

Part-A

(3)

- * Application layer ✓
- * Session layer
- * Internet layer
- * Security layer
- * Transport layer ✓

WSP 885
WSP 7
WNC 8
OS 9

- * Application layer
- * Transport layer
- * Network layer
- * Internet layer.

(3) (4)

10. * The Shoop protocol is a TCP aware link layer protocol designed to improve performance of TCP over networks of wired and single hop wireless links.

* Its main function is to buffer data close to the mobile host to perform fast local retransmission in case of packet loss.

(1)

- * Address mobility
- * Inefficiency of network layer protocol
- * Inefficient design and functionality of application layer protocols.
- * Inefficient design and functionality of transport layer.

(5). * The WAE logical model not only includes this standard request & response scheme, but it also includes push services.

* Then an origin server pushes content to the gateway. The gateway encodes the pushed content

and transmits the encoded push content to the client. Several user agent can reside within a client.

③. ⑯ * Application Layer

- * Session Layer
- * Transaction Layer
- * Security Layer
- * Transport Layer.

Part - B.

⑧ WML.

Wireless Markup Language

- * Tag based browsing language
- * Screen Management (text, images)
- * hyperlinks and navigation support
- * takes into account limited display, navigation capabilities of devices.
- * XML based language
 - * describes only internet of interaction in an abstract manner.

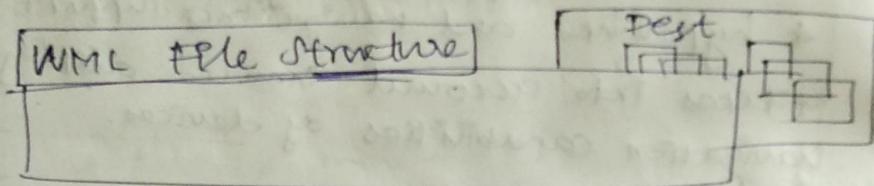
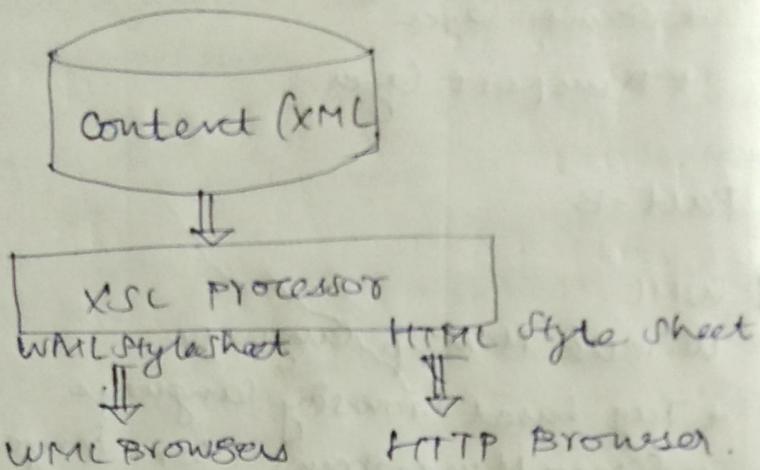
* cards and decks.

- * document consists of many cards
- * user interaction are split into cards
- * Explicit navigation between cards
- * deck is similar to HTML page, unit of content transmission.

* Events, variables and statement

- * The basic units for a card. cards are grouped together into decks. Document - Deck (unit of transfer)

- * All decks must contain
 - * Document Prologue
 - * XML and document type of deck
- * <WML> element
Must contain one or more cards.



WML Example

```

Navigation { 
  <Card>
    <Do TYPE = "ACCEPT">
      <Go URL = "#ocard" />
    </Do>
    Welcome!
  </Card>
}

variables { 
  <Card>
    <Do TYPE = "ACCEPT">
      <Go URL = "/submit" />
    </Do>
  </Card>
}
  
```

The code example illustrates WML syntax. It shows a navigation section and a variables section. The navigation section contains a card with a do element (type=accept) that performs a go operation to a URL of "#ocard". The variables section contains a card with a do element (type=accept) that performs a go operation to a URL of "/submit". Braces on the left side group the navigation and variables sections under their respective labels.

⑧ WSP - wireless session Protocol.

goals

- * HTTP 1.1 functionality.
- * Request Reply, content type negotiation

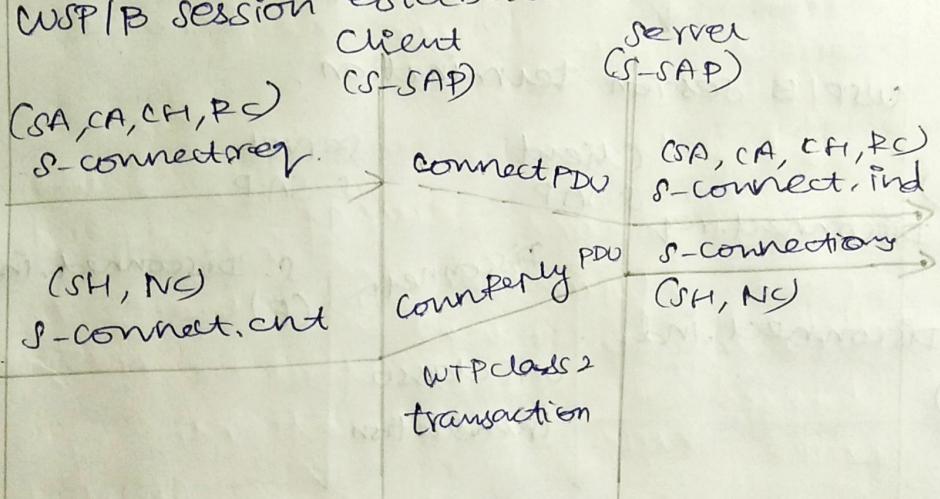
WSP services.

- * provides shared state
- * session Management
- * content encoding
- * push.

WSP sessions.

- * session content and push.
- * connection-mode.
- * connectionless mode.

WSP/B session establishment



CH: client header.

RC: Request Capabilities

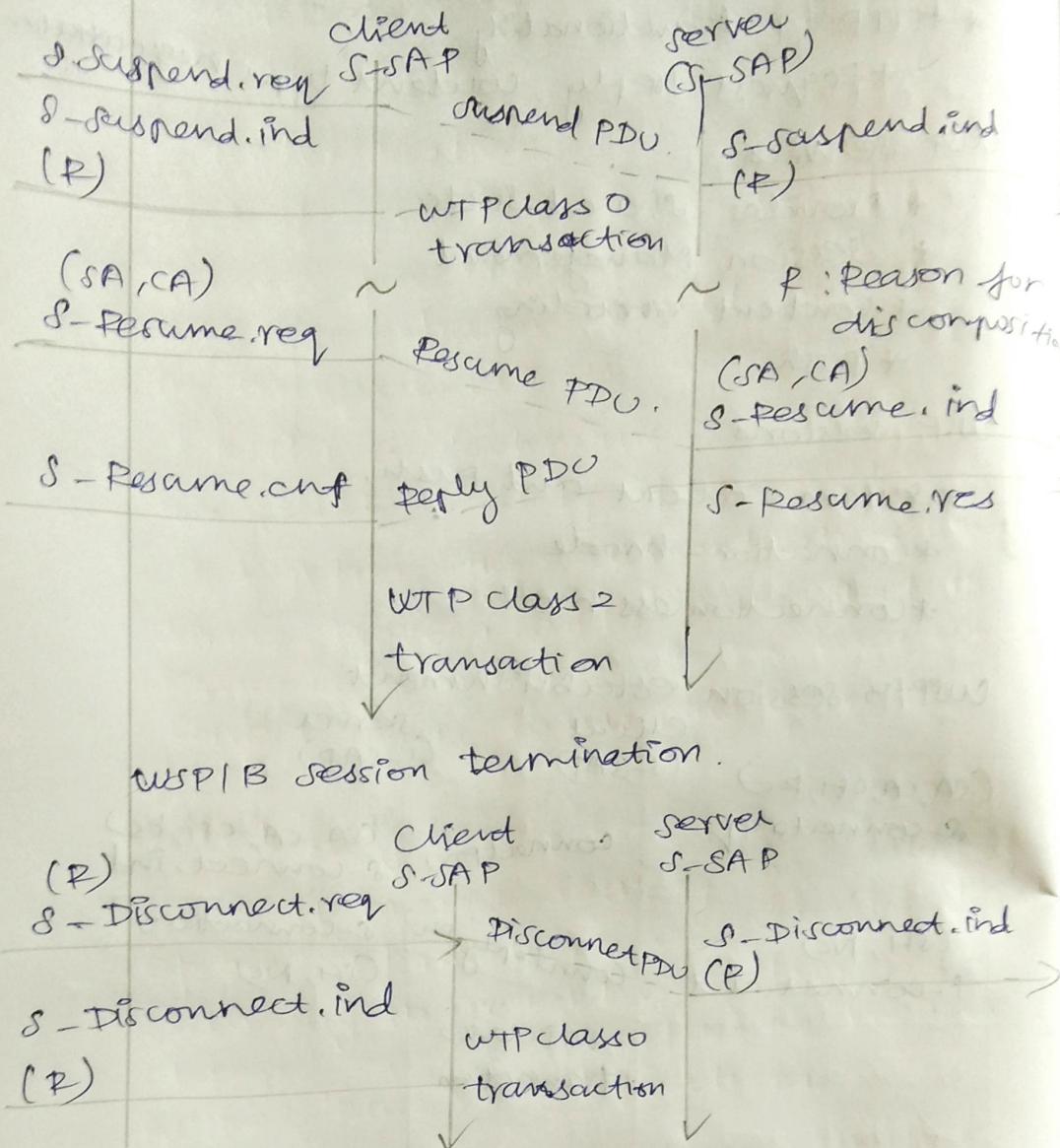
SH: server header.

NC: Negotiated Capabilities

* header encoding

compact binary encoding of headers, content type, textual structured values.

WSP/B session suspend/resume



capabilities.

- * message size and client, server.
- * protocol options; confirmed Push facility
- * Push facility, acknowledgement headers,
- * Maximum outstanding requests
- * Extended methods
- * header code pages.

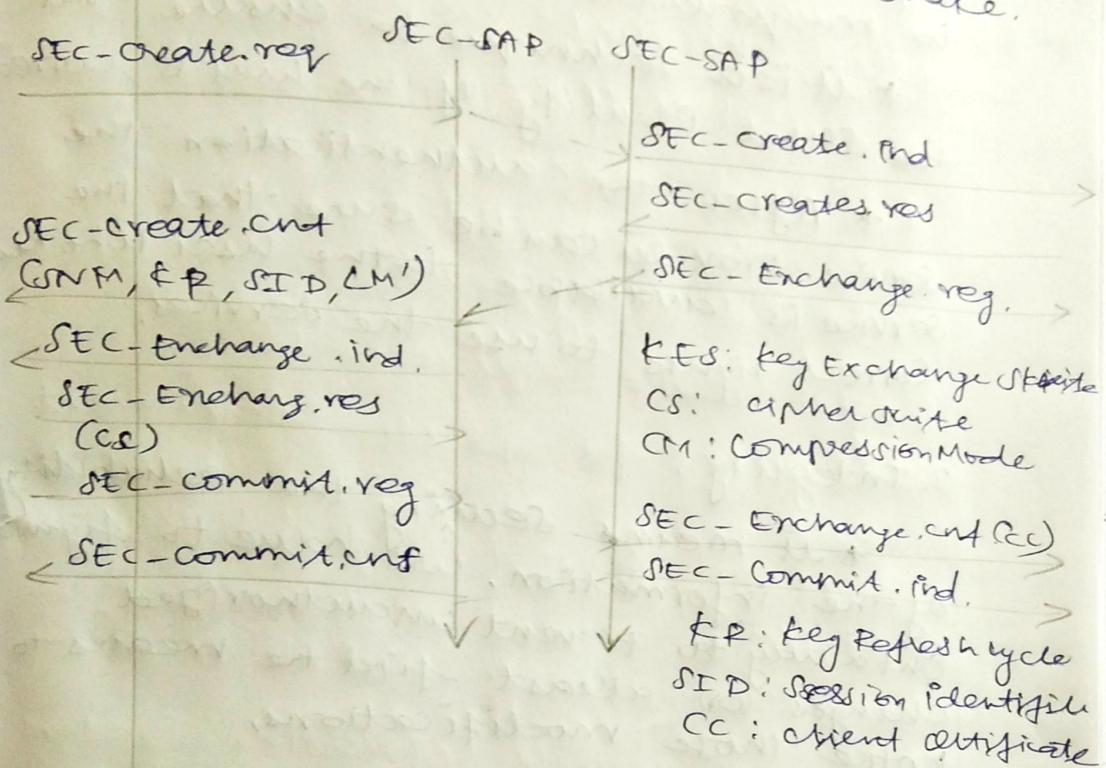
⑨ WTLS

→ wireless Transport Layer Security
Provides authentication, privacy, integrity
for the wireless application protocol.

→ it is based on TLS / SSL

→ optimized for low bandwidth
communication channels.

WTLS: secure session, full handshake.



i. Privacy.

* The wireless Application Protocol specification defines privacy so that the used transfer method ensures a private end to end transfer.

* Maintaining privacy is mainly fighting against the disclosure threat.

* The main tool for providing privacy is cryptography.

* A Plaintext is simply encrypted and decrypted using a strong ~~key~~ to implement privacy.

Q. Authentication.

* It should be possible for the receiver of a message to ascertain its origin: an intruder should not be able to masquerade as someone else.

* It is a technique to ensure that the stated identity of the user is correct.

* After the authentication the service provider can be sure that the service is available to the user who has correct rights to use the services.

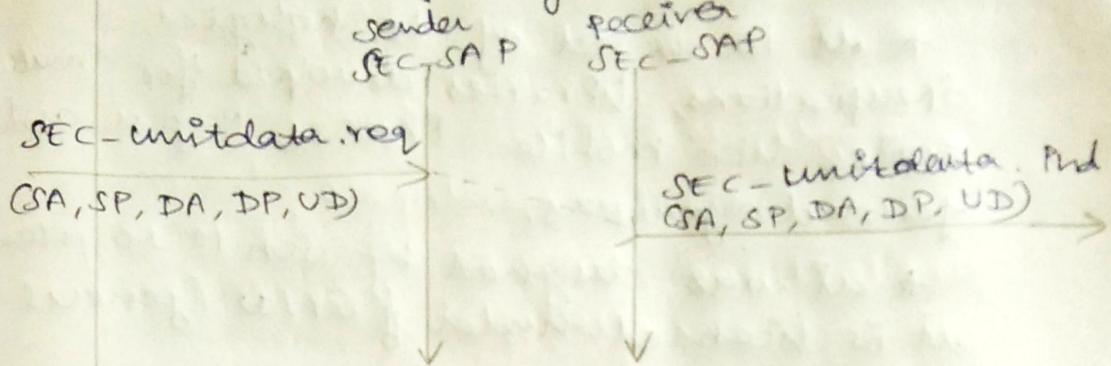
3. Integrity.

* It means securing the reliability of the information. We have to figure out a way to prevent unauthorized changes or atleast find the means to notice those modifications.

* It is guaranteed by calculating checksums from the original information to be sent.

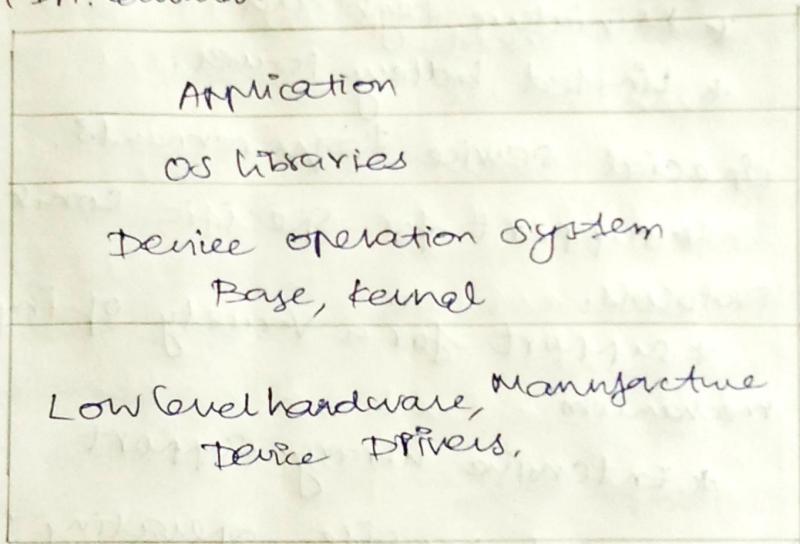
Eg: Information is signed with the user's digital signature.

WTLS: Transferring datagrams.



⑩. Operating system structure.

* A mobile OS is a software platform on top of which other programs called application programs can run on mobile devices such as PDA, cellular phones, smartphone.



Mobile operating system platforms.

- * Java ME Platform
- * Palm OS.
- * Symbian OS
- * Linux OS
- * Windows Mobile OS
- * iPhone OS
- * Google Android Platform.

Java ME Platform.

- * It is a set of technologies, specifications, libraries developed for small devices like mobile phones, pagers, and personal organizers.
- * It was designed by Sun Microsystems.
It is licensed under GNU General Public License.

Special constraints and Requirements

- * Limited memory
- * Limited screen size
- * Miniature keyboard
- * Limited battery power.

Special service requirements.

- * Support for specific communication protocols.
- * Support for a variety of input mechanism
- * Extensive library support

Commercial mobile operating system

- * Palm OS.
- * Symbian OS.
- * Linux OS.
- * Windows Mobile OS
- * BlackBerry OS.
- * iPhone OS.

1. Palm OS.

- * It is an embedded operating

System designed for ease of use with a touch screen based graphical user interface (GUI)

Features.

- * Memory Management
- * Sound playback and record

Capabilities

- * TCP/IP network access
- * Expansion support
- * Security.

2. Symbian OS.

- * It is a 32 bit, little endian operating system, running on different flavors of ARM architecture.

3. iPhone OS.

- * It runs on iPhone and iPad.
- * The MAC OS kernel includes some components.
 - * Mach kernel
 - * BSD
 - * I/O component
 - * file systems
 - * Networking components.

B. Windows mobile OS.

- * It is a compact OS designed for mobile devices and based on Microsoft Win32.

- * It provides ultimate interoperability

4. BlackBerry OS.

- * it has a multitasking environment.
- * it is an event-driven OS.

↳ google android platform.

- * it allows developers design applications in Java like language using google developed Java libraries.

④ * WSP /B could be run on top of the connectionless unreliable CDP services.

1. S-unit - Method invoke. req to request an operation on a server.

2. S-unit - Method result. req to return results to a client

3. S-unit - Push. req to push data out to a client.

* Transfer to reply and Push) of the standard transfer service of CDP

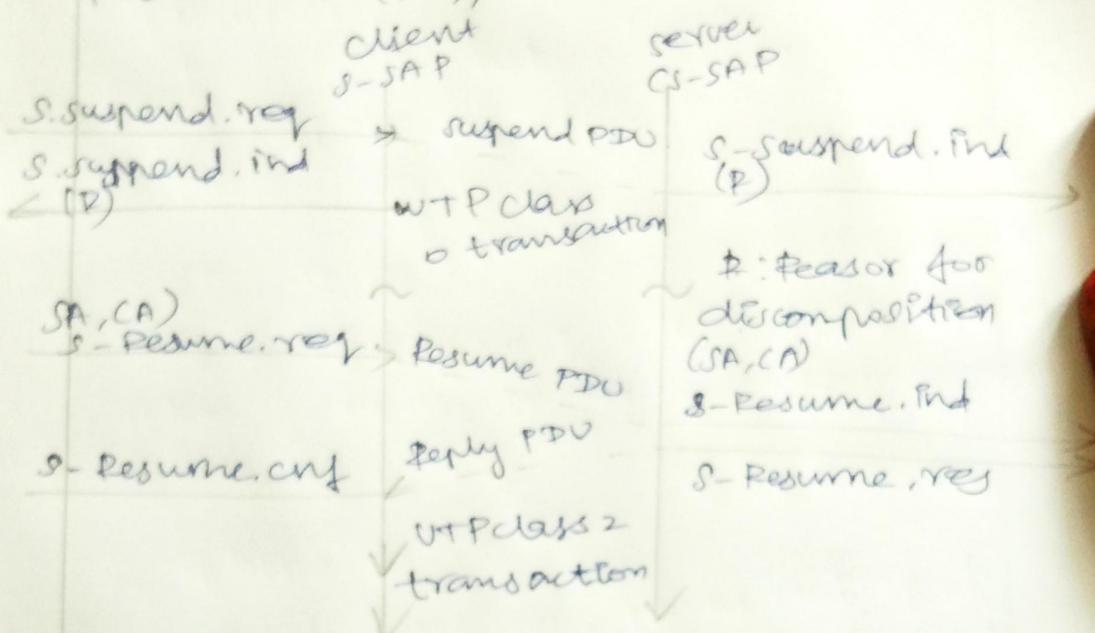
the PDUs (method, Pdone with the help of unreliable datagram

* Besides the server address (SA), the Client address (CA), the method (M), and the request ORI (RQ), the user of the S-unit - Method invoke. req primitive can determine a transaction identifier (TID) to distinguish between different transactions on the user level.

* The function of the S-unit - Method result primitive remains the same

as explained above; the status (S), response header (RH), response body (PB) represent the result of the operation.

* The ~~was~~ s-unit Push Primitive has the Parameters Client address (CA), Server Address (~~SA~~), Push Identifier (PID), Push header (PH), and push body (PB).



④ I-TCP [16]

2. Snopp - TCP [6]

3. HTCP [17] and M-TCP [7]

I-TCP [16] MTCP [17] and M-TCP [7] are based on splitting the TCP connection into two. one for wired and other for wireless portion of network.