#### **Transport Layer**

application

transport

network

link

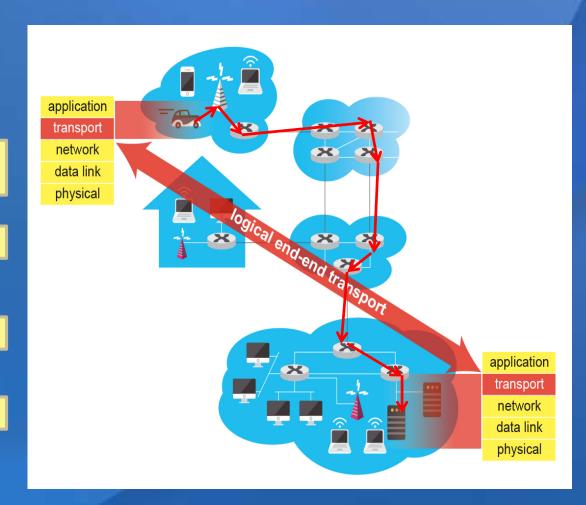
physical

Logical Communication between Processes

**Forwarding & Routing** 

**Data Transfer Between Neighbors** 

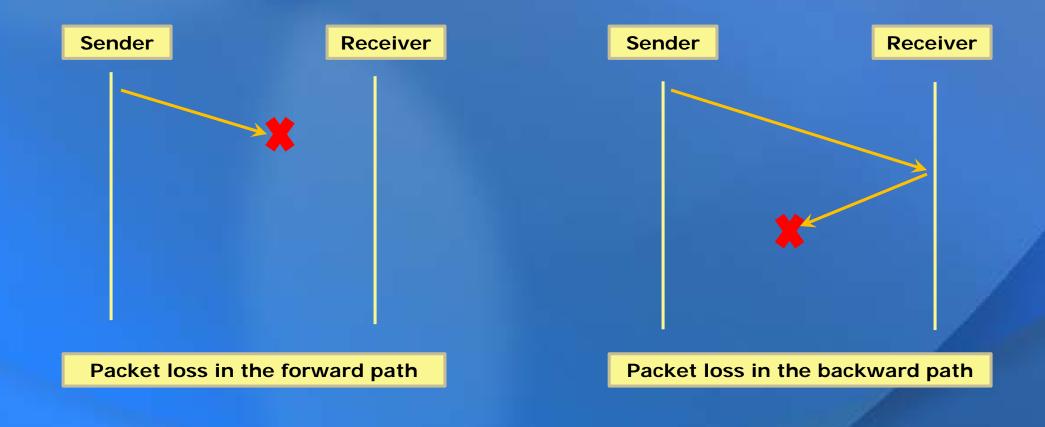
Bits "On The Wire"



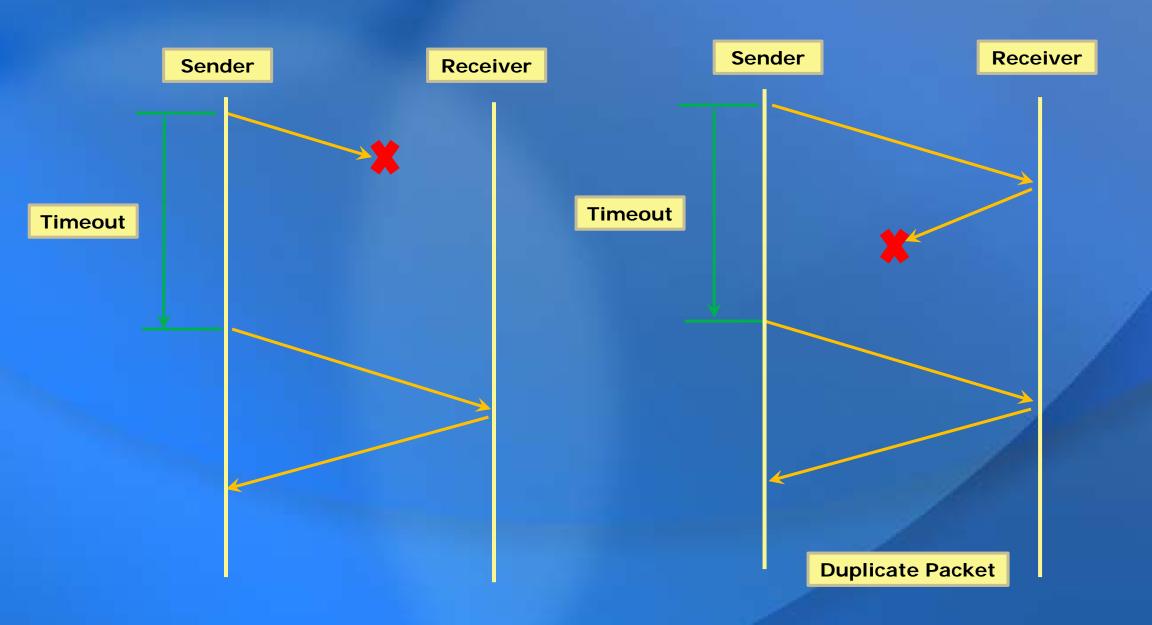
## **Stop-and-Wait Protocol**

Sender Receiver Forward Path Sender sends a packet Receiver receives the packet and sends ACK Backward Path Sender receives ACK and sends a new packet

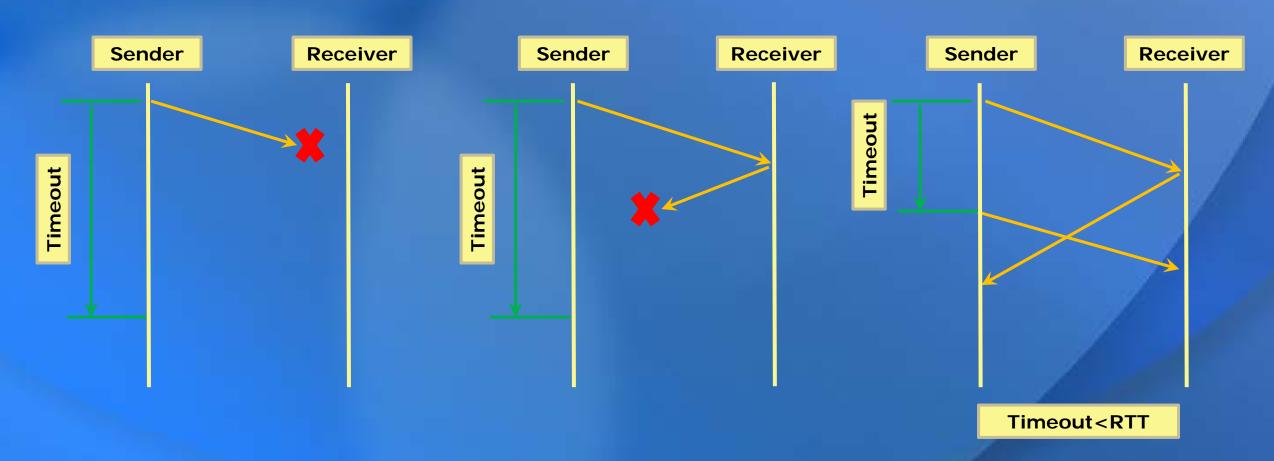
## Packet Loss due to Link Reliability



#### **Time-Out and Retransmission**



# **Effect of Timeout on Throughput**



Selection of Timeout: a Tradeoff

- 1. Too large: unnecessary waiting for lost packets (Throughput)
- 2. Too small: unnecessary retransmissions (Energy)