ASSIGNMENT-2

WIRELESS AND MOBILE COMMUNICATION

(2043102)

1) **TCP over Adhoc Network:**

The Transmission Control protocol is the most predominant transport Layer protocol in the Internet today. It transports more than 90% of the traffic on the Internet. Its reliability, end-to-end congestion control mechanism, byte stream transport Mechanism, and above all, its elegant and simple design have not only contributed to the sucess of the Internet, but also have made TCP an Influencing protocol in the design of many of the other protocols + applications. Its adaptability to the congestion in the design network has been an Important feature leading to graceful degradation of the services offered by the network at times of extreme congestion.

TCP in its traditional form was designed and optimized only for wired networks. Extensions of TCP in its traditional form was designed and optimized only for efficient integration of an adhoc n/w with the Internet is paramount wherever possible, it is essential to have mechanism that can improve TCP's performance in adhoc wireless n/w. This would enable the seamless operation of application-level protocols such as FTP, SMTP and HTTP across the integrated adhoc wireless Network and the Internet.

problems with TCP

→ TCP attributes packet losses to congestion
→ It goes back to the Slow Start phase and restarts with one packets.
→ This would result in a degradation of TCP throughput.
→ Notice that packet losses could be due to fading / mobility.

Feedback based TCP (TCP-F) :-

TCP-F requires the following to enhance performance:

→ Support of reliable data-link layer protocols;

→ routing support to inform the TCP sender about path breaks;

→ routing protocol is expected to repair the broken path within a reasonable time.

The aim of TCP-F: minimize the throughput degradation resulting from path breaks.

TCP with explicit link failure notification (TCP-ELFN)

According to TCP-ELFN an explicit link failure notification is used.

When an intermediate node detects a link failure:

Sends an explicit link failure notification to TCP-ELFN sender: ender Sending an ICMP destination unreachable message (DUR). — or inserting info regarding

link break in Route Error message of the routing protocol.

Once the TCP - ELFN Sender receives the ELFN packet:

→ It disables its retransmission timer and cw;

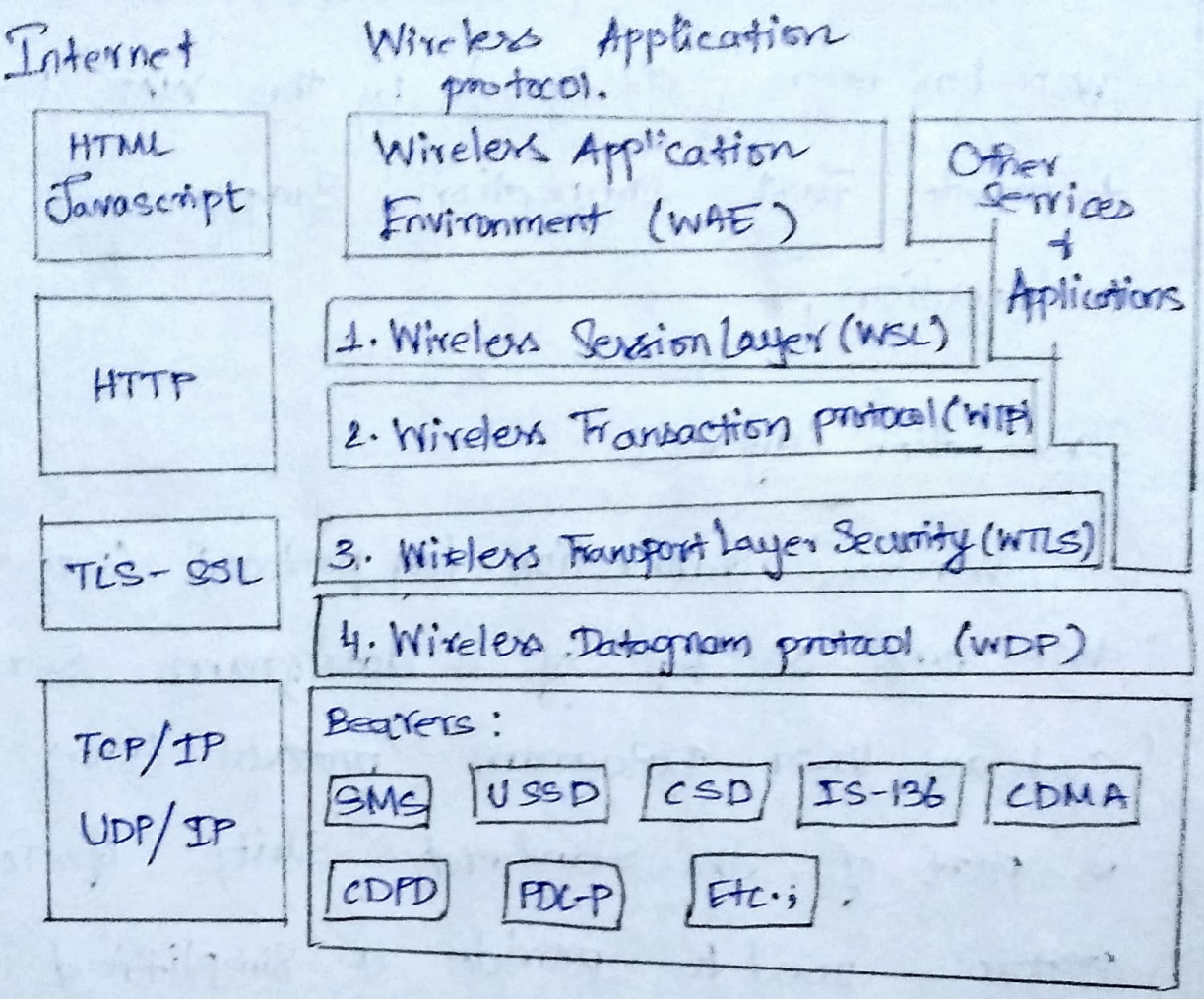
→ enters a Standby State.

Being in Standby State the TCP - ELFN Sender:

→ periodically Onginates probe packets to see if a new route is established;

→ When ACK for a probe packet is received TCP - ELFN continues to perform as usual.

2. WAP protocol Architecture:



Application Layer:

Wireless Application Environment (WAE). This layer is of most Interest to content developers because it contains among other things, device specifications, and the content development programming languages, WML and WML Script.

Session Layer:

Wireless session protocol (WSP). Unlike HTTP, WSP has been designed by the WAP Forum to provide fast connection suspension & reconnection.

Transaction Layer:

Wireless Transaction ~~tay~~ protocol (WTP). The WTP runs on top of a datagram service; such as User Datagram protocol (UDP) and is part of the Standard Suite of TCP/IP protocols used to provide a simplified protocol suitable for low bandwidth wireless Stations.

Security Layer:

Wireless Transport Layer Security (WTLS). WTLS incorporates Security features that are based upon the established Transport Layer Security (TLS) protocol Standard. It

Transport Layer:

Wireless Datagram protocol (WDP). The WDP allows WAP to be bearer-independent by adapting the transport layer of the underlying bearer. The WDP presents a consistent data format to the higher layers of the WAP protocol stack; thereby offering the advantage of bearer Independence to application developers.

Each of these layers provides a well-defined interface to the layer above it. This means that the internal workings of any layer are transparent or invisible to the layers above it. The layered architecture allows other applications and services to utilise the features provided by the WAP-stack as well. This makes it possible

to use the WAP - Stack for services and applications that currently are not specified by WAP.

3. TCP:

TCP stands for Transmission Control protocol. It is a transport layer protocol that facilitates the transmission of packets from source to destination. It is a connection-Oriented protocol that means it establishes the connection prior to the communication that occurs between the computing devices in a network. This protocol is used with an IP protocol, so together, they are referred to as a TCP/IP.

The Main Functionality of the TCP is to take the data from the application layer. Then it divides the data into a several packets; provides numbering

to these packets, and finally transmits these packets to the destination. The TCP, on the other side, will reassemble the packets & transmits them to the application layer. As we know that TCP is a connection-oriented protocol, so the connection will remain established until the communication is not completed between the sender and the receiver.

Features of TCP protocol:

The following are the features of a TCP protocol:

(i) **Transport Layer protocol**

TCP is a transport layer protocol as it used in transmitting the data from the sender to the receiver.

(iii) Reliable :

TCP is a reliable protocol as it follows the flow and error control mechanism. It also supports the acknowledgement mechanism, which checks the state & sound arrival of the data.

(iii) Order of the data is maintained

This protocol ensures that the data reaches the intended receiver in the same order in which it is sent. It orders & numbers each segment so that the TCP layer on the destination side can reassemble them based on their ordering.

(iv) Connection - Oriented :

It is a Connection - Oriented service that means the data exchange occurs only after the connection establishment. When the data transfer

is completed, then the connection will get terminated.

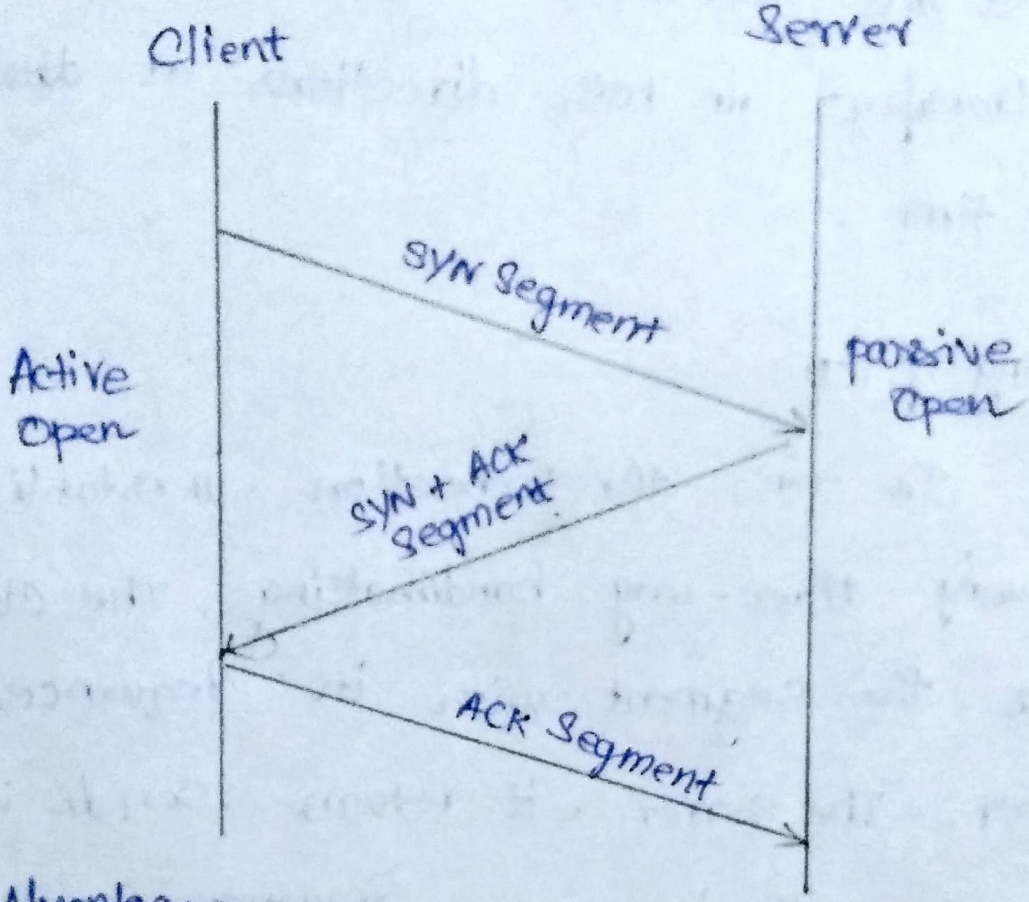
(v) Full-duplex:

It is a Full-duplex means that the data can transfer in both directions at the same time.

Working of TCP:

In TCP, the connection is established by using three-way handshaking. The client sends the segment with its sequence number. The server, it return, sends its segment with its own sequence number as well as the acknowledgement sequence, which is one more than the client sequence number. When the client receives the acknowledgement of its segment, then it sends the acknowledgement to the

Server. In this way, the connection is established between the Client and the Server.



Advantage:

(i) It provides a flow control mechanism using a sliding window protocol.

(ii) It provides error detection by using check sum and error control by using Go Back or ARP protocol.

Disadvantage:

It increases a large amount of overhead as each segment gets its own TCP header, so fragmentation by the router increases the overhead.