

More Git, Networking, HTTP API



Announcements

- ▶ Enrollment Codes -
- ▶ Enrollment Conflicts Accomodated
 - ▶ Enroll by tomorrow night
- ▶ Gradescope
- ▶ Drop Deadline - September 16th
- ▶ HW1 Releasing Thursday
 - ▶ Bash, Git, HTTP, Golang

Last Week

- ▶ Cloud computing intro
 - ▶ Costs, Benefits, etc.
- ▶ Command Line
 - ▶ Writeup?
- ▶ Git

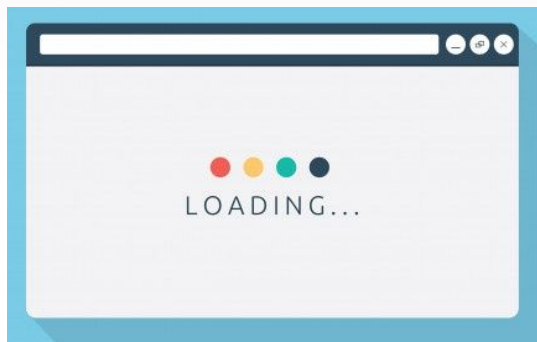
▶ Today

- ▶ Git
 - ▶ Merge Conflicts
- ▶ Networks, Server Communication
- ▶ HTTP API



Git Merge Conflict Demo

Recall



Networking Protocols

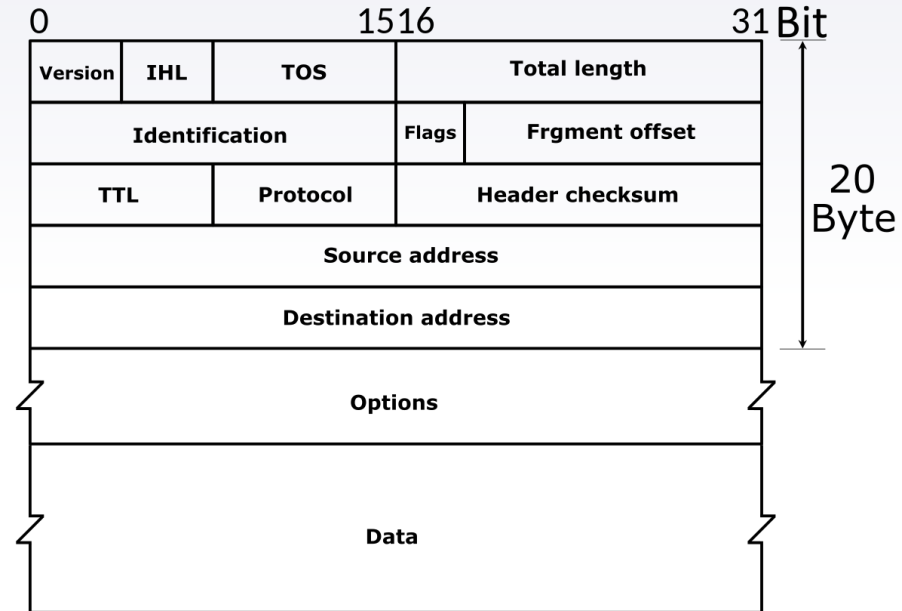
- ▶ Internet Protocol (IP)
- ▶ User Datagram Protocol (UDP)
- ▶ Transmission Control Protocol (TCP)
- ▶ Hypertext Transfer Protocol (HTTP)

Internet Protocol (IP)

- ▶ Responsible for delivering information from the *source* to the *destination*
- ▶ Sends information in blocks of data called *packets*
- ▶ Connectionless
 - ▶ Only cares about where a packet is going

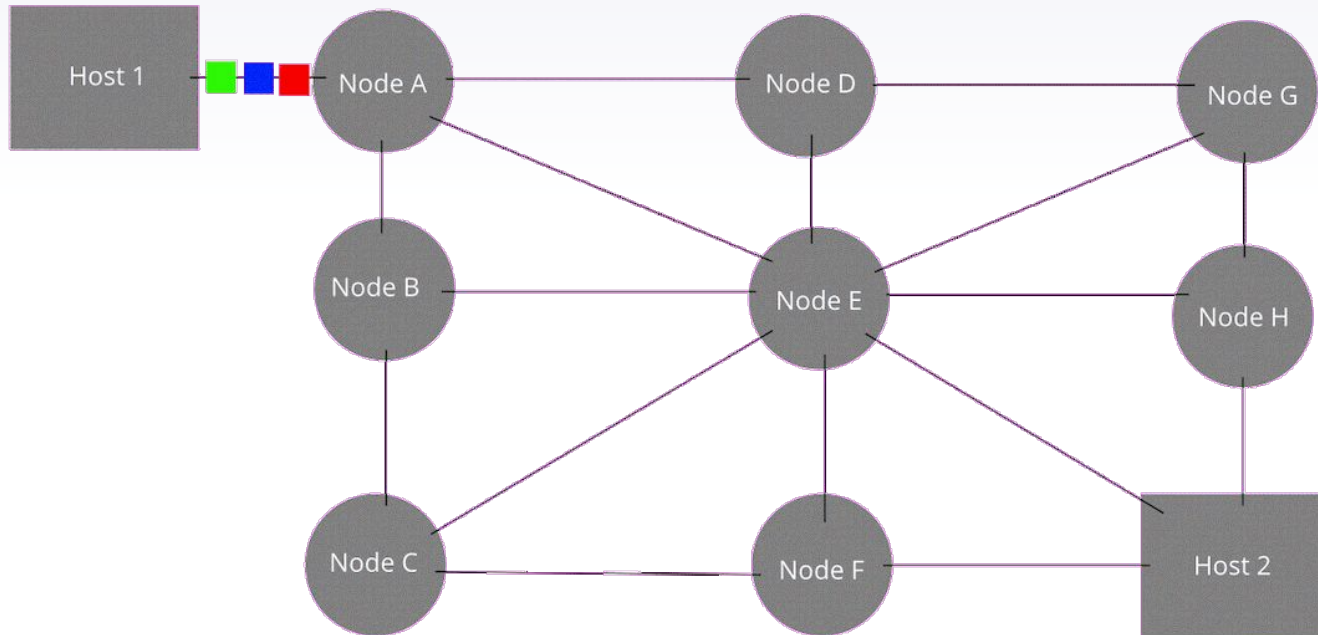
Packet

- ▶ Once sent, packets may take different paths
- ▶ Packets may arrive in any order
- ▶ Packets might not arrive at all
- ▶ Packets are reassembled at destination



Packet

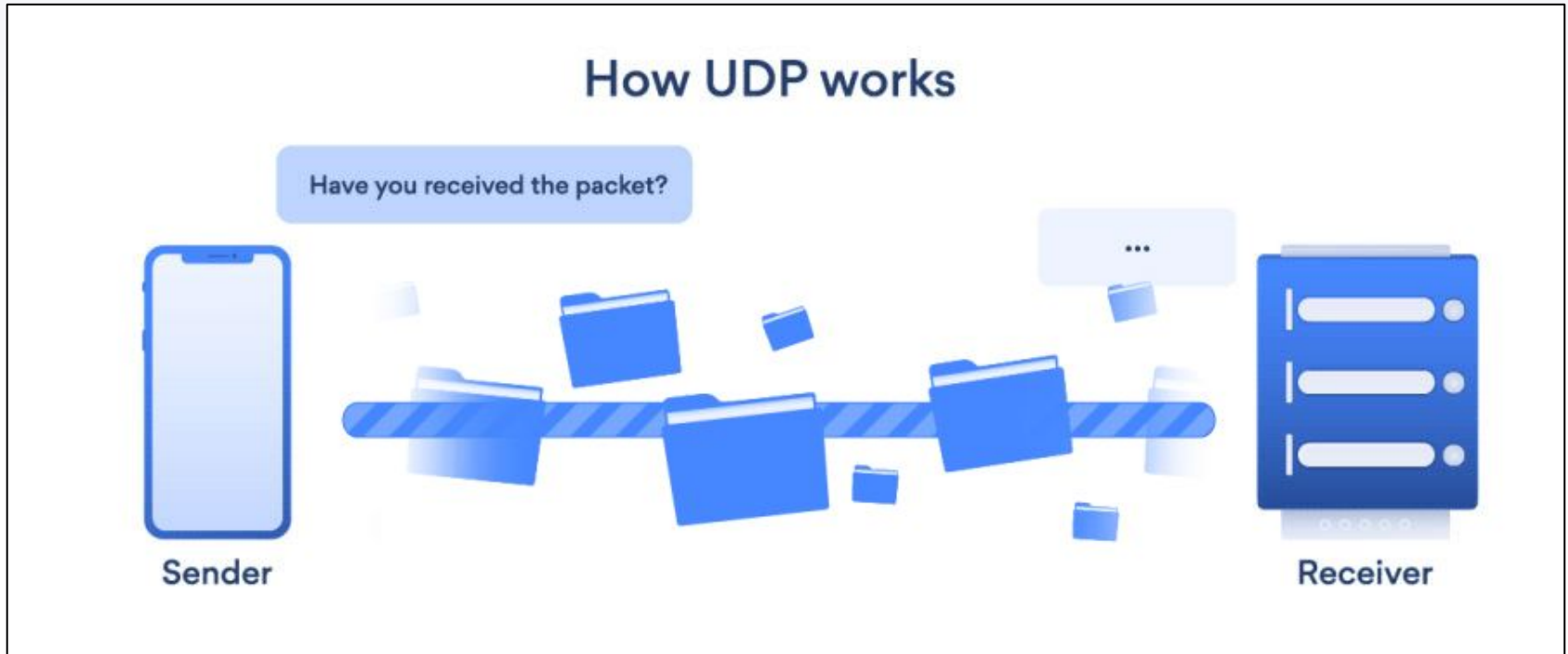
The original message is **Green, Blue, Red.**



User Datagram Protocol(UDP)

- ▶ Built on top of IP
- ▶ Packets not ensured to be delivered
- ▶ Packets not ensured to arrive in correct order
- ▶ Connectionless

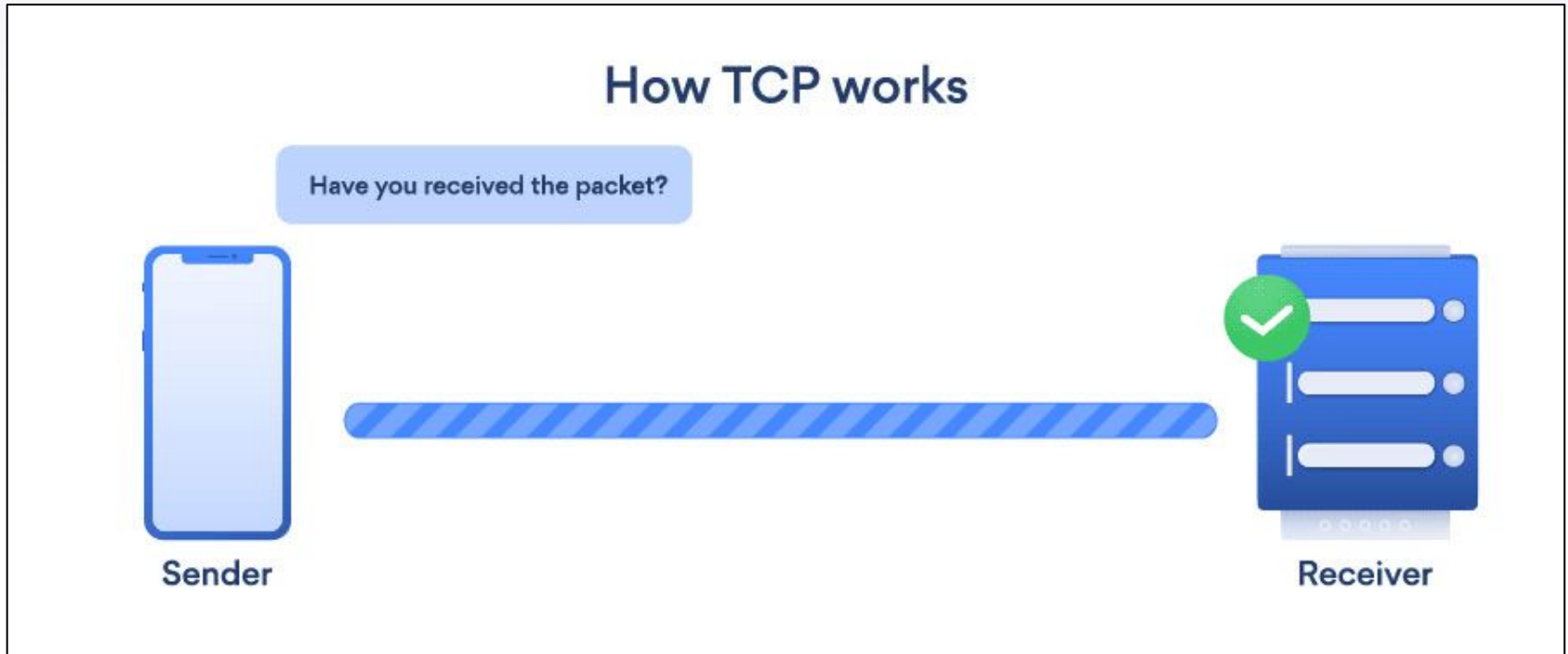
User Datagram Protocol(UDP)



▶ Transmission Control Protocol(TCP)

- ▶ Built on top of IP
- ▶ Packets are ensured to be delivered
- ▶ Packets are ensured to be in-order
- ▶ Establishes a connection
- ▶ Slower than UDP

Transmission Control Protocol(TCP)



Hypertext Transfer Protocol(HTTP)

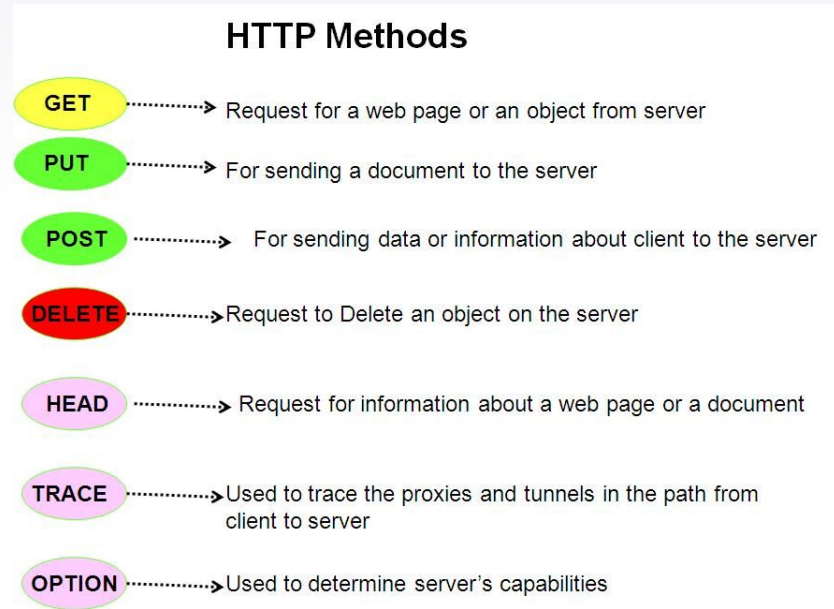
- ▶ Built on top of TCP
 - ▶ We want to make sure our server receives *all* of the necessary info
- ▶ Used within web browsers to send *requests*
- ▶ Servers receive the *request* and send a *response*
- ▶ Stateless*

▶ HTTP Request Structure

- ▶ Request Method
- ▶ Target (URL)
- ▶ Headers
- ▶ Query Parameters
- ▶ (Optional) Body

HTTP Request Methods

- ▶ GET - Read data
- ▶ PUT - Update (replace) data
- ▶ POST - Write Data
- ▶ DELETE - Delete data
- ▶ (PATCH) - Partially modify data
- ▶ ...



HTTP Headers

- ▶ Describes
 - ▶ what the browser wants
 - ▶ what encoding the browser will accept
 - ▶ browser name/version
 - ▶ OS name/version
 - ▶ not limited to web browsers (!)

▶ HTTP Query Parameters

`https://www.bank.com/details?date=mmddyy¤cy=usd`

HTTP Request Body

- ▶ Payload - data to deliver to the server
- ▶ JSON (Key-Value)
 - ▶ {
 "op" : "cloud computing",
 "postID" : 34402
}