WAP – Wireless Application Protocol

Learning Objectives

- ➢ Introduction
- ➢ Evolution of WAP
- ➢ Components of WAP
- ➢ Architecture of WAP
- ➢ WAP Gateway
- ➢ Application of WAP
- ➢ Challenges of WAP
- ➢ Summary

I: Introduction

We are moving towards an open, global world where Internet becomes the part of our environment. People are looking towards mobile devices using Internet efficiently and effectively to share any information. WAP is designed to allow mobile users to access and communicate with internet.

The wireless industry created specification to standardize the way of using Internet on mobile devices. It is an application communication protocol. It is derived from Internet Standards. It enables the programmer to create the web applications for mobile devices. It is meant for micro browsers.WAP uses WML (Wireless Markup Language). WML is defined as an XML 1.0 application. Figure 1 shows the interface between internet and mobile devices.
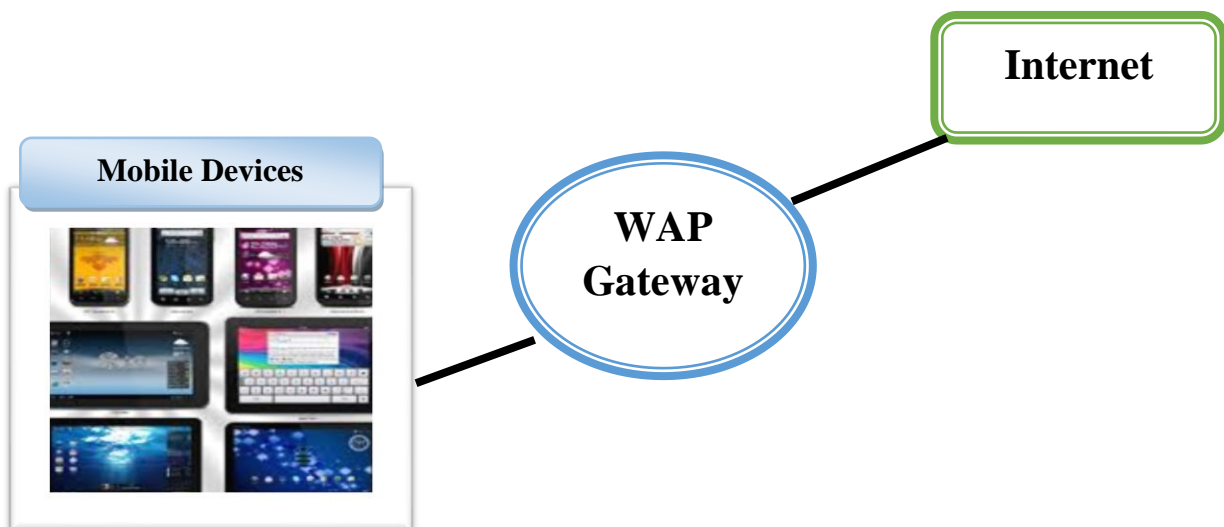
Figure 1: Interface between Mobile devices and Internet

II   Evolution of WAP

NTT(Nippon Telegraph and Telephone corporation) a Japan based company developed a language cHTML(Compant Hyper Text Markup Language) and a gateway to connect mobile devices in 1992.

USA based company Unwired planet developed HDML (Handheld Device Markup Language) in 1994 and then in 1995 come up with HDTP (Handheld Device Transport Protocol).

ITTP (Intelligent Terminal Transfer Protocol) developed by Ericsson in 1995. In 1997 Nokia came with TTML (Tagged Text Markup Language), after that Nokia came with NBS(narrowband Socket) to support wireless messages.

WAP was released in 1998 with WAP 1.0, though different version of WAP has been released in market WAP 1.1, WAP1.2, WAP 1.2.1 etc. WAP standards are maintained by WAP forum. It was founded in 1997 by Nokia, Motorola and Openwave.

III: Components of WAP

1)   Browser – It has Micro browser because it is meant for handheld devices. These browsers are similar to existing web browsers.

2)   Markup language – As web browser is having HTML, similar to that for mobile devices Markup language is used.

3)   Script language-Mobile devices also need scripting language to get instructions similar to JavaScript.

4)   Gateway – It facilitate the transition from wireless to wired world.

5)   Server - There are WAP sever, Origin server and WTA server. Server is required to support services to wireless devices, it is similar to web servers.

6)   Protocol layers – As OSI model and TCP/IP model is used for network, similarly wireless devices are also requiring Transport layer, security layer, session layer etc.

7)   Telephony application interface – This interface enables access to telephony functions.

IV: Architecture of WAP

The WAP architecture is somewhat similar to OSI model, having different protocol stack. The architecture of WAP is illustrated in Figure 2. The protocol stack of WAP consists of following layers:

➢ Wireless Application Environment(WAE)

- ➢ Wireless Session Protocol(WSP)
- ➢ Wireless Transaction Protocol(WTP)
- ➢ Wireless Transport Layer Security(WTLS)
- ➢ Wireless Datagram Protocol(WDP)
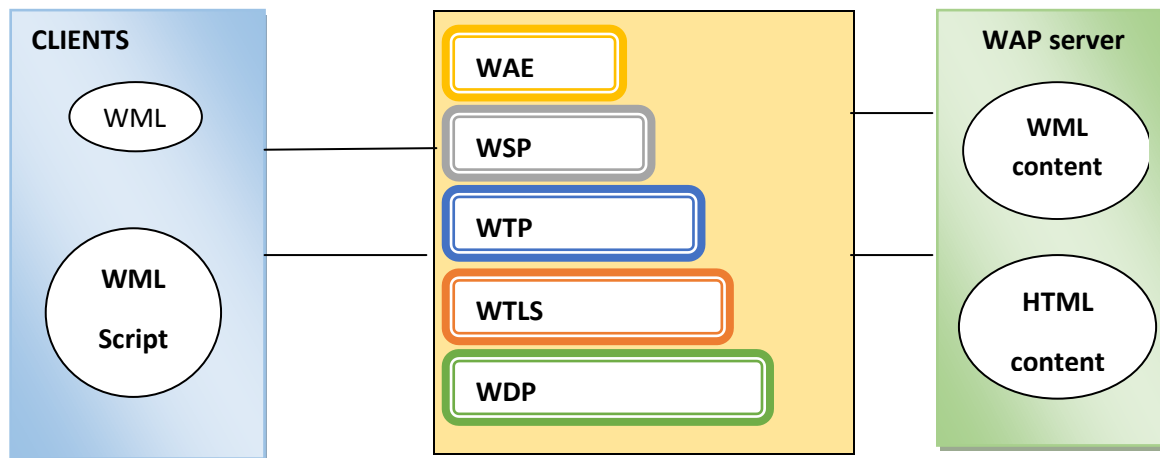
Figure 2: WAP Architecture

A: Wireless Application Environment (WAE)

It is a generic application environment which is combination of WWW and mobile telephony technologies. It describes the user interface on the phone. It contains WML and WTA (Wireless Telephony Application). The main objective of WAE is interoperable environment.

WAE includes a micro-browser server environment which provides

- ❖ WML
- ❖ WML script
- ❖ WTA
- ❖ Content formats

B: Wireless Session Protocol (WSP)

This layer provides a lightweight session layer to allow efficient exchange of data between applications. Application layer gives a consistent interface for two session services such as:

- ❖ Connection-oriented service that operates above the transaction layer protocol
- ❖ Connectionless service that operates above a secure or non-secure datagram service
- ❖ Optimized for low-bandwidth bearer networks with long latency

C: Wireless Transaction Protocol (WTP)

This layer offers transaction support, adding reliability to the datagram service provided by WDP. It is a light weight transaction oriented protocol.

Three classes of transaction services

- ❖ Unreliable one-way requests

- ❖ Reliable one-way requests

- ❖ Reliable two-way request-reply transactions

D: Wireless Transport Layer Security (WTLS)

This layer is based on industry oriented Transport Layer Security (TLS) protocol. It optimizes the use over narrow-band communication channels.

Features of WTLS:

- ❖ Data integrity

- ❖ Privacy

- ❖ Authentication

- ❖ Denial-of-service protection

E: Wireless Datagram Protocol (WDP)

It is the transport layer that sends and receives messages via any available bearer network, including SMS, USSD, CSD, CDPD and GPRS. It operates above the data capable bearer services supported by various network types. It provides a common interface to the upper layer protocols and hence they function independent of the underlying wireless network.

V: WAP Gateway

It acts as a middleware, which is used for encoding and decoding between cellular devices and the web server. It located telecom network or Internet Service Provider. The WAP gateway structure is depicted in Figure 3.

Main functions of the Gateway are as under

- ➢ Implement the WAP protocol stack
- ➢ Transfer of Protocol between mobile phone and server
- ➢ User authentication
- ➢ Compress WML pages

The HTTP interface consists of WAP content which is combination WML and WML Script. It captures the usage data for billing. It allows the best usage of bandwidth by allowing small packet transfer.

The SSL(Secure Service Layer) establish the service link between web server and browser and maintain its security. It is a Security Standard.

TCP(Transmission Control Protocol) is the protocol for Internet. It is connection oriented protocol. It decide the divide the data into packet for efficient transmission on network. It is used with IP(Internet Protocol).
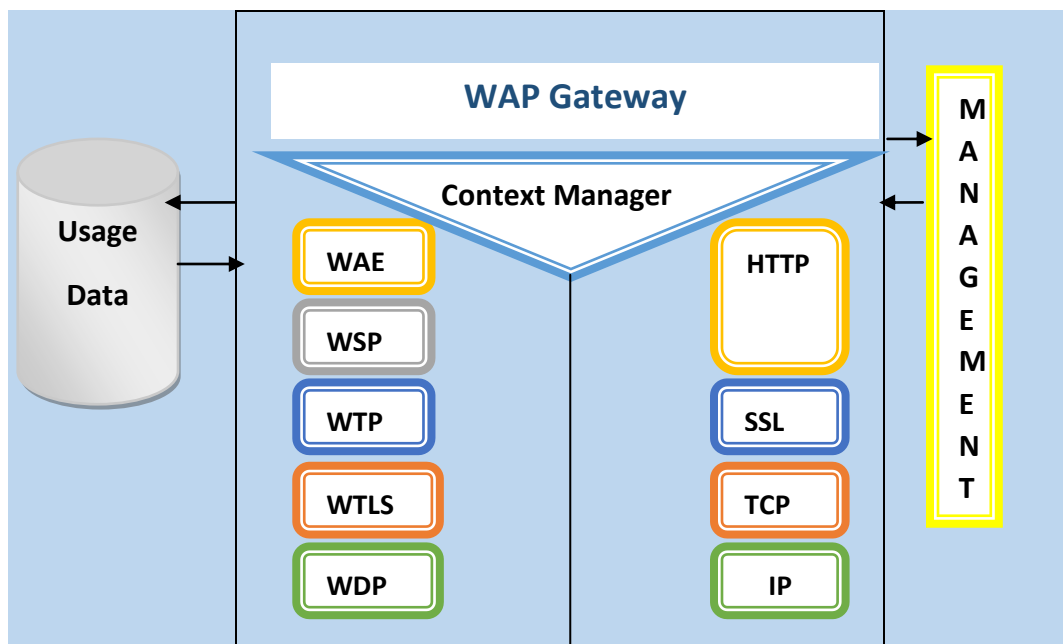
Figure 3: WAP Gateway

VI: Application of WAP

- Business Applications- Any business person can track its sales figure, status in market, market up and down, share market, competitors data etc

- Online Services
  - Banking: Users can get their current balance, transfer funds between accounts and receive fax of a mini-statement
  - E- Commerce: Customer can use their handset just like their PC to see the sales, purchase products and services over the Web.
  - Tele services: Most of telecommunication services are updating the data usage status. More and more options are available in the market. CRM and SCM is done by using tele-services.
  - Prepaid Services
  - Email: All the mails and data can be synchronized in the inbox. Users can keep track of their email and notification etc. from their handset.

- Others include:
  - Interactive Chat
  - Auctions
  - Games

VII: Challenges in WAP

- The biggest challenge in WAP is to provide support to the applications which are having huge content and graphical interface.
- It is difficult to get assurance of service in wireless devices.
- The major issue is in interface design for handheld devices, as these devices are very compact, small and having limited memory. Working in these constraints and getting good interface to interaction is always a challenge.
- Usability of the network
- WAP website generally supported by WML which is scalable. WAP supports all other markup languages such as HTML and XML, but has one hand navigation so it uses WML only because of scalability.

- ➢ Low Bandwidth
- ➢ Limited device capability

VIII: **Summary**

Wireless network and devices have specific needs and requirement. These are the devices with limited screen, limited processing etc. WAP enables such devices to use internet. As internet access and mobile communication comes a long way. It is mandatory to have standards for operation; WAP is the standard which is acting as an interface between the World Wide Web and mobile devices. Though it has to deal with number of challenges but today's devices capability is increase with the help of WAP. It supports most of the wireless networks such as CDMA, GSM, and TETRA etc. It is also supported by all operating system used in handheld devices such as Windows, Java etc.