Chapter 2

BACKGROUND STUDY

2.1 Introduction
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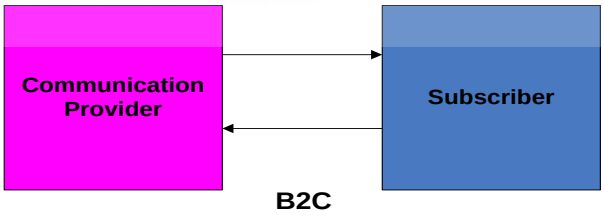
2.1 Introduction

The Wireless Application Protocol (WAP) has become the standard for communication between server applications and its clients. WAP can be explained as a set of protocols, which allow data exchange for mobile cellular systems and is the current world standard for the presentation and delivery of wireless information. Further, it is device and network independent.

[Betty and the GeEks Presentation on Wireless Communication]

One of the main applications of WAP is for B2C information exchange.



WAP is used as a standardized method so that a cellular phone can talk to a server among the cellular network that it belongs to. WAP technology not bound only to the services offered by the cellular networks. It has become the link of the Internet to the Mobile World, bride a gap between two of the top industries of the world.

2.2 WAP architecture

WAP also follows a model similar to the Internet. The Internet itself has a layered protocol stack. The portable device using WAP has a browser software that connects to WAP Gateway and sends requests to receive data from web servers. Data could be

a web page or an email. The content is then sent back to the portable device, and depending on the capability of the portable device to receive and view data, the data is received and viewable. An overview of the WAP architecture is depicted in Figure 2.1.

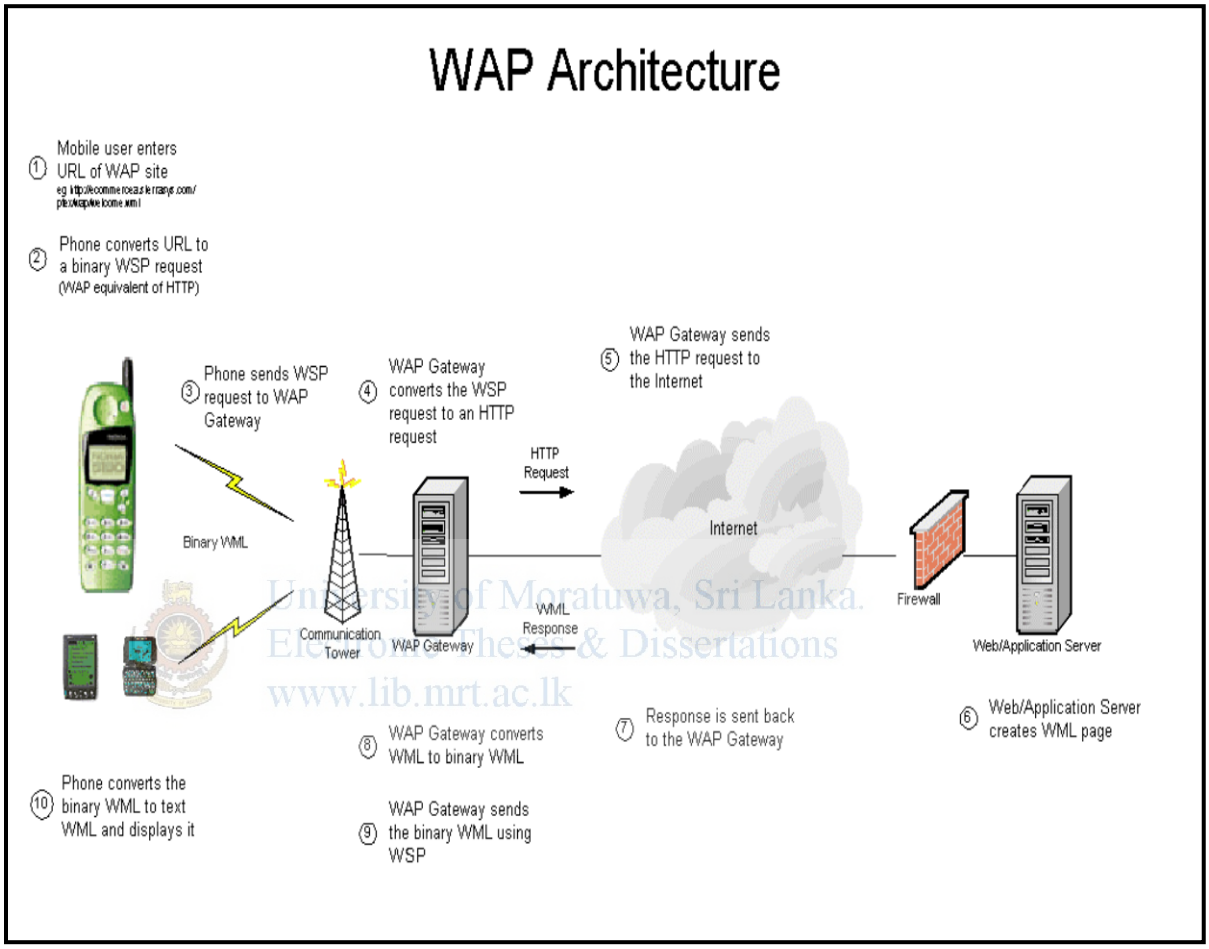


Figure 2.1 – WAP Architecture

[Ref: Pic: Keerti Sharma-August (2002), www.wapforum.org]

Early adapters of WAP include Ericsson, Nokia, Motorola, and Phone.Com (formerly Unwired Planet). In December 1997, these three large companies, all with strong influence on the Mobile market, formed the WAP Forum, an organization with open membership and now with over 300 members worldwide. The purpose of this forum is to make sure that the specifications of WAP do not go astray.

[Ref: www.wapforum.org]

Basic specifications of WAP include micro browsing, scripting, wireless telephone applications, and a layered protocol stack.

To create wireless Internet content, a Web site creates special text only or low graphics version of the site. A Web server sends the data in HTTP form to a WAP gateway. This system includes the WAP encoder, script compiler, and protocol adapters to convert the HTTP information to WML. The gateway then sends the converted data to the WAP client on wireless device.

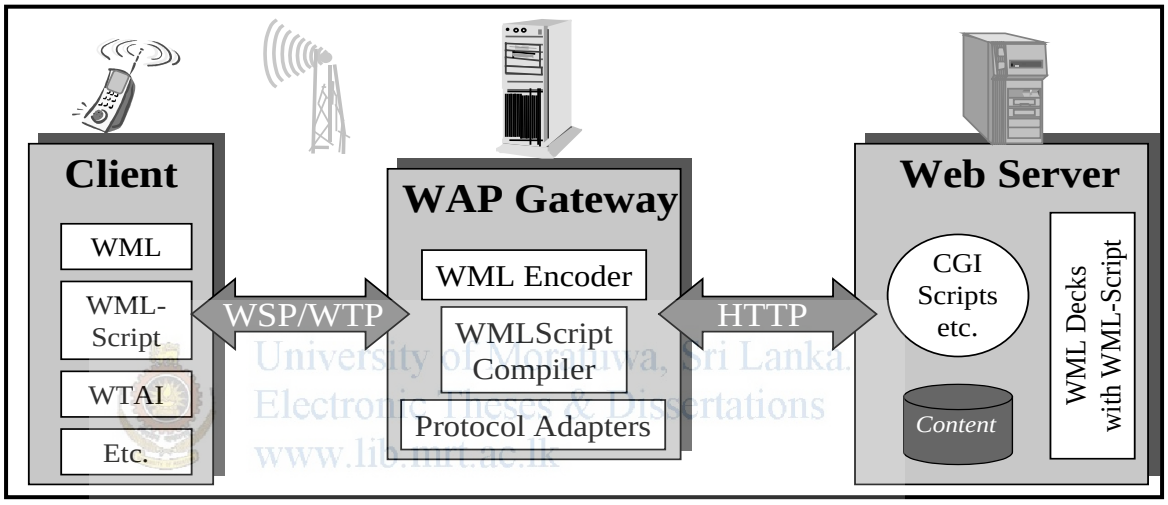


Figure 2.2 – Inside WAP

The World Wide Web model follows a three-layer protocol. Referring to figure 2.2 diagram, the WAP model follows the World Wide Web model in that there is a Web Server, a Client, and a Gateway. The main web server is where one would find and server side functions. The Web Server also holds content that Clients will want to view.

2.3 WAP Layers

Wireless Application Protocol consists of several layers. The following figure 2.3 will give an indication about the layers of WAP and the description of each layer.

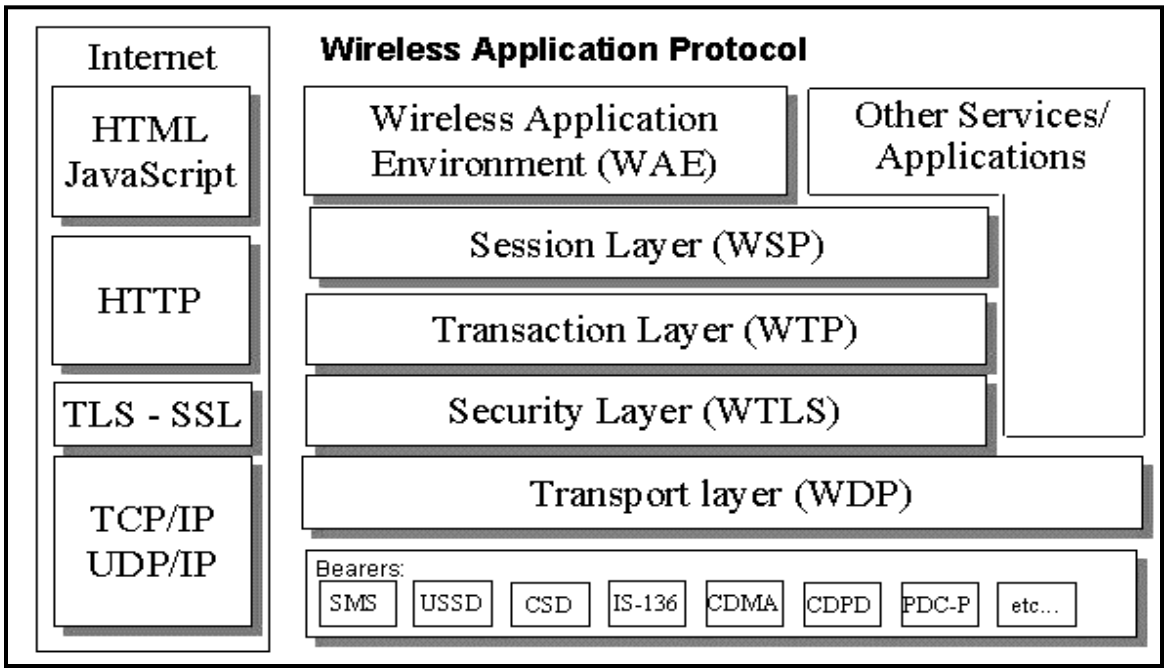


Figure 2.3 –WAP Layers (Keerti Sharma-August (2002))

WAE - Wireless Application Environment

WAE holds the tools that wireless Internet content developers use. WAE is the uppermost layer in the WAP1 (WAP1 enables mobile users with wireless devices to easily access and interact with information services) software stack, this layer provides basic components on which ASPs can develop their mobile applications.

WSP - Wireless Session Protocol

This determines whether a session between the device and the network will be connection-oriented or connectionless and provides the application layer of WAP with a consistent interface for two session services. A connection-oriented service that operates above the transaction layer protocol WTP and a connectionless service that operates above a secure or non-secure datagram service (WDP).

WTP - Wireless Transaction Protocol

Acts like a traffic cop, keeping the data flowing in a logical and smooth manner. It also determines how to classify each transaction request: Reliable two ways (WTP/C), Reliable one way (WTP/T) and Unreliable one way (WTP/D).

WTLS - Wireless Transport Layer Security

A security protocol based upon the industry-standard Transport Layer Security (TLS) protocol, formerly known as Secure Sockets Layer (SSL). WTLS is intended for use with the WAP transport protocols and has been optimized for use over narrow-band communication channels.

WDP - Wireless Datagram Protocol

WDP is the Transport layer protocol in the WAP architecture. WAP provides a common interface to the Security, Session, and Application layers. This allows upper layers to function independently of the underlying wireless network. This is the key to global interoperability

[Ref: http://computer.howstuffworks.com/wireless-internet.htm , http://en.wikipedia.org/wiki/WAP, http://www.wapforum.org, http://www.tml.tkk.fi/Studies/Tik-110.300/1998/Essays/wap_2.html]

What is a WAP Gateway?

A WAP Gateway is a server through which all wireless (WAP) data is transferred from wireless devices (using WAP requests) to content sites (in WML format) and back again. A WAP Gateway is a server that typically resides within the wireless carrier's network but may also reside within a corporate business environment.

WAP gives mobile phone users access to Internet or web services through handheld devices. WAP Gateway technology provides a solution to the growing demand for wireless mobile services across the world. WAP Gateways act as a bridge between the mobile world and the Internet and offers WAP services like encoding of WML pages, end-user authentication system, & WML script compiling.

WAP uses the underlying web structure to enable communication between content providers and mobile devices. This wireless protocol employs Wireless Mark-up Language (WML) for application contents instead of Hypertext Mark-up Language coding (HTML).

What is WML? (Wireless Mark-up Language)

WML stands for Wireless Mark-up Language. It is a mark-up language inherited from HTML, but WML is based on XML, so it is much stricter than HTML.WML is used to create pages that can be displayed in a WAP browser. WML pages are called DECKS. They are constructed as a set of CARDS, related to each other with links. When a WML page is accessed from a mobile phone, all the cards in the page are downloaded from the WAP server. The phone computer -inside the phone - does navigation between the cards without any extra access trips to the server.

[Ref: http://en.wikipedia.org/wiki/Wireless_Markup_Language, http://xml.coverpages.org/wap-wml.html]

2.4 Advantages of WAP

- WAP handles limited bandwidth
  - Minimizes traffic over wireless interface
  - WSP layer, too, is binary encoded
  - WTP is not only designed to minimize amount of data transferred but also the number of transactions

- WAP handles high latency
  - WAE uses scripting to avoid round trip delays, e.g. by validating user input locally
  - WTAI environment introduces a repository to hold services that should be started in response to an event in mobile network, e.g. incoming call.

- WAP handles less stable connections
  - The sessions supported by WSP are assumed to be long-lived.
  - WTP layer has been kept very simple compared to TCP

- WAP handles small displays
  - WML structures its documents in ‘Decks & Cards’

- When an application is executed, user navigates through a series of cards

2.5 Technical Challenges of WAP

Wireless technology also has its drawbacks. With WAP, several problems may have to be addressed during its development:

- Since WAP is designed for portable devices, important details such as dealing with small screen sizes (a Palm Pilot or mobile phone) very important. A small screen size does not allow high resolution or high pixel images to be seen clearly.
- Because WAP is designed for portable devices, there is limited device memory restricting the amount of data that can be stored.
- WAP allows two devices to communicate only, and data transfers are usually done with GPRS connection.
- WAP also works on devices that have limited bandwidth.
- There are no "cookies" available to hold the session together.

Some WAP applications

- Location-based services
    - Real-time traffic reporting
    - Event/restaurant recommendation
    - Highly customized ads
    - Instant messaging-type "buddy" location
- Enterprise solutions
    - Email access
    - Database access
    - A "global intranet"
    - Information updates "pushed" to WAP devices
- Financial services
    - Banking
    - Bill-paying
    - Stock trading

        - Funds transfers

- Travel services
    - Schedules and rescheduling
    - Reservations

Some known WAP Services

- www.google.com
    - WAP browser's dream. Search engine, plus web pages over WAP.
- Wap.tfl.gov.uk
    - Current problems with London Transport, tubes, buses.
- www.ayg.com
    - Great WAP portal with loads of links.
- Wap.ananova.com
    - Pick your subjects and create your own news page.
- Wap.bt.com/wap/dq/dqws.jsp
    - BT Directory Enquiries

Chapter Summary

This chapter presented the WAP as a powerful tool in next few decades and the underlying structure of it. MLL will no different and non-existence of such system provided an opportunity to implement language learner to address a real world problem. Next chapter will discuss the problem domain and the analysis.