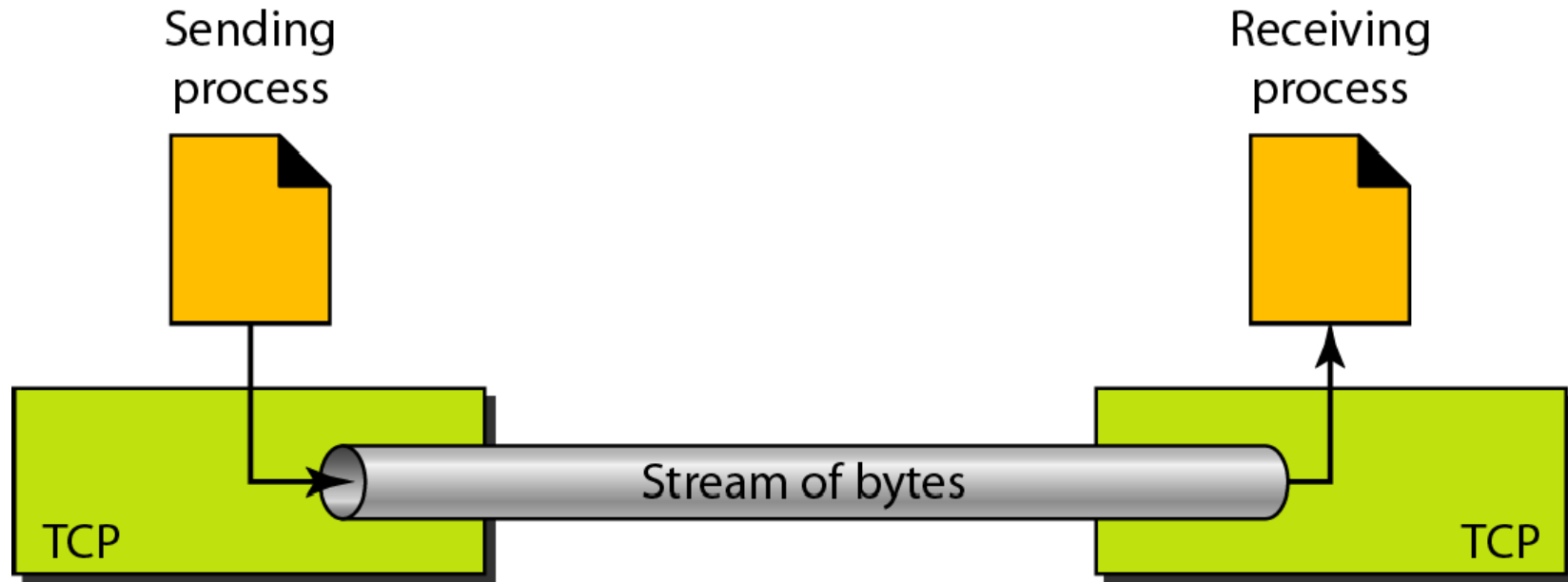


TCP is a connection-oriented protocol; it creates a virtual connection between two TCPs to send data. In addition, TCP uses flow and error control mechanisms at the transport level.

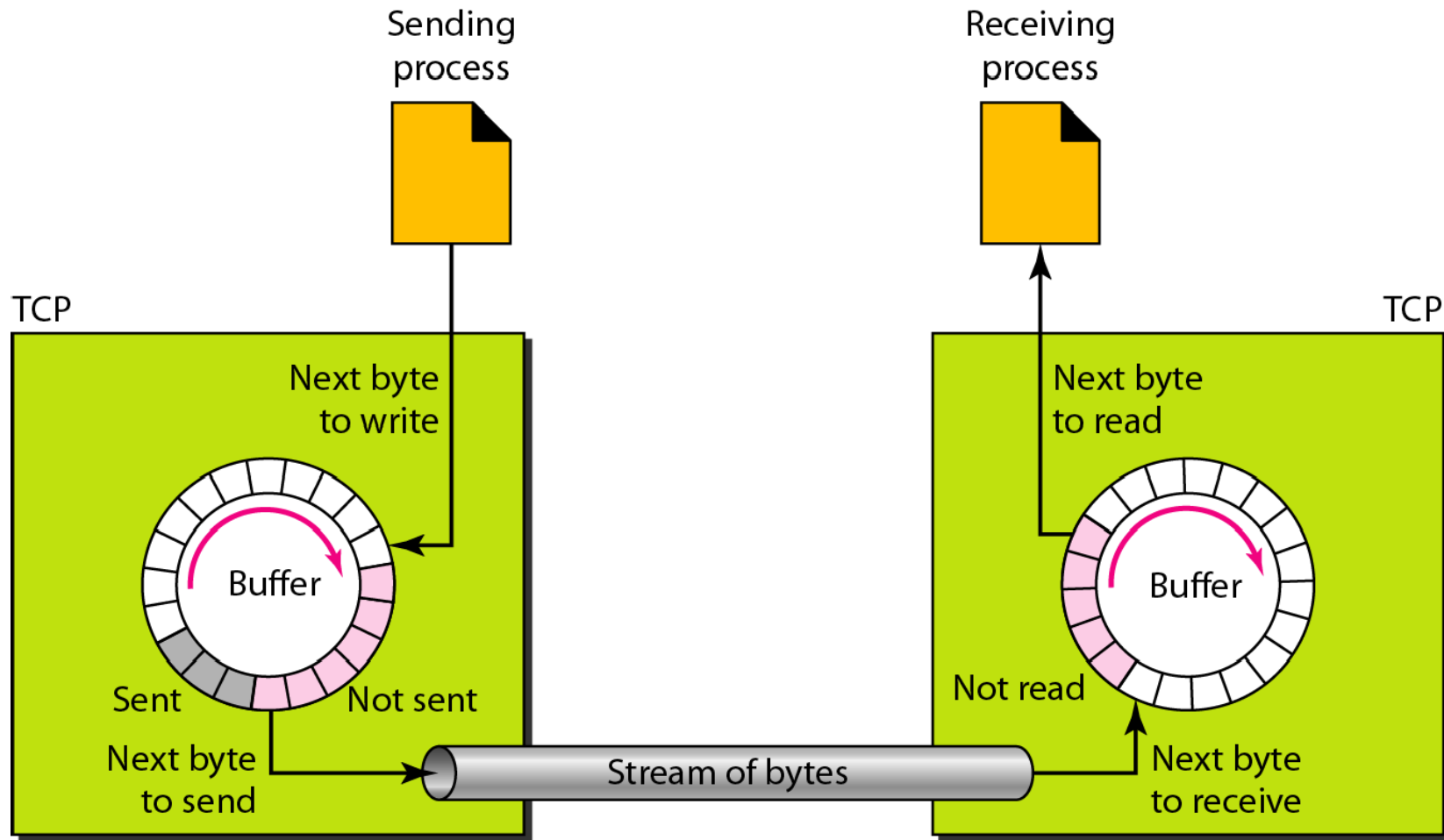
Well-known ports used by TCP

<i>Port</i>	<i>Protocol</i>	<i>Description</i>
7	Echo	Echoes a received datagram back to the sender
9	Discard	Discards any datagram that is received
11	Users	Active users
13	Daytime	Returns the date and the time
17	Quote	Returns a quote of the day
19	Chargen	Returns a string of characters
20	FTP, Data	File Transfer Protocol (data connection)
21	FTP, Control	File Transfer Protocol (control connection)
23	TELNET	Terminal Network
25	SMTP	Simple Mail Transfer Protocol
53	DNS	Domain Name Server
67	BOOTP	Bootstrap Protocol
79	Finger	Finger
80	HTTP	Hypertext Transfer Protocol
111	RPC	Remote Procedure Call

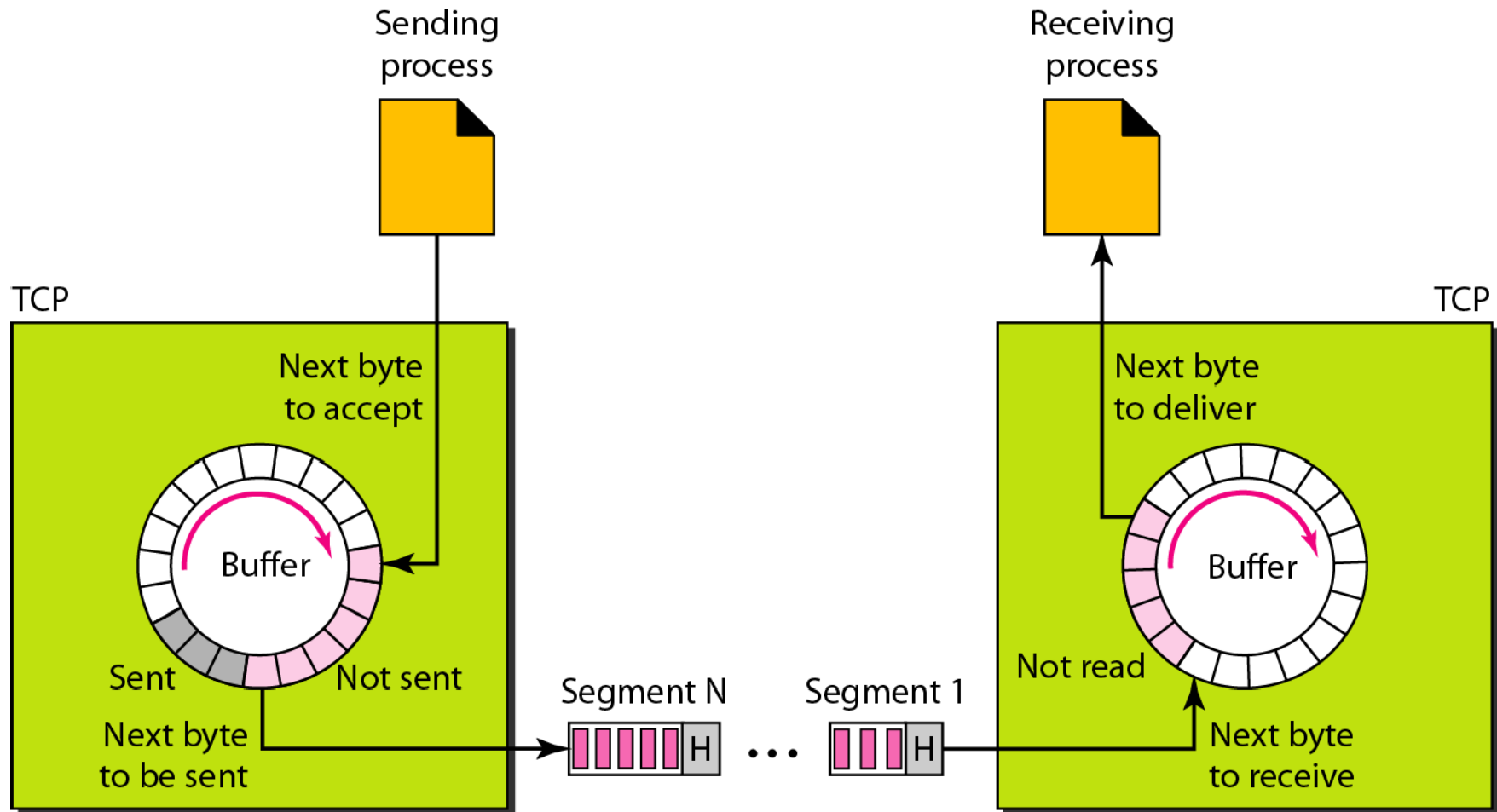
Stream delivery



Sending and receiving buffers



TCP segments



Note

The bytes of data being transferred in each connection are numbered by TCP. The numbering starts with a randomly generated number.



Example

The following shows the sequence number for each segment:

Segment 1	➔	Sequence Number: 10,001 (range: 10,001 to 11,000)
Segment 2	➔	Sequence Number: 11,001 (range: 11,001 to 12,000)
Segment 3	➔	Sequence Number: 12,001 (range: 12,001 to 13,000)
Segment 4	➔	Sequence Number: 13,001 (range: 13,001 to 14,000)
Segment 5	➔	Sequence Number: 14,001 (range: 14,001 to 15,000)

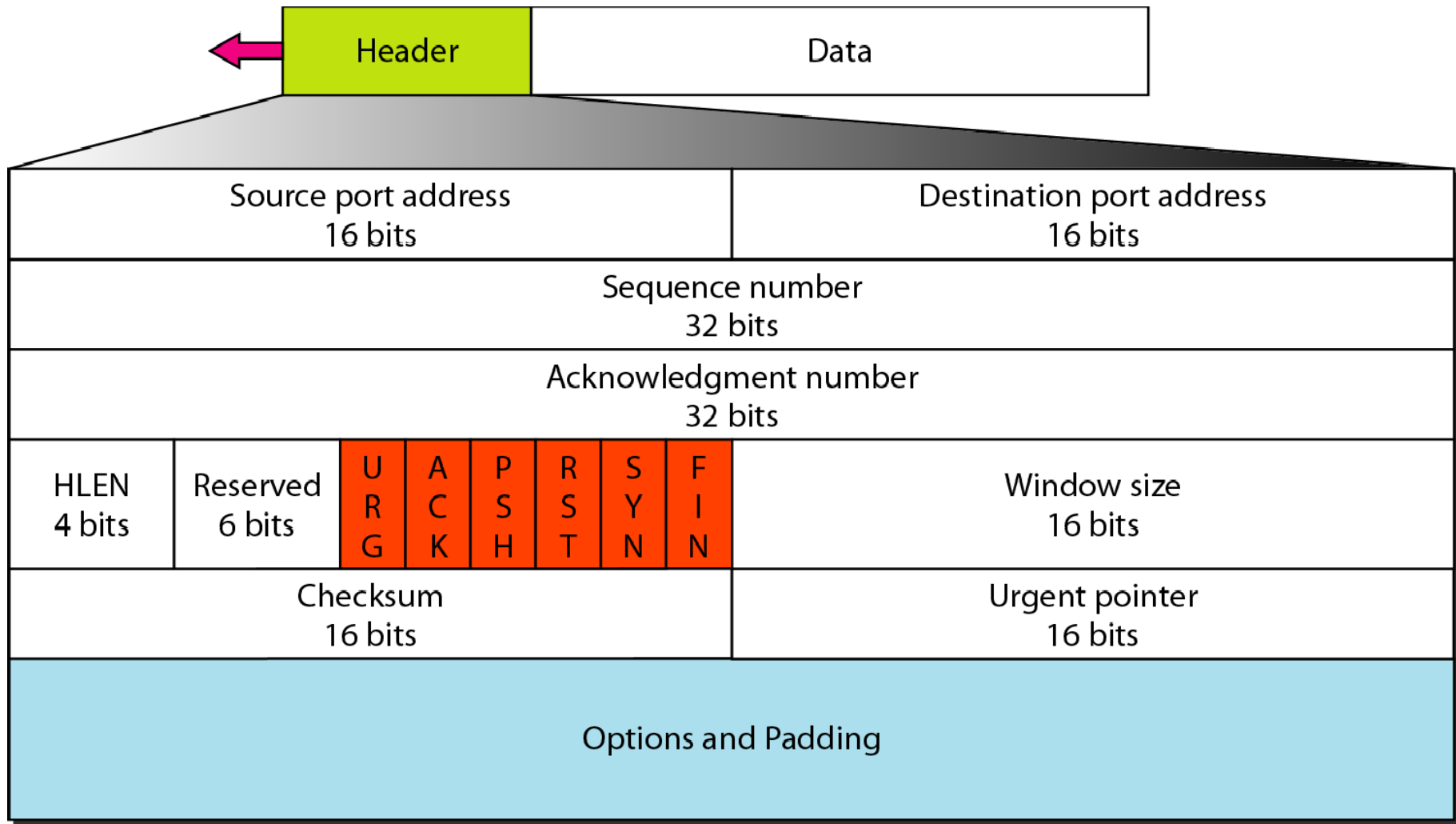
Note

The value in the sequence number field of a segment defines the number of the first data byte contained in that segment.

Note

**The value of the acknowledgment field in a segment defines the number of the next byte a party expects to receive.
The acknowledgment number is cumulative.**

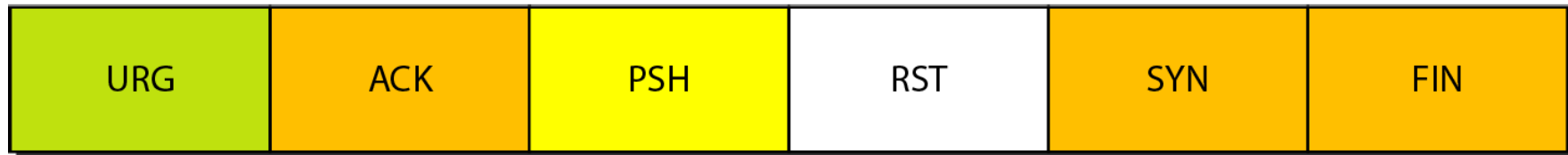
TCP segment format



Control field

URG: Urgent pointer is valid
ACK: Acknowledgment is valid
PSH: Request for push

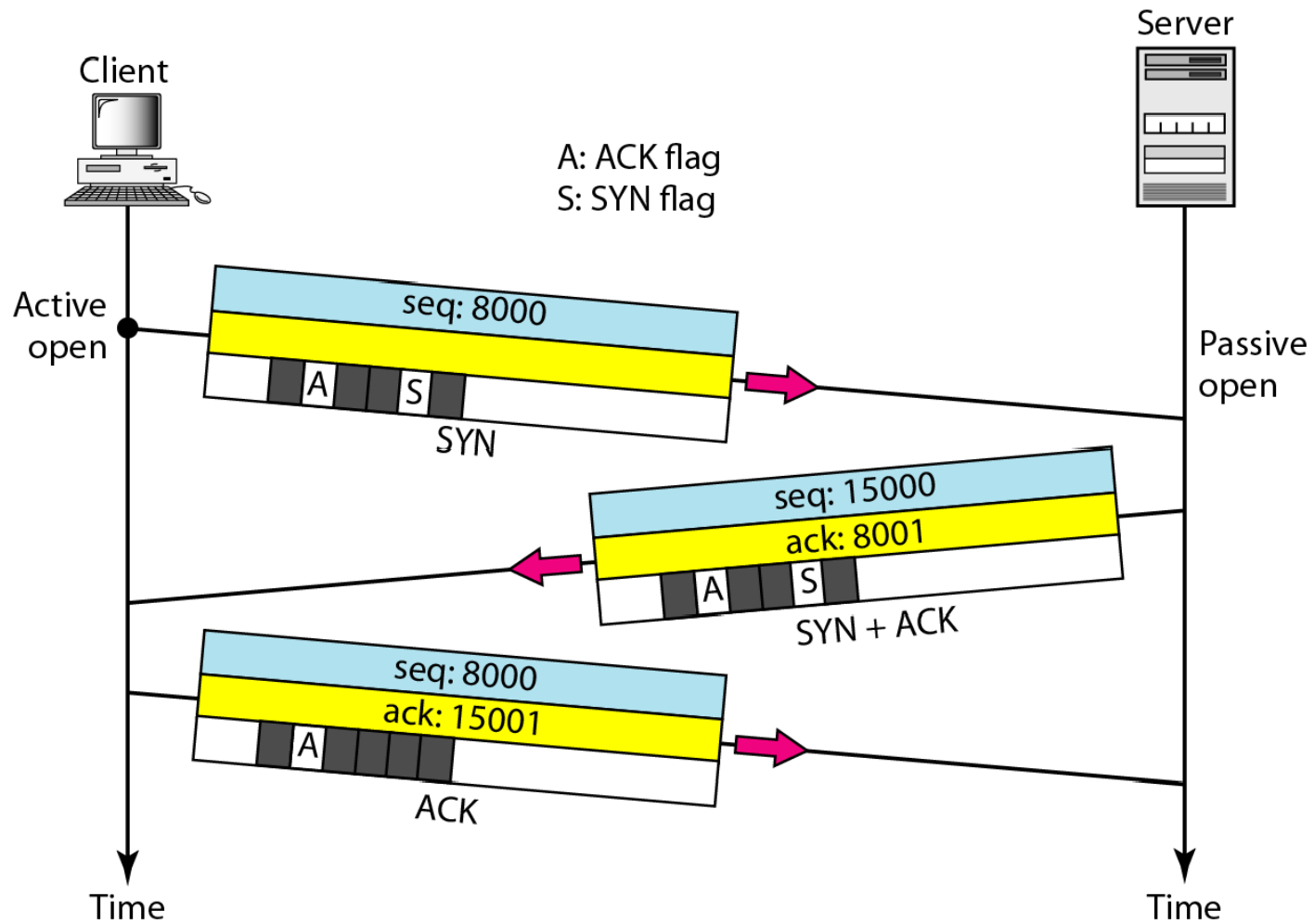
RST: Reset the connection
SYN: Synchronize sequence numbers
FIN: Terminate the connection



Description of flags in the control field

<i>Flag</i>	<i>Description</i>
URG	The value of the urgent pointer field is valid.
ACK	The value of the acknowledgment field is valid.
PSH	Push the data.
RST	Reset the connection.
SYN	Synchronize sequence numbers during connection.
FIN	Terminate the connection.

Connection establishment using three-way handshaking



Note

A SYN segment cannot carry data, but it consumes one sequence number.

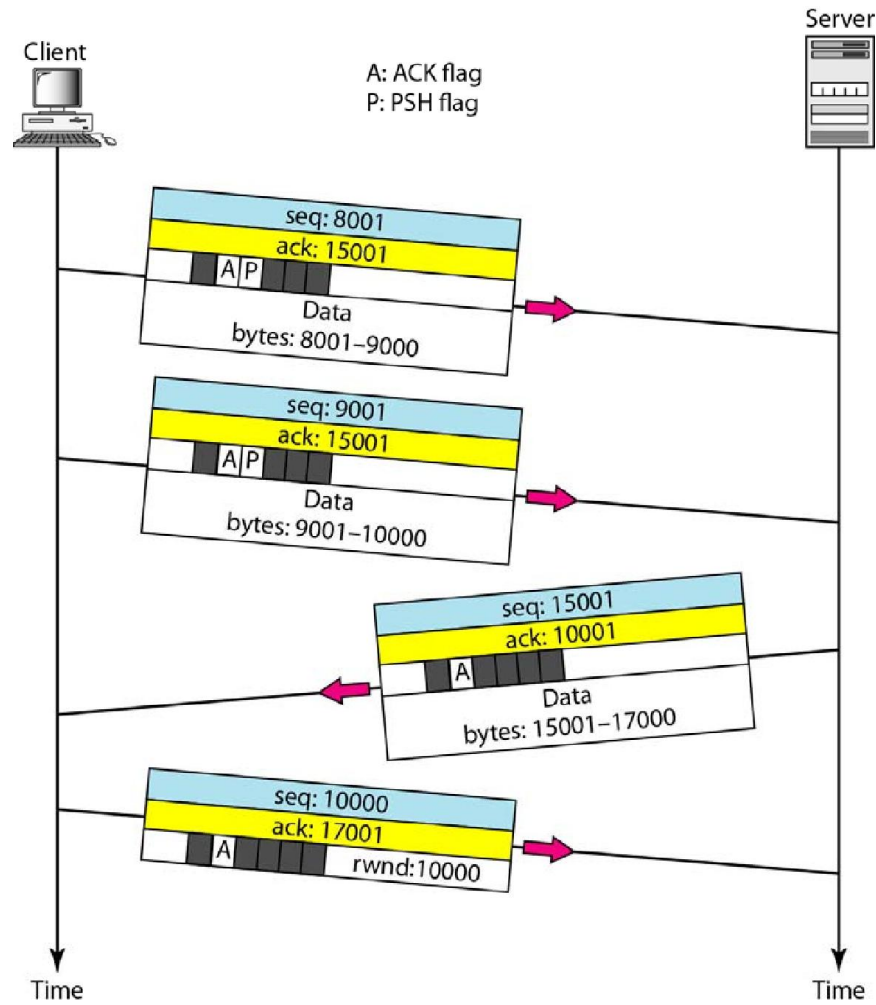
Note

A SYN + ACK segment cannot carry data, but does consume one sequence number.

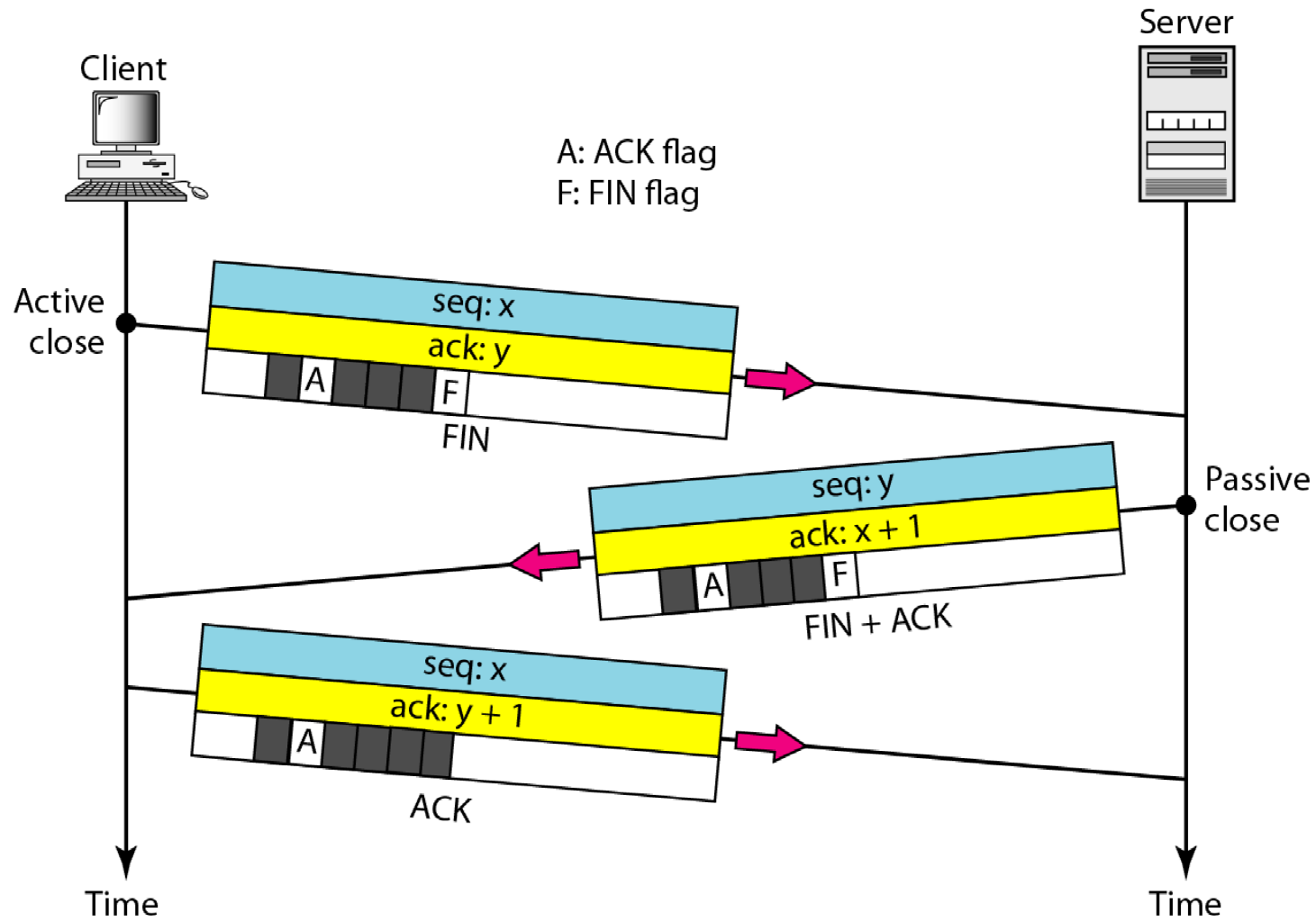
Note

**An ACK segment, if carrying no data,
consumes no sequence number.**

Data transfer



Connection termination using three-way handshaking



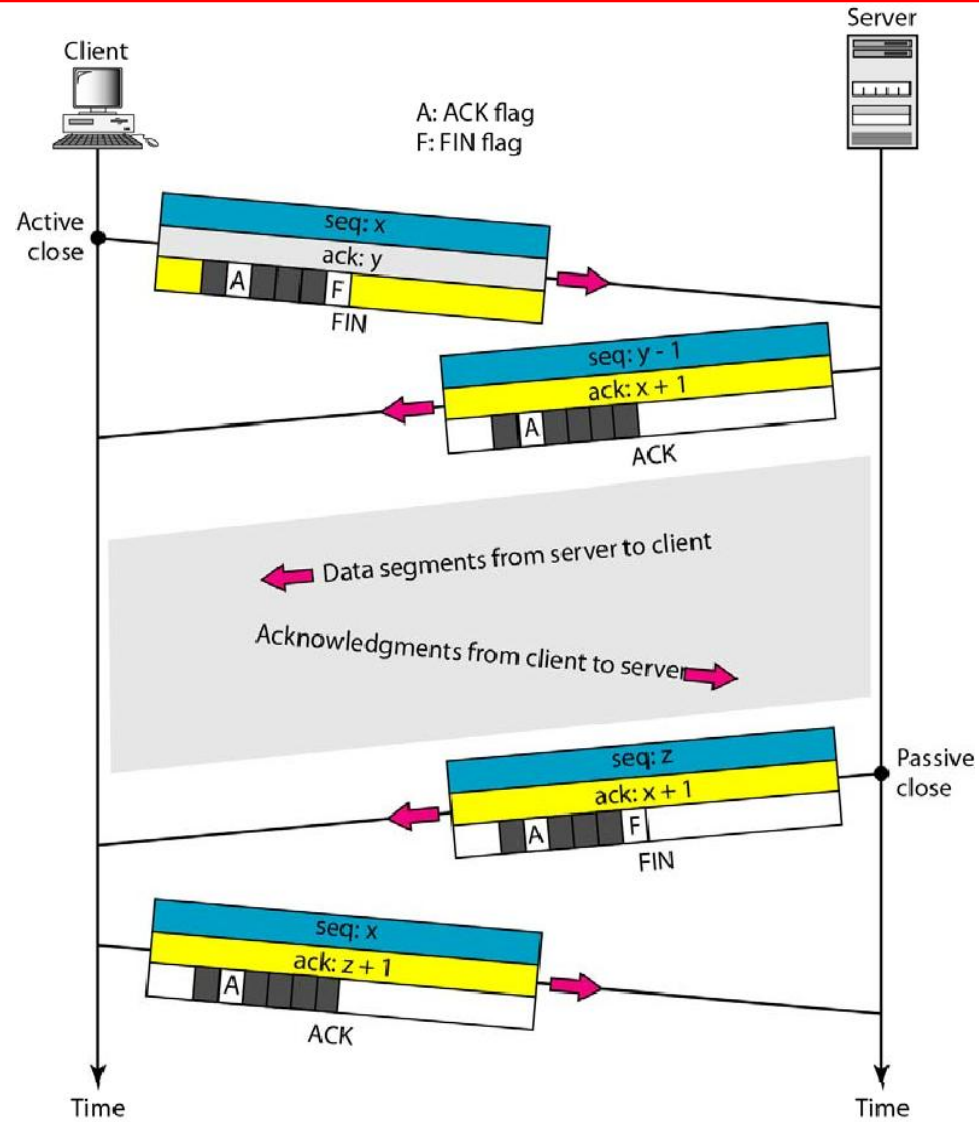
Note

The FIN segment consumes one sequence number if it does not carry data.

Note

The FIN + ACK segment consumes one sequence number if it does not carry data.

Half-close



References

- 1. Computer Networks, A. S. Tenenbaum, D. J. Wetheral, Pearson India.***
 - 2. Data Communications and Networking, B.A. Forouzan, Tata McGraw Hill Education Private Limited.***
 - 3. Data and Computer Communications, William Stallings, Pearson-Prentice Hall.***
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