

Advanced Programming Language (630501)
Fall 2011/2012 – Lecture Notes # 2

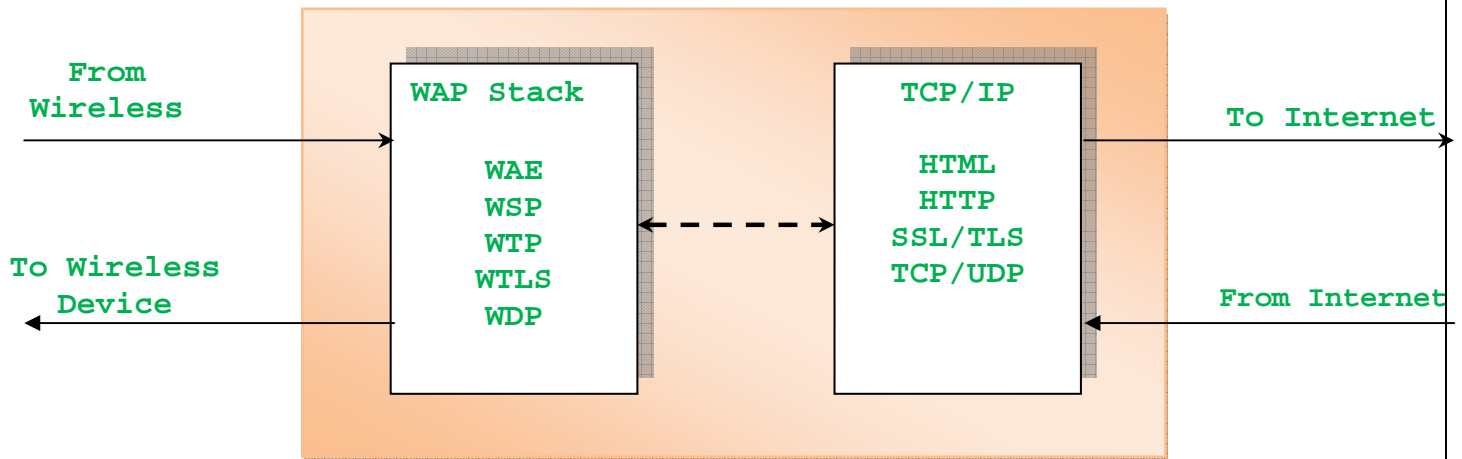
Wireless Application Protocol

Outline of the Lecture

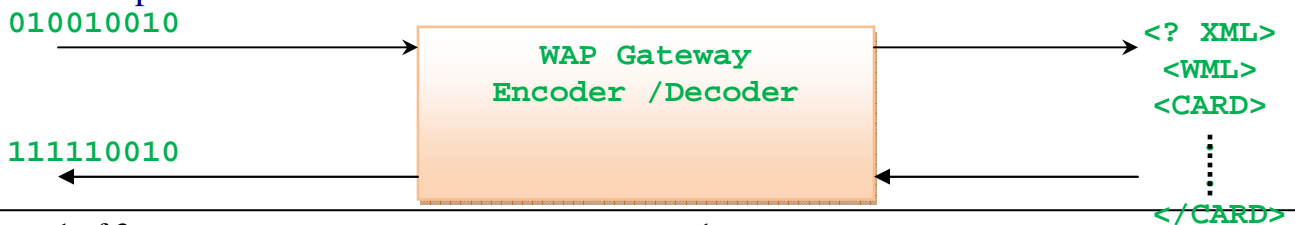
- WAP Session Execution steps
- WAP Internal structure WAP protocol
- Wireless Network

WAP Session Execution steps

- Connection is created between mobile device and the WAP gateway (via WSP).
- After entering the WAP Address site, the gateway is sent a request from the devices browser using WSP (controls the start and the end of the connection).
- The Gateway translates the WAP request into an HTTP request and sends it to the appropriate origin server.
- The origin server sends back the request information to the Gateway via HTTP.
- The Gateway translates and Compresses the information and sends it back to the browser in the mobile device.



- The Coder /Decoder (**CODEX**) functionality within the Gateway is used to convert the WML and WMLScript content going and coming from the client into a binary form that is optimized for low bandwidth networks.

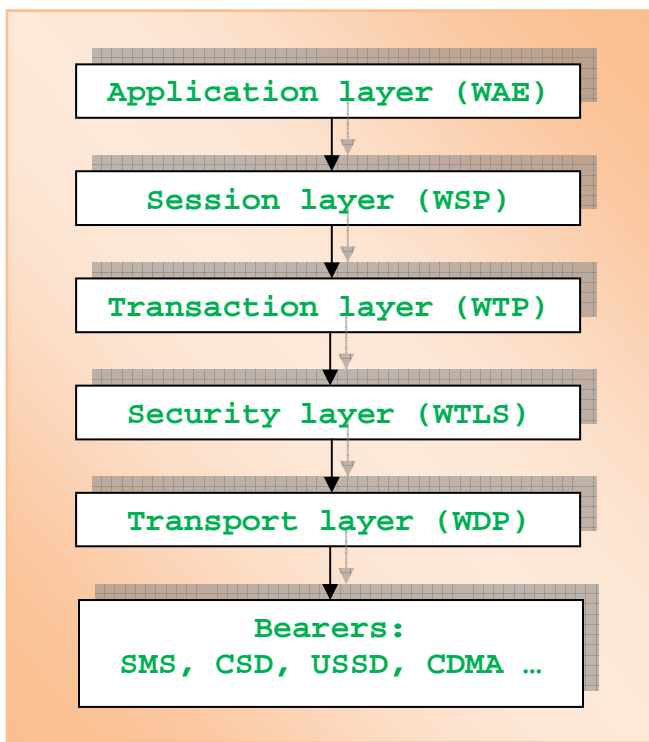


- Content belonging to a non –Secure session is cached on the storage media of the Gateway reducing the processing time.
- Translation of encrypted data takes in the memory of the Gateway.
- CODEX can provide the translation from HTML or text to WML.

WAP Application Server

- The WAP application server has exactly the same function as a Web server, the only difference lies in the content that they store and send back to the clients.
 - Web server: HTML, Java script, multimedia and all types of images.
 - WAP server: WML, WMLScript, and WBMP (wireless Bitmap) image files.

WAP Internal structure WAP protocol



Application layer:

- Provides an application environment intended for the development and execution of portable application and services WAE consists of two different user agents located on client side.WAE user agent: - including the micro: Browser and the text message editor and the WTA user agent.

Session layer :-

- Supplies methods for the organized exchange of content between Client/Service Applications
- WSP contains:
 - **Connection – Oriented Session Service:** Operates over WTP.
 - **Connectionless Session Service:** Operate directly over WDP.
 - Session services are those functionalities

that help to set up a connection between a client and server using **primitives' messages**.

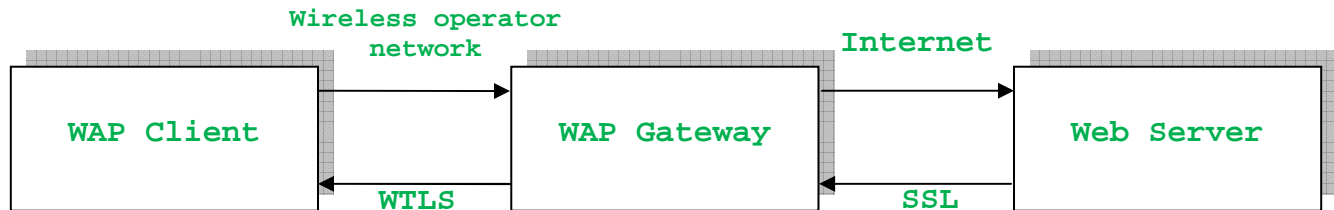
- **Primitives messages** are defined message that client sends to the server to request a service facility like: (**S-Connect** → to create a connection).
- The clients sends **request** primitives and receive **confirm** primitive and the server can send **response** primitives and receive **indication** Primitives.
- The connectionless session service provides only **non-confirmed service**.
- To start session, the client invokes a WSP primitives that provide some parameters, such as the server address, client address and client headers .In some respects WSP is basically a binary form of HTTP.

Transaction Layer:

- Provides different methods for performing transaction to varying degree of reliability.

Security Layer:

- Optional layer that provides, when present, authentication, privacy and secure connection between applications.
- It based on **SSL** (Secure Socket Layer) it provides services that ensure privacy, server authentication, client authentication data integrity.



- A Standard SSL session is opened between the web server and the WAP gateway, and WTLS session is initialized between the gateway and the mobile device, the encrypted content is send through this connection from the server to the gateway, which translates it and sends it to mobile phone.
- The transaction between SSL and WTLS takes place in the memory of the WAP gateway.

Transport Layer:

- The bottom layer, connect with the bearer service offered by the operator.
- Bearer services are the communication between the mobile phone and the base stations.
- They Include: "SMS, CSD, USSD, GSM, GPRS, DECT, CDMA, FDMA, and TDMA".
- The physical layer prepares the data to be sent from the mobile device over the air services and sends the data using bearer service implemented in the network that the device is operating in.
- WDP has an interface with various bearer networks, so it must have a **bearer specific implementation** WDP is the only layer that must be rewritten to support different bearer networks. The WTP layer implements a simple request-response transaction-oriented protocol instead of the three-way-handshake connection mechanism.

Wireless Network

- When we want to cover an area with a wireless network, we divide the geographic region in to sections called Cells (**Cellular Networks**); every cell contains an antenna also called **Base Station** which communicates with the mobile phones.
- Base Stations are grouped and controlled by a **Base Stations Controller** that is attached to a **Mobile switching Center**.
- The base stations controller has access to the fixed network as well as the wireless network.