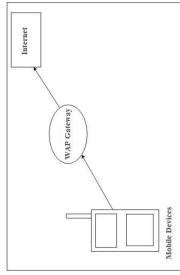


What is WAP?

WAP is a protocol that is introduced in 1999, which stands for Wireless application protocol. It offers Internet communications over wireless devices, such as mobile phones. In the early 2000s, it accomplished some popularity and was mainly superseded by more recent standards by the 2010s. Also, it offers a way of creating web applications for mobile devices, and it is designed for micro-browsers.

Most of the wireless networks are supported by WAP, as well as TDMA, CDMA, and GSM. Also, all operating systems can support a wireless application protocol. It enables access to the internet in mobile devices and uses the mark-up language like WML, which stands for Wireless Markup Language that is referred to as XML 1.0 application. WAP offers the facility to connect interactive wireless devices (like mobile phones) to the internet and enhances wireless specification interoperability.



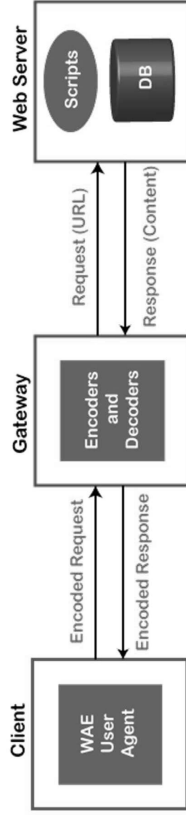
WAP may be created on any kind of operating system, and it acts in an open application environment. It is more beneficial for mobile users as it has the ability to deliver electronic information efficiently. In 1998, Nokia, Motorola, Ericson, and Unwired Planet founded the WAP Forum, whose objective was to standardize several wireless technologies with the help of protocols.

The WAP CSS (cascading style sheet) makes capable of developers to format screen sizes in order to mobile device adaptability. When the WAP CSS content is used, then reformatting is not required. It controls page layout compatibility with different mobile device's display screens.

The transport layer handles the physical network issues, by which wireless gateways can be easily accessed by global wireless operations. A WAP gateway is a server, which provides the facility to access the wireless network. The WAP Forum offers specification development, WAP tool testing and also provides support for all mobile services. Now, the WAP Forum is referred to as the Open Mobile Alliance.

WAP Model

In the mobile device, the user opens the web browser and access the website and visit webpages accordingly. The mobile device forwards the URL request to a WAP gateway through the network using the WAP protocol. Then, the WAP gateway refers to this request over the internet after translating it into a conventional HTTP request. The specified Web server accepts the request and processes the request. Then, it returns the response to the mobile device in the WML file through the WAP gateway that will be displayed in the web browser on the device.



WAP Protocol stack



1. Application Layer (WAE)

The Wireless Application Environment contains content development programming languages like WML and mobile device specifications. It functions much like a JavaScript and holds the tools that wireless Internet content developers use. It includes scripting languages such as WML and WMLScript that are used in conjunction with WML.

2. Session Layer (WSP)

It determines the session will be connection-oriented or connectionless between the device and the network and offers a reconnection and fast connection suspension. The data is passed both ways between the network and the device in the connection-oriented session. Then, WSP forwards the packet to the next layer WTP (Wireless Transaction Protocol). When the information is being streamed or broadcast from the network to the device, commonly, the connectionless session is used. Then, WSP forwards the packet to the WDP (Wireless Datagram Protocol) layer.

3. Transaction Layer (WTP)

The Wireless Transaction Protocol offers transaction support. It is a part of TCP/IP and runs on top of UDP, which stands for User Datagram Protocol.

4. Security Layer (WTLS)

The Wireless Transport Layer Security provides security in terms of data integrity, privacy and authentication that help to save your data. It also has the ability to work like Transport Layer Security. Also, it contains security features that have Transport Layer Security.

5. Transport Layer (WDP)

With the network carrier layer, the Wireless Datagram Protocol functions in conjunction and presents a constant data format to higher layers of WAP protocol stack.

Components of WAP

There are three major components of the WAP, which are as follows:

1. Protocol Support

- **IP networks:** Protocols supported contains the HTTP (known as WP-HTTP), TLS, and the wireless "profiled" versions of TCP (known as WP-TCP).
- **Non-IP networks:** It includes four layers: Wireless Transport Layer Security, Wireless Datagram Protocol, Wireless Session Protocol, and Wireless Transaction Protocol.

2. Application Environment

- **WML Specification:** WML stands for Wireless Markup Language, based on XML and XHTML.
- **WMLScript Specification:** A scripting language that is used for running code on clients.
- **WAP Micro Browser:** Especially, it is designed to control the WAP device. WAP devices make capable of operating in a limited resource environment with the help of a WAP micro-browser.

3. Services and Capabilities

- **Customization of User Profile:** On the basis of client device capabilities and user preferences, WAP enables servers to customize content delivered to users.
- **Telephony Support:** Wireless application protocol allows telephone services to be operated from within a data environment. As a result, WAP phones can function as web devices and integrated voice.

Advantages of WAP

There are various advantages using WAP: such are as follows:

Portability

The primary use of WAP is to write applications using proprietary protocols. When you are porting applications to a different kind of network, it will need substantial code rewriting. For example, a different type of networks like GSM and CDMA, and bearer protocol like CSD (circuit-switched data) or SMS (short message service).

User Experience

- The devices with limited processing power, small screens, limited memory, and limited battery.
- Provide a narrow bandwidth connection.

Cost and Application Development Time Reduction

WAP helps to add new services at a lower cost and quickly. It could be done by the WAP tools and platforms like WAP devices, WAP gateways, and WAP software development tool kits.

Some of the other advantages of WAP are:

- No hardware obsolescence
- Real-time send/receive data
- Most modern mobile telephone devices support WAP
- Implementation near to the Internet model
- Time-saving
- Increased sales for devices, infrastructure & gateway manufacturer.
- Personalized

Disadvantages of WAP

- Not very familiar to the users
- The third party is included
- The business model is expensive
- Low speeds, security, and very small user interface

- Small display screens
- Limited bandwidth
- Speed of access and limited availability

Applications for WAP

Corporate Applications: The WAP has used incorporation applications where salespeople want to use their WAP for allowing direct access to the latest pricing, handsets to get instant, competitive information any time, latest news.

Mobile Banking: It is used in the banking sector for different purposes, such as provide details of user account balance, last four transactions, overdraft limits and so on. The elements such as WAP, private information services, security and various different other elements are included in it. Additionally, it has numerous ways to provide Users' information. On the other hand, the user can get information by sending a request via message, or the service can be push-based, which means it can be automatically generated on the basis of events or set intervals.

All mobile phones are able to run mobile banking services, or services can be tailored for a protocol-compliant phone or particular branded phone, e.g., WAP. Furthermore, the WAP is not only beneficial for information provision, but it can also secure electronic commerce and mobile transactions.

Games: Games are a huge service that is most widely used by people in terms of applications or software in mobile devices. Similarly, as music distribution will increase electronically, games will also increase. You can download games or videos from an internet site rather than go to a video store to rent a game or video.

Mobile Commerce: It is required to use a mobile phone for transactions in mobile commerce applications. Usually, it means transferring funds electronically or making a payment for goods. Electronic commerce applications offer services for transferring money between accounts and paying the amount for purchasing something.

Ringtones: It is another emerging service to download ringtones. When someone calls on the phone, it plays tunes. The phone users can change their phone ringtone to make different it from others. Usually, phones come with different inbuilt ringtones into its internal memory, which users can select from them to set on the phone ringtone. However, in modern times, it is more common to download the ringtones from an internet site to the phone. Additionally, there are also many ringtone composers available that help users to compose their own unique ringtones according to their requirements.

Unified Messaging: It is an emerging value-added network service that elevates communication above the technology used to communicate. People get different kinds of messages that are difficult to manage. For accessing different types of messaging, unified messaging offers users a single interface. Typically, it helps to notify people when they get a new message with the help of alerting them through a unified messaging box. The short message commonly includes an indication to specify the new message. Furthermore, with WAP, users can access and manage their unified messaging box accordingly.

Positioning: The meaning of positioning in terms of mobile context can include several things: the location of phones or vehicles or people. The GPS (Global Positioning System) is a global network of 24 satellites. A receiver with GPS can get their satellite position and find out the location. The SMS is standard for sending GPS information like latitude, longitude, bearing, and latitude. Generally, the length of GPS information is around 60 characters, which can leave room for other vehicle-specific information.

Qualitative Information:

The different variety of content can be delivered to mobile phone users, such as share prices, flight information, lottery results, sports scores, weather, jokes, news headlines, and more. This information may be in the form of any kind of visual information, graphs or maps.

History of WAP

In 1988, Nokia, Ericsson, Unwired Planet, and Motorola founded the WAP Forum. To collect together the several wireless technologies in a standardized protocol was the main objective to develop the WAP (Wireless application protocol).

Europe

When the WAP is introduced, it was hyped by Marketers. BT Cellnet, a UK telecom that ran an advertising campaign, in which with the help of a Neuromancer like information space, a cartoon WAP user was browsed.

Between 2003 and 2004, when the wireless services, such as T-Mobile T-Zones, Vodafone Live! and other easily accessible services, were introduced, the WAP made a stronger resurgence. By transferring of UMTS and GPRS, operator revenues were generated that is a different business model as compared to use by the traditional ISPs and Web sites.

The use of WAP had largely disappeared until 2013. The use of WAP has been retired by most of the major websites and companies, and for many years, it is not conventional technology for the web on mobile phones. Now, the latest mobile phone internet browsers are designed in such a way; they are capable of supporting HTML, CSS, and JavaScript. Also, for webpage compatibility, modern handsets avoid the need for using any type of WAP markup. The handsets that support HTML are widespread, such as all versions of the iPhone, Android handsets, all Windows Phone, many Nokia handsets, and all BlackBerry devices.

Asia

In Japan, the WAP got major success; even it was not used by the largest operator NTT DoCoMo, successfully deployed by SoftBank Mobile and rival operators KDDI (au). Especially the services based on WAP are Java (J2CL), J-Phone's Sha-Mail picture mail services, as well as (au)'s chakumovie. In 2010, WAP and i-mode usage declined like Europe, as the smartphones that HTML capable become popular in Japan.

USA

In the US, the adoption of WAP was suffered as many cell phones required extra fees for data support and separate activation. There was also a reason for suffering from adopting the WAP in the US; telecommunications companies demanded limiting data access to only approved data providers. On 31 July 2007, With the related to the problem, the FCC (Federal Communications Commission) issued an order. The third-party application developers, device manufacturers, and others can use any application or device while operating on this particular licensed network band.

What is WAP 2.0?

The WAP forum 2.0 version was introduced in 2002 that helps to enhance the wireless user experience, and uses a cut-down version of XHTML with end-to-end HTTP and carries the wireless world closer to the internet with a suite of specifications. It offers support for protocols like HTTP, TCP, and IP that provide an environment, which allows wireless devices to use present internet technologies. Additionally, it is configured by the operator and can include billing information, telephone numbers, location, and other handset information. It includes various features; such are as follows:

- It enhances of WAP Push functionality.
- For describing the device capabilities, it provides a user agent profile.
- Furthermore, it also offers an external functionality interface for supporting external plug-in, such as functionality in micro browsers.

What is WAP Gateway

The Wireless Application Protocol (WAP) gateway is a software system that decodes and encodes requests and responses between the smartphone micro browsers and the internet. A request for accessing a website is sent via a WAP gateway as it provides security. It helps devices that are WAP-enabled wireless to communicate to applications and internet Web sites. You need a WAP gateway service if you want to access internet resources from a WAP-enabled wireless device. WML (Wireless Markup Language) helps to deliver web pages in a special format, which is compiled and forwarded through the WAP gateway.

The WAP gateway typically is a server that functions as an intermediary in an access request. The HTTP requests for a web site to the server, the server gets data from the requested website. Then, convert it into an encrypted form that displays on the client browser.

WAP browser

A WAP browser enables mobile devices to access compatible web pages. A large number of internet protocols can be used by the mini browser to convert web pages into plain text. Usually, in terms of a WAP browser effectiveness, web developers create separate WAP web pages for mobile devices. The web content generally takes longer to load without WAP optimization, also may not translate the content correctly in order to mobile devices.

Advanced internet languages like extensible hypertext markup language (XHTML) and compact hypertext markup language (CHTML) are also supported by the WAP browsers today. It has made it possible for newer mobile devices to support advanced internet languages with the WAP browser to translate popular XHTML media elements. Older types of mobile devices that contain small display screens still use the WAP browser to translate web pages. Even modern mobile devices can handle displaying web pages in their entirety as they are increasingly powerful.

What is WML?

Wireless markup language (WML) is a markup language that is based on HTML and HDML. The HTML (Hypertext markup language) translates content for desktop browsers, but WML translates for wireless devices that are not capable of processing capabilities. For mobile phones, it is used to develop websites and is specified as an XML document type. While designing websites with a wireless markup language, limitations of wireless devices such as limited memory, small display screens, small resources and low bandwidth of transmission have to be considered. The sites designed with WAP are different from normal HTML sites, as they are monochromatic (only black and white) and have very small space for display screen.

Features of WML

- **User Interaction:** It offers simple ways to communicate with users, as users are free to choose inputs such as keys or voice; because it has the ability to support several types of input like text entry control, password entry, and option selector.
- **Text and Images:** WML describes a way for presenting the images and text to the user. The images will be monochrome and need to be in WBMP format.
- **Navigation:** WML provides browsing history and hyperlink navigation.
- **Context Management:** This state can be saved between different decks. It includes some key features as compared to HTML, which is given below:
 - The variables cannot be stored in HTML, but variables can be defined in WML that holds data in string format.
 - HTML is a markup language for desktop, but WML is for small, wireless computing devices.
 - The image format supported by WML is WBMP, and HTML supports, GIF and JPEG, BMP.
 - HTML is not case sensitive, and WML follows XHTML specification; hence, it is case sensitive.