few modifications to existing web applications. The current set of web application development tools will easily support WAP development. Further, in the coming years, more development tools will be announced.

WAP Microbrowser

To browse a standard internet website, you need a web browser. Similarly, to browse a WAP enabled website, you would need a micro browser. A Micro Browser is a small piece of software that makes minimal demands on hardware, memory, and CPU. It can display information written in a restricted mark-up language called **WML**. Although, tiny in memory footprint, it supports many features and is even scriptable.

Today, all the WAP enabled mobile phones or PDAs are equipped with these micro browsers so that you can take full advantage of WAP technology.

2. WAP – KEY FEATURES

Here, in this chapter, we have listed a few key features offered by WAP:

A Programming Model Similar to the Internet's

Though WAP is a new technology, but it reuses the concepts found on the Internet. This reuse enables a quick introduction of WAP-based services as both the service developers and the manufacturers are familiar with these concepts today.

Wireless Markup Language (WML)

You must be using HTML language to develop your web-based application. Same way, WML is a markup language used for authoring WAP services, fulfilling the same purpose as HTML does on the Web. In contrast to HTML, WML is designed to fit into the small handheld devices.

WMLScript

Once again, you must be using Java Script or VB script to enhance the functionality of your web applications. Same way, WMLScript can be used to enhance the functionality of a service, just as Java script can be utilized in HTML. It makes possible to add a procedural logic and computational functions to WAP based services.

Wireless Telephony Application Interface (WTAI)

The WTAI is an application framework for telephony services. WTAI user agents are able to make calls and edit the phone book by calling special WMLScript functions or by accessing special URLs. If one writes WML decks containing names of people and their phone numbers, you may add them to your phone book or call them right away just by clicking the appropriate hyperlink on the screen.

Optimized Protocol Stack

The protocols used in WAP are based on well-known Internet protocols, such as **HTTP** and **Transmission Control Protocol** (TCP), but they have been optimized to address the constraints of a wireless environment, such as low bandwidth and high latency.

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3. WAP – THE MODEL

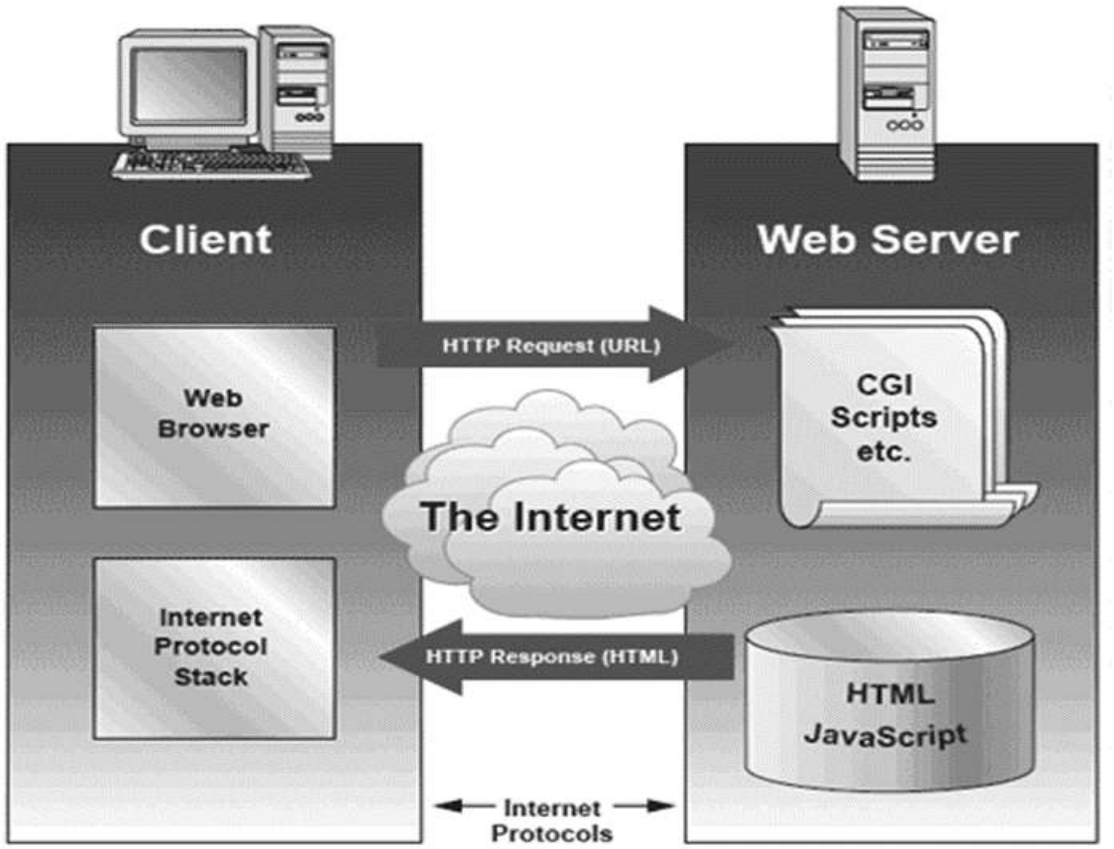
Before we describe WAP model, first we would like you to understand how a Standard Internet works.

The Internet Model

The Internet model makes it possible for a client to reach services on a large number of origin servers, each addressed by a **unique Uniform Resource Locator** (URL).

The content stored on the servers is of various formats, but HTML is the predominant. HTML provides the content developer with a means to describe the appearance of a service in a flat document structure. If more advanced features like procedural logic are needed, then scripting languages such as JavaScript or VB Script may be utilized.

The figure below shows how a WWW client requests a resource stored on a web server. On the Internet standard communication protocols, like HTTP and Transmission Control Protocol/Internet Protocol (TCP/IP) are used.



The content available at the web server may be static or dynamic. Static content is produced once and not changed or updated very often; for example, a company presentation. Dynamic content is needed when the information provided by the service provider changes more often; for example, timetables, news, stock quotes, and account

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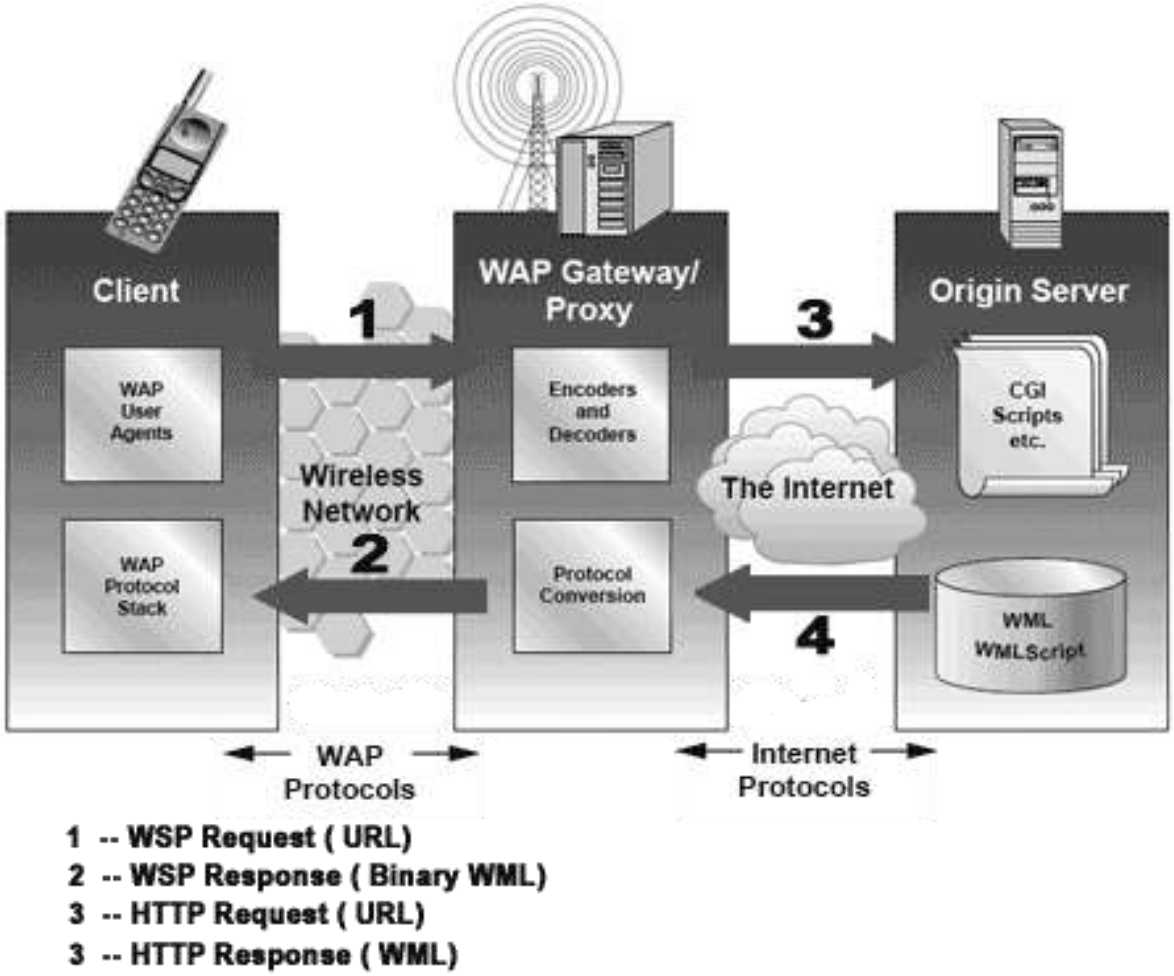
information. Technologies such as Active Server Pages (ASP), Common Gateway Interface (CGI), and Servlets allow content to be generated dynamically.

The WAP Model

The figure below shows the WAP programming model. It is quite similar to the Internet model. Without the WAP Gateway/Proxy, the two models would have been practically identical.



WAP Gateway/Proxy is the entity that connects the wireless domain with the Internet. You should make a note that the request that is sent from the wireless client to the WAP Gateway/Proxy uses the Wireless Session Protocol (WSP). In its essence, WSP is a binary version of HTTP.

A **markup language** - the Wireless Markup Language (WML) has been adapted to develop the optimized WAP applications. In order to save valuable bandwidth in the wireless network, WML can be encoded into a compact binary format. Encoding WML is one of the tasks performed by the WAP Gateway/Proxy.

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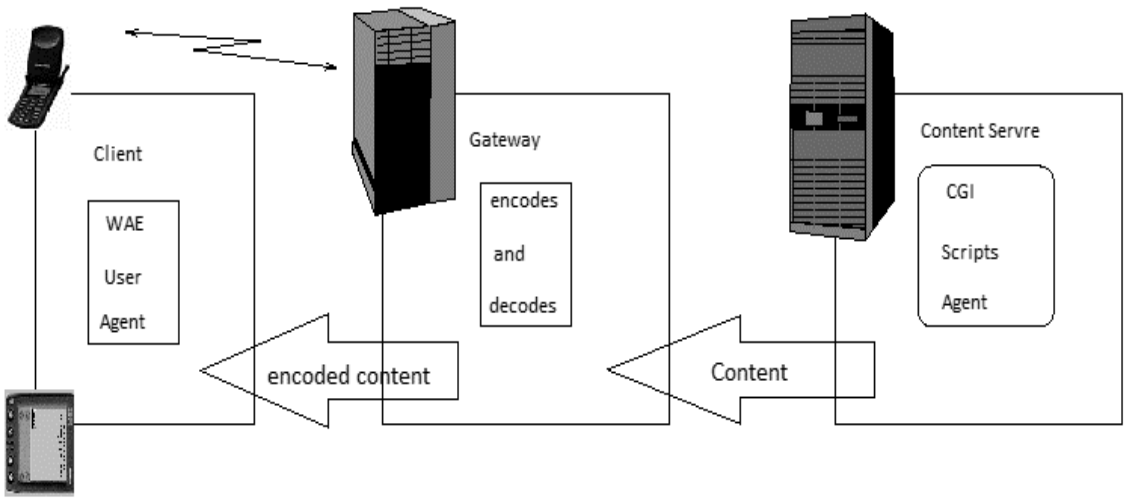
How WAP Model Works?

When it comes to actual use, WAP works as follows:

- The users select an option on their mobile devices, which have a URL with Wireless Markup language (WML) content assigned to it.
- The phone sends the URL request via the phone network to a WAP gateway using the binary encoded WAP protocol.
- The gateway translates this WAP request into a conventional HTTP request for the specified URL and places it on to the Internet.
- The appropriate Web server picks up the HTTP request.
- The server processes the request just as it would any other request. If the URL refers to a static WML file, the server delivers it. If a CGI script is requested, it is processed and the content returned as usual.
- The Web server adds the HTTP header to the WML content and returns it to the gateway.
- The WAP gateway compiles the WML into binary form (as shown in the image given below).
- The gateway then sends the WML response back to the phone.
- The phone receives the WML via the WAP protocol.
- The micro-browser processes the WML and displays the content on the screen.



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