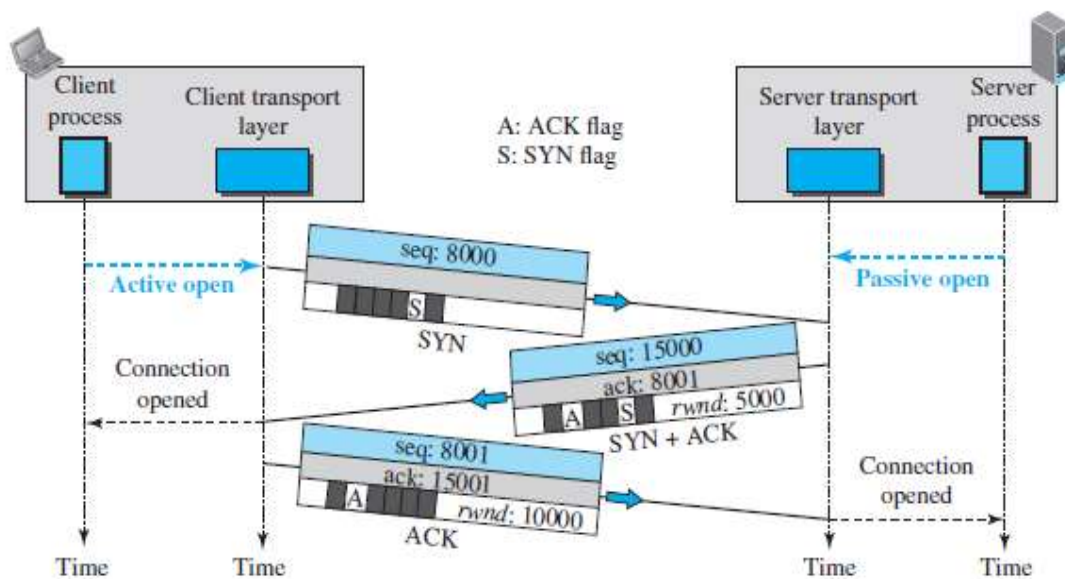


## TCP CONNECTION

- ✓ **Connection Establishment:**
- ✓ **Three Way Handshaking:**
  - The connection establishment in TCP is called three way handshaking. The process starts with the server. The server program tells its TCP that it is ready to accept a connection. This is called a request for a *passive open*.
  - The client program issues a request for an *active open*. A client that wishes to connect to particular server.



**Fig:** Connection establishment using three-way handshaking

The three steps in this phase are as follows.

- ✓ The client sends the first segment, a SYN segment, A SYN segment cannot carry data, but it consumes one sequence number.
- ✓ The server sends the second segment, a SYN +ACK segment, with 2 flag bits set: SYN and ACK. A SYN +ACK segment cannot carry data, but does consume one sequence number.
- ✓ The client sends the third segment. This is just an ACK segment. An ACK segment, if carrying no data, consumes no sequence number.

### Data Transfer:

- After connection is established, bidirectional data transfer can take place. The client and server can both send data and acknowledgments.

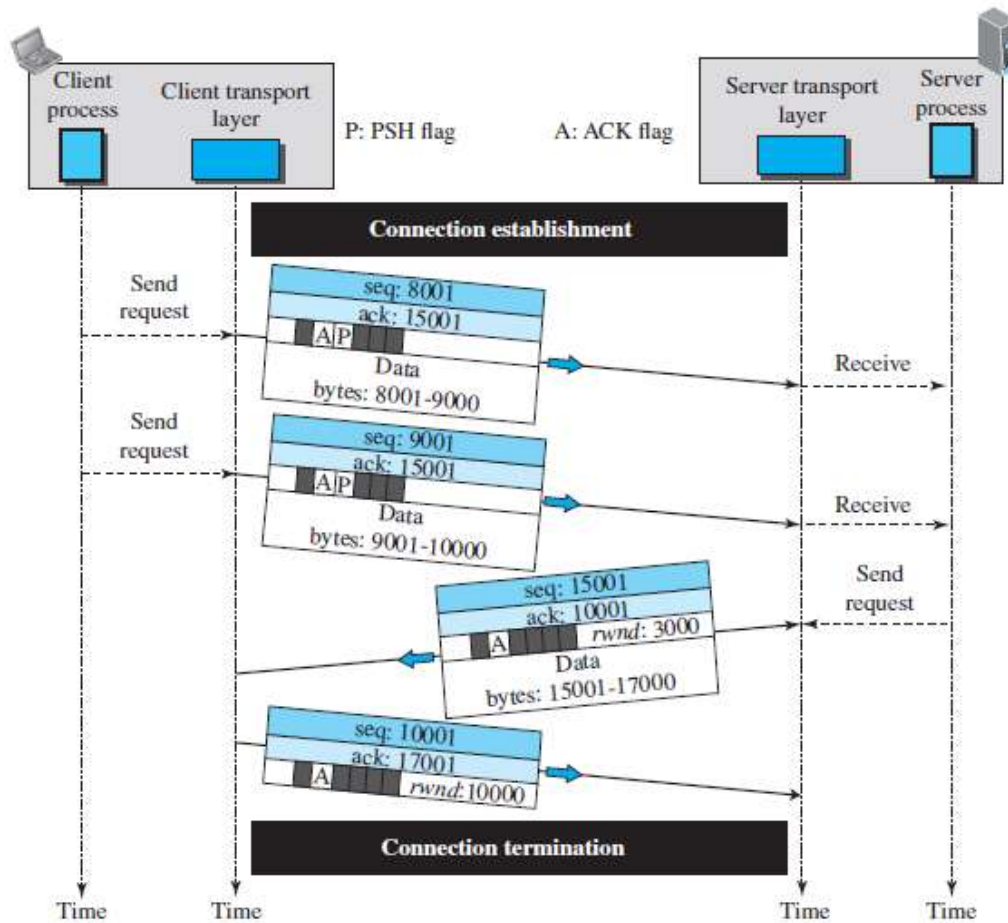


Fig: Data transfer.

**Connection Termination:**

- Two options for connection termination: three-way handshaking and four-way handshaking with a half-close option.

**Three-Way Handshaking:**

1. Sends the first segment, a FIN segment.
2. The server TCP, after receiving the FIN segment, informs its process of the situation and sends the second segment, a FIN +ACK segment.
3. The client TCP sends the last segment, an ACK segment, to confirm the receipt of the FIN segment from the TCP server.

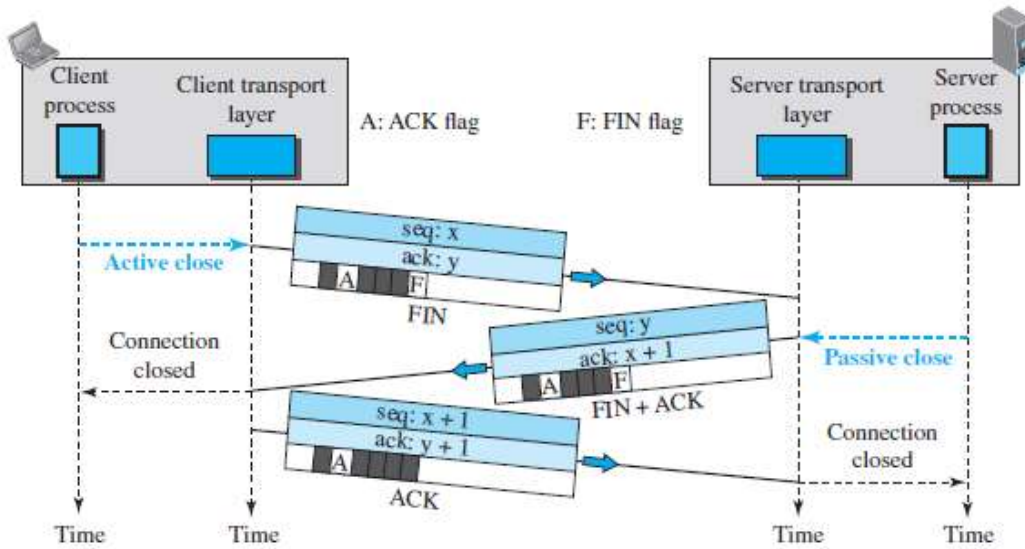


Fig: Connection termination using three-way handshaking.

➤ **Half-Close:**

- In TCP, one end can stop sending data while still receiving data. This is called a half-close.

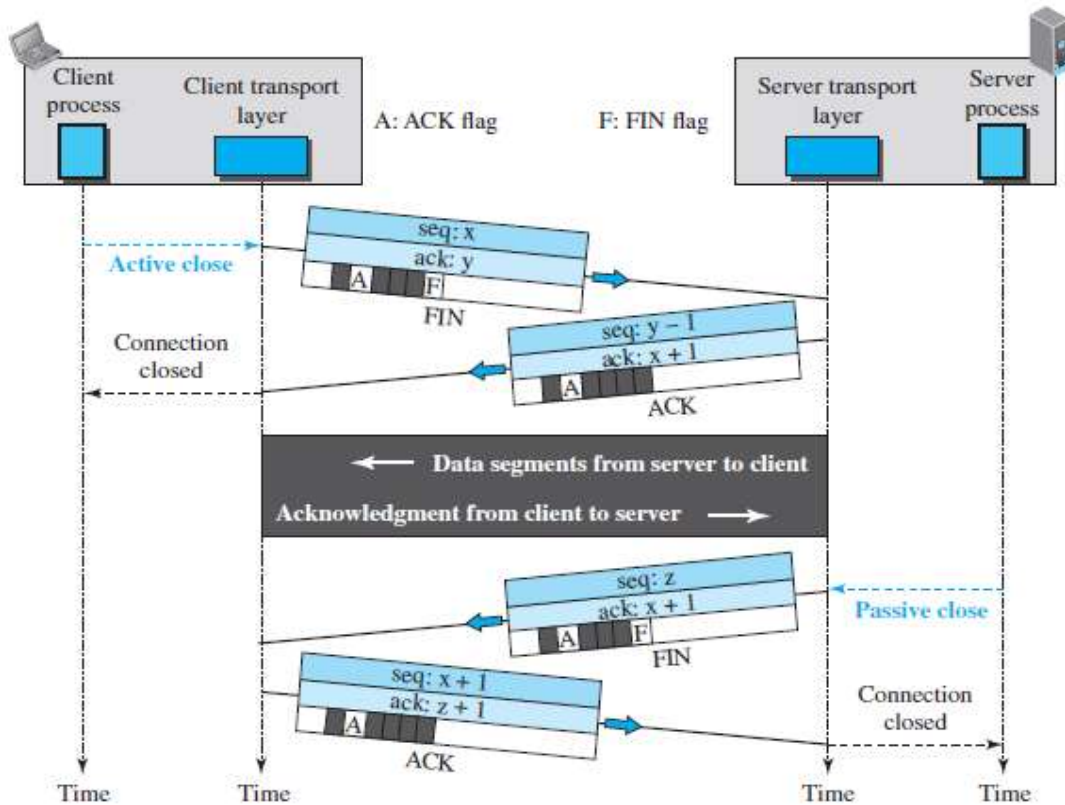


Fig: Half-close.