Wireless Application Protocol
Introduction

• An open specification that enables mobile users to have access to the Internet.

• WAP specifies both communication protocols and application environment so that it can work regardless of the underlying wireless networks, such as CDPD, CDMA, GSM, PDC, PHS, DECT, and GPRS

• Can be built over any operating system including PalmOS, Windows CE, JavaOS and so on.
• The first generation of WAP is referred to as WAP 1.x (or WAP1) was released in 1998.
• The next generation is WAP 2.x (or WAP2) was released in January 2002.
• **The main difference between WAP1 and WAP2 is**
• WAP2 assumes relatively high-performance mobile terminals and employs a lot of Internet standards.
• This enables WAP2 mobile terminals to interact with servers in the Internet directly and then to establish secure channels with them end-to-end.
• WAP1 employs optimized protocols for relatively inexpensive terminals and low-bandwidth wireless networks while sharing part of the tasks with WAP gateways.

• This enables mobile terminals to be simple, but secure connections must be severed by the WAP gateways to exchange WAP1 protocols with the Internet protocols.
WAP Protocol Stack

Typical Protocol Stack of WAP1
Typical Protocol Stack of WAP2
Functions of each Layer

• **Wireless Application Environment (WAE):**
  
  provides an environment for processing WAP applications, usually Web applications.

• **Wireless Session Protocol (WSP):**
  
  provides similar functionality to HTTP with new features, such as
  
  long-lived sessions,
  
  session suspend/resume and transformation of application data.

• Data transformation is done so that the size can be smaller and that the WAP1 clients can process it with smaller complexity.
• the WAP gateway transforms html (or wml) to the corresponding binary file, which is smaller and easier to process for WAP1 clients.

• WSP has a consistent interface for two session services:
  
  - connection-mode services over the transaction layer protocol
  - connectionless services over a secure or non secure datagram transport.
• **Wireless Transaction Protocol (WTP):**

  provides *reliability* of transmission data.

  It is designed for low-performance mobile clients, so that it can manage acknowledgments and retransmission of lost data efficiently over the wireless datagram network.
• **Wireless Transport Layer Security (WTLS):**

  *provides* confidentiality, integrity and authentication between a WAP 1.x client and a WAP Gateway.

  It also protects against replay attacks following similar trends from TLS.

  Additional features include datagram support, optimized handshake, dynamic key refreshing, elliptic curve cryptosystem support and so on.
• **Wireless Datagram Protocol (WDP):**

  *provides a general* datagram service, which offers a consistent service to the upper layer protocols and communicates transparently over one of the available underlying bearer services.

• This consistency is provided by a set of adaptations to specific features of these bearers. Usually, UDP/IP or SMS (Short Message Service) are used as WDP depending on the available underlying bearer services.
• **Hypertext Transfer Protocol (HTTP):**

  HTTP is a protocol to request and transmit files, especially for Web pages and Web applications.

  supports additional features, such as message body compression of responses.

• **Transport Layer Security (TLS):**

  TLS provides confidentiality, data integrity and authentication between two entities.

  In WAP2, the connection is end to end, i.e. the WAP 2.0 client has a direct connection with the application server, and hence the WAP Gateway proxies nothing but encrypted TLS data.

  In WAP1, TLS is used between the WAP Gateway and the application server.
• **Transmission Control Protocol (TCP):**

  *TCP provides reliability of transmission data over the IP layer.*

  It manages sequence and acknowledgement numbers and re-transmits lost data.

  A wireless profile of TCP defines optimized parameters for the wireless environment maintaining full interoperability with standard TCP implementations in the Internet.

• **Internet Protocol (IP):** *IP is a protocol to manage routing of transmission data, addressing of hosts/networks and so on*