DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECT301- COMMUNICATION NETWORKS

III YEAR/ V SEMESTER

UNIT 3 TRANSPORT LAYER & APPLICATION LAYER

TOPIC – TRANSMISSION CONTROL PROTOCOL

The Internet Transport Protocols:

- Introduction to TCP
- The TCP Service Model
- The TCP Protocol
- The TCP Segment Header
- TCP Connection Establishment
- TCP Connection Release
- TCP Connection Management Modeling
- TCP Transmission Policy
- TCP Congestion Control
- TCP Timer Management
- Wireless TCP and UDP
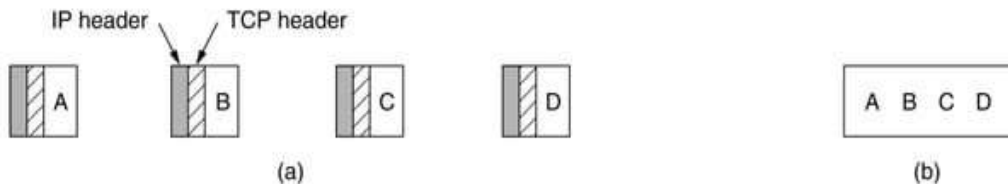- Transactional TCP

The TCP Service Model

Port	Protocol	Use
21	FTP	File transfer
23	Telnet	Remote login
25	SMTP	E-mail
69	TFTP	Trivial File Transfer Protocol
79	Finger	Lookup info about a user
80	HTTP	World Wide Web
110	POP-3	Remote e-mail access
119	NNTP	USENET news

Some assigned ports.
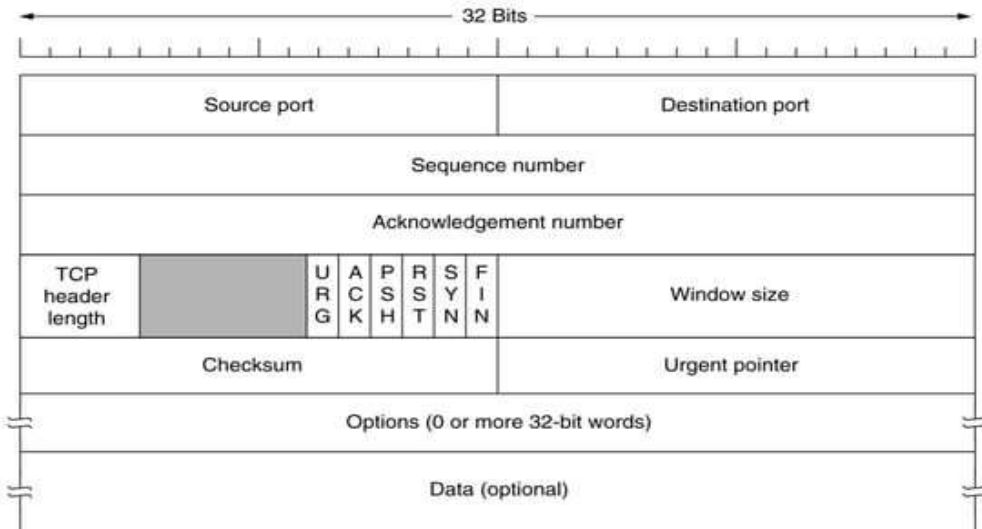
(a) Four 512-byte segments sent as separate IP datagrams.
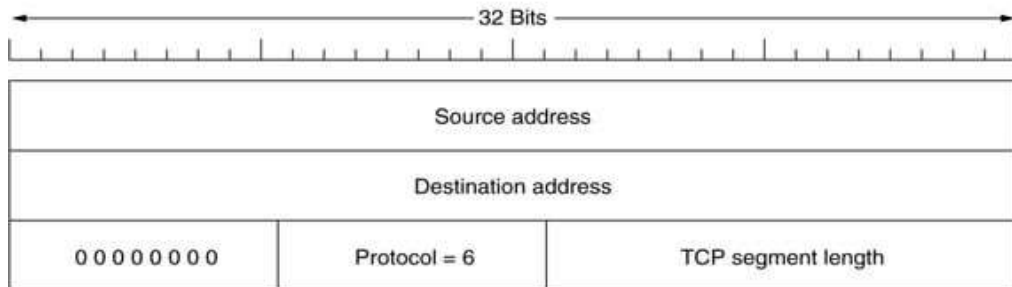(b) The 2048 bytes of data delivered to the application in a single READ CALL.
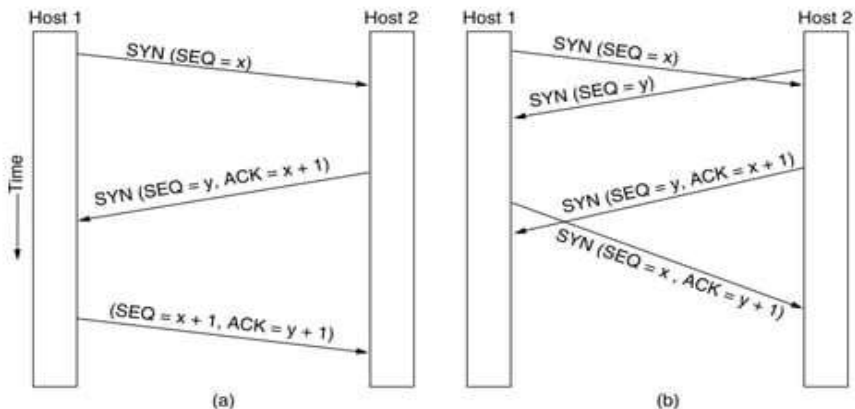
The TCP Segment Header

TCP Header.

The TCP Segment Header (2)

32 Bits		
Source address		
Destination address		
0 0 0 0 0 0 0 0	Protocol = 6	TCP segment length

The pseudoheader included in the TCP checksum.

TCP Connection Establishment

(a) TCP connection establishment in the normal case.
(b) Call collision.

TCP Connection Management Modeling

State	Description
CLOSED	No connection is active or pending
LISTEN	The server is waiting for an incoming call
SYN RCVD	A connection request has arrived; wait for ACK
SYN SENT	The application has started to open a connection
ESTABLISHED	The normal data transfer state
FIN WAIT 1	The application has said it is finished
FIN WAIT 2	The other side has agreed to release
TIMED WAIT	Wait for all packets to die off
CLOSING	Both sides have tried to close simultaneously
CLOSE WAIT	The other side has initiated a release
LAST ACK	Wait for all packets to die off

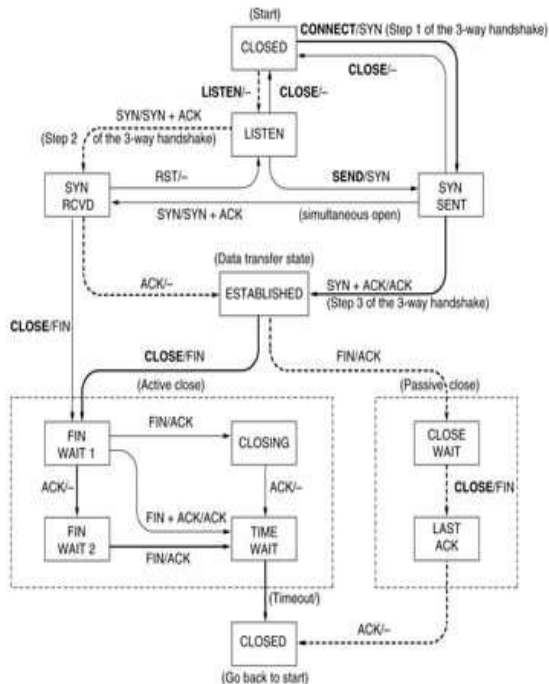The states used in the TCP connection management finite state machine.
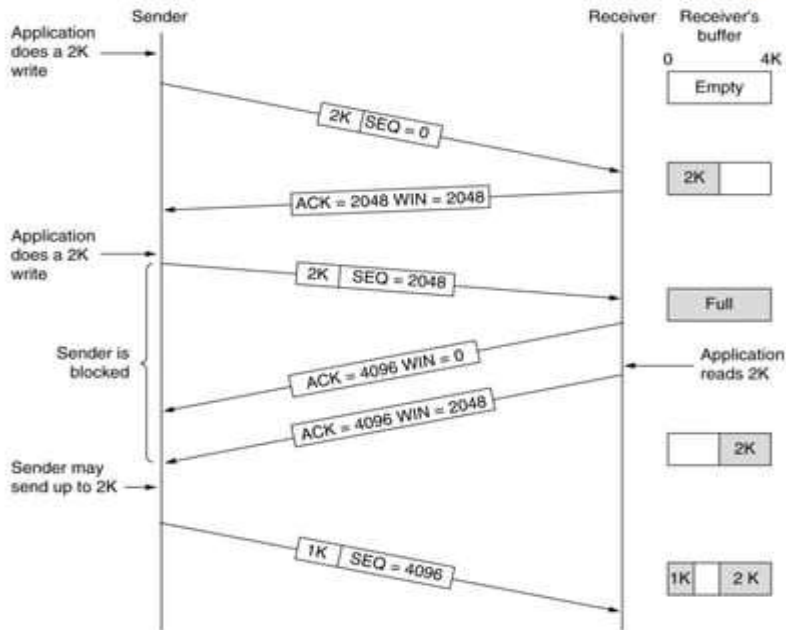
TCP connection management finite state machine. The heavy solid line is the normal path for a client. The heavy dashed line is the normal path for a server. The light lines are unusual events. Each transition is labeled by the event causing it and the action resulting from it, separated by a slash.
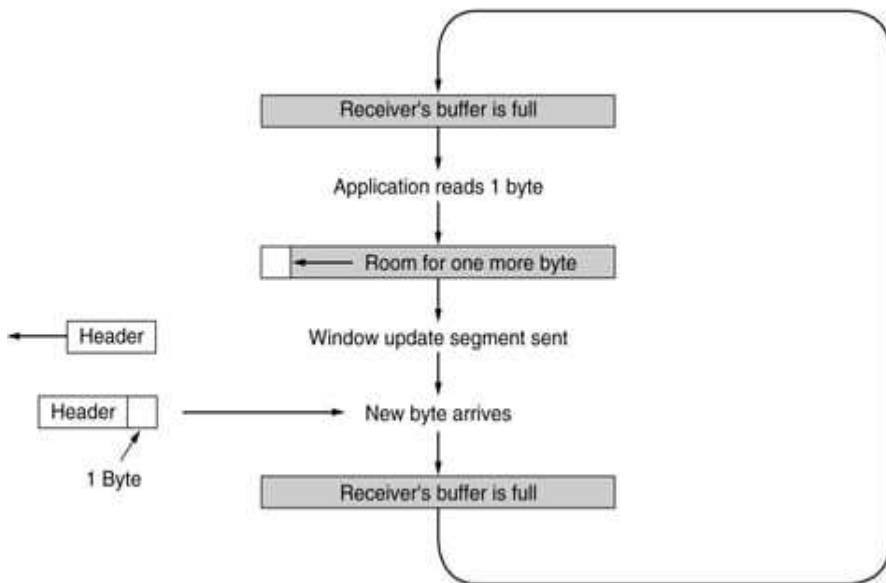
TCP Transmission Policy

Window management in TCP.
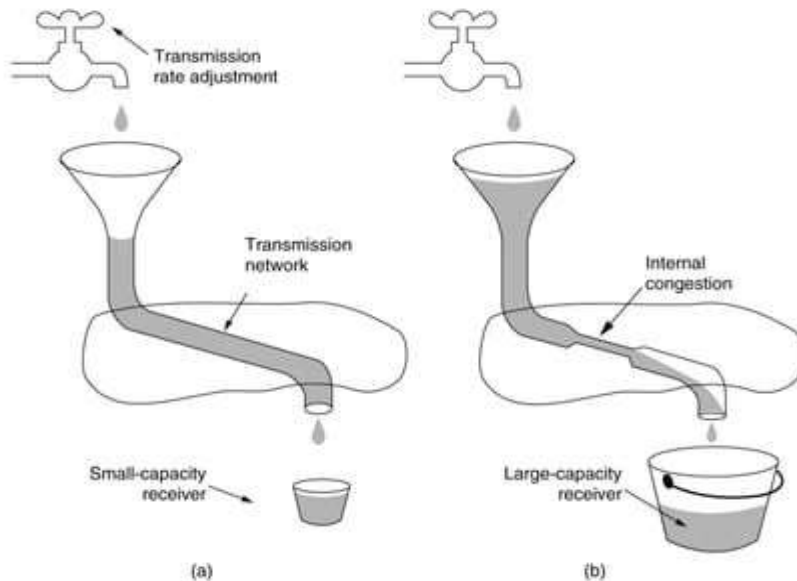
Silly window syndrome.

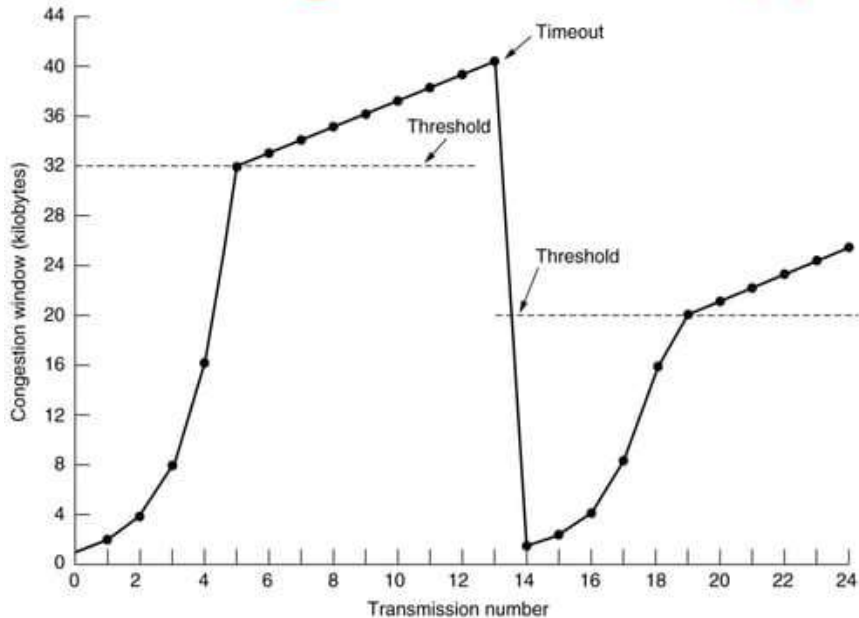# TCP Congestion Control

(a) A fast network feeding a low capacity receiver.
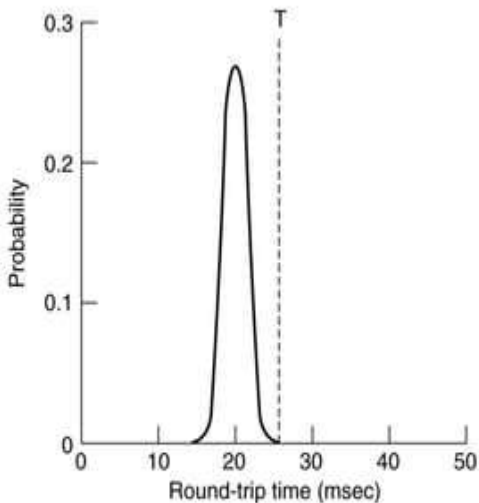(b) A slow network feeding a high-capacity receiver.
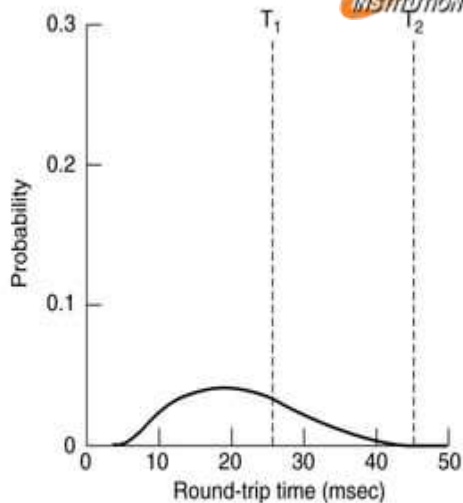
TCP Congestion Control (2)

An example of the Internet congestion algorithm.
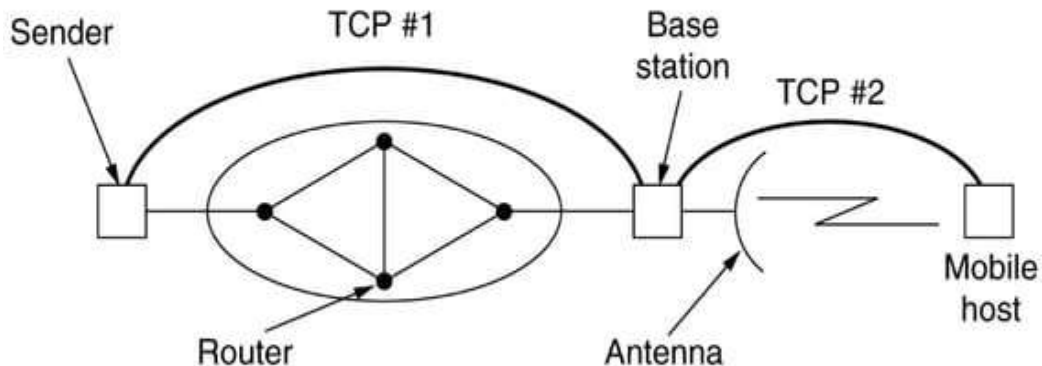
TCP Timer Management

(a) Probability density of ACK arrival times in the data link layer.
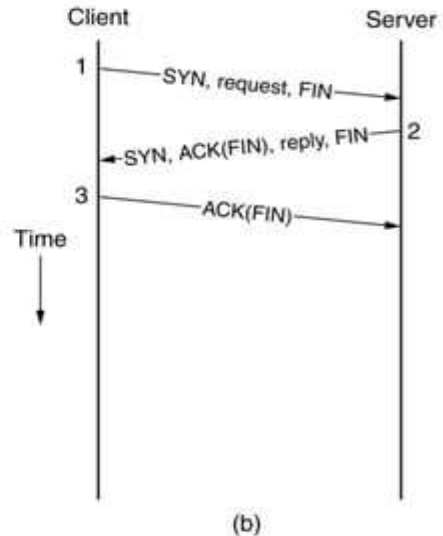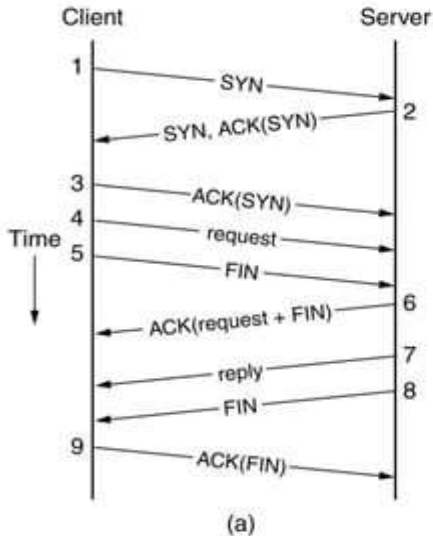(b) Probability density of ACK arrival times for TCP.

Wireless TCP and UDP

Splitting a TCP connection into two connections.

Transitional TCP

(a) RPC using normal TPC.
(b) RPC using T/TCP.

THANK YOU