

# Key Features of the Transmission Control Protocol

Here are some key properties of TCP. These are important to know to understand the design of the protocol.

## WE'LL COVER THE FOLLOWING ^

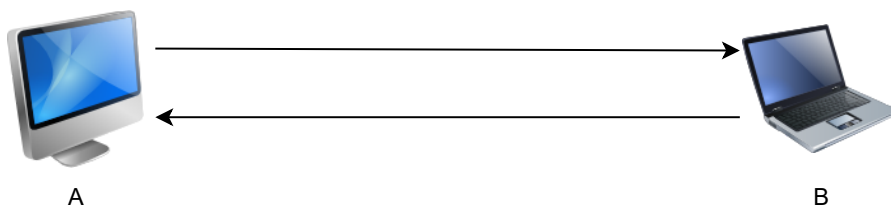
- Connection Oriented
- Full Duplex
- Point-to-point Transmission

## Connection Oriented #

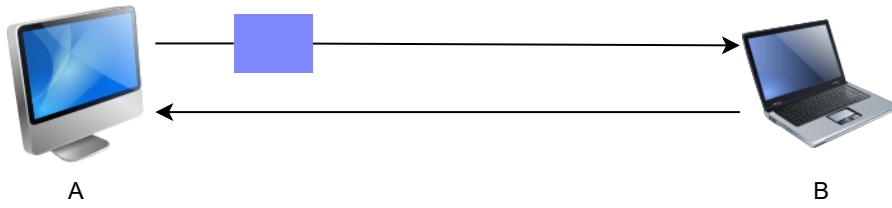
TCP itself is **connection-oriented** and creates a long term connection between hosts. The connection remains until a certain termination procedure is followed.

## Full Duplex #

Furthermore, TCP is **full-duplex**, which means that both hosts on a TCP connection can send messages to each other simultaneously.

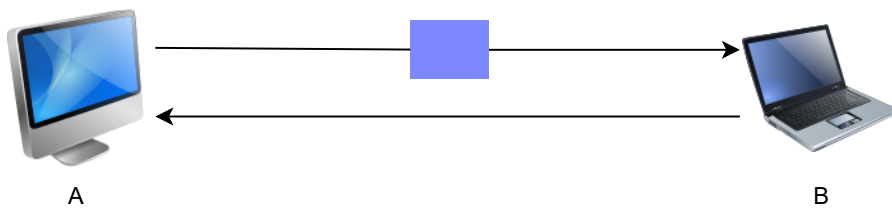


Suppose two hosts are connected to each other over TCP



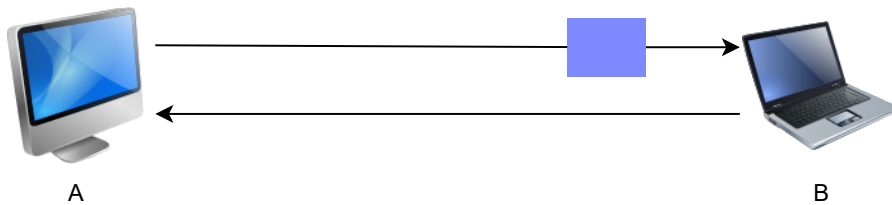
Host A can send a message to host B

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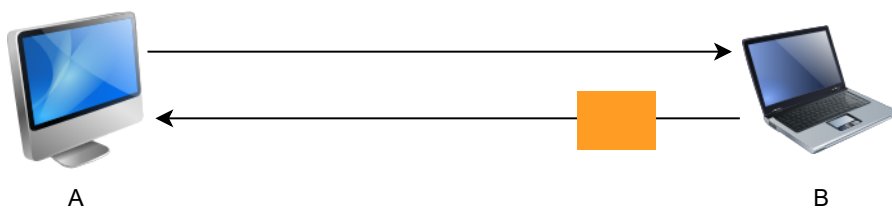
Host A can send a message to host B

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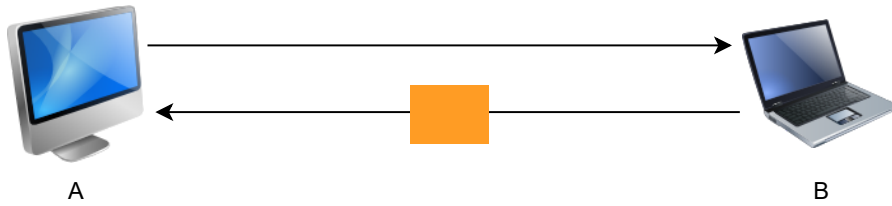
Host A can send a message to host B

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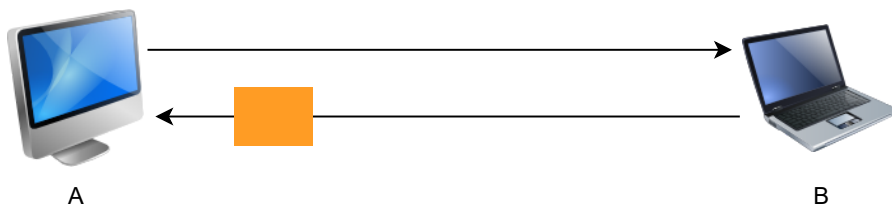
Similarly, host B can send a message to host A

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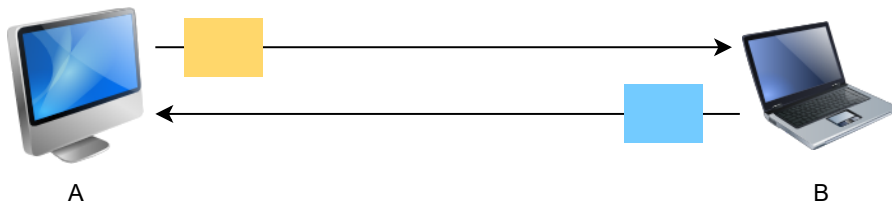
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Similarly, host B can send a message to host A

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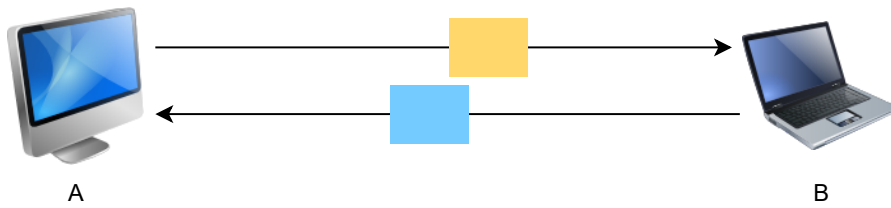
Also, both hosts can send each other messages simultaneously because TCP is full duplex!

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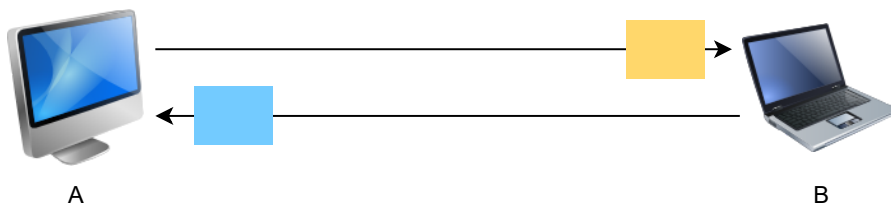
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## Point-to-point Transmission #

TCP connections have **exactly two endpoints!** This means that **broadcasting** or **multicasting** is not possible with TCP.

## Error Control

TCP can detect errors in segments and make corrections to them.

## Flow Control

TCP on the sending side controls the amount of data being sent at once based on the receiver's specified capacity to accept and process it. The sender adjusts the sending rate accordingly.

## Congestion Control

As specified in a previous lesson, TCP has in-built mechanisms to control the amount of congestion on the network.



TCP detects and handles errors!

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Now we understand what TCP is and its general design principles. Let's study TCP headers in the next lesson!