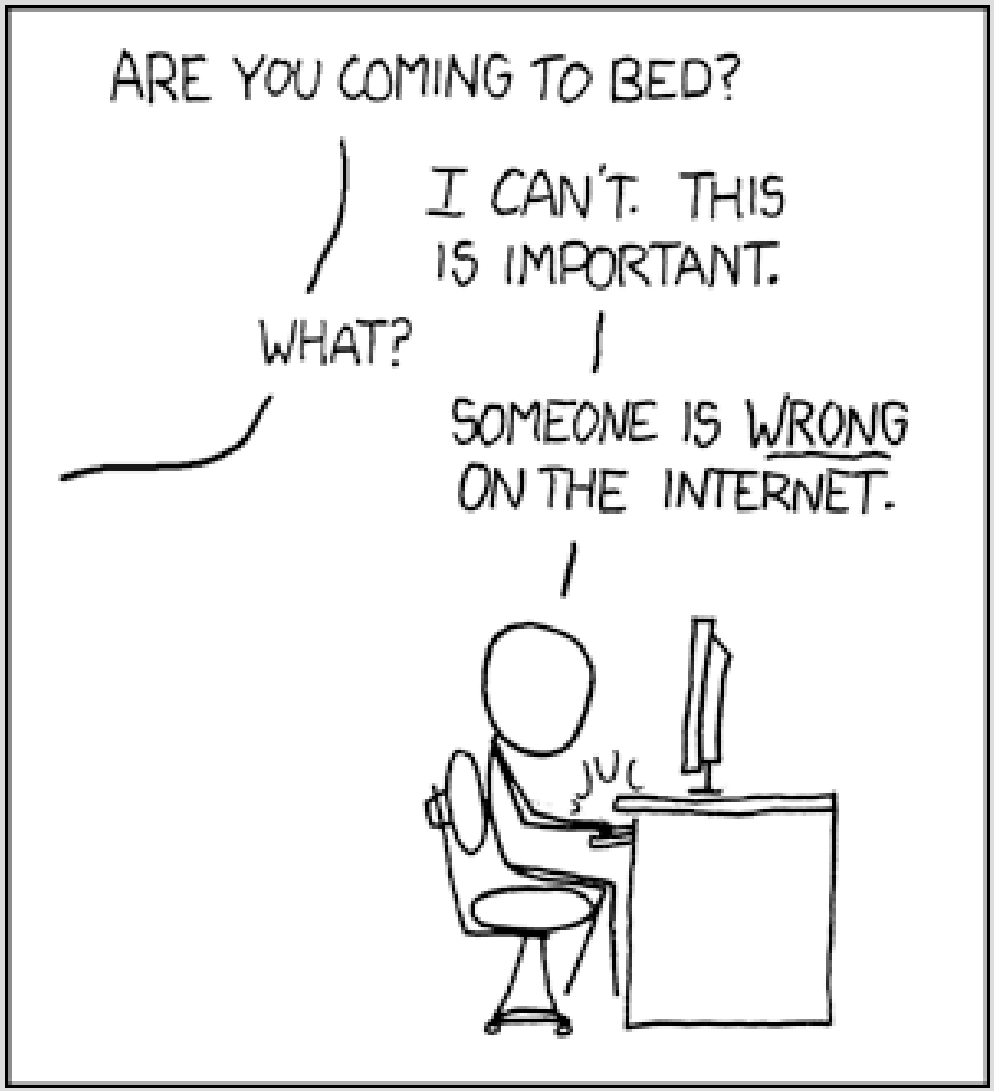
Over the Internet



Highlights

- Sockets and packets and ports, oh my!

Packet

When data travels through the Internet, it passes through many “stations” along the way

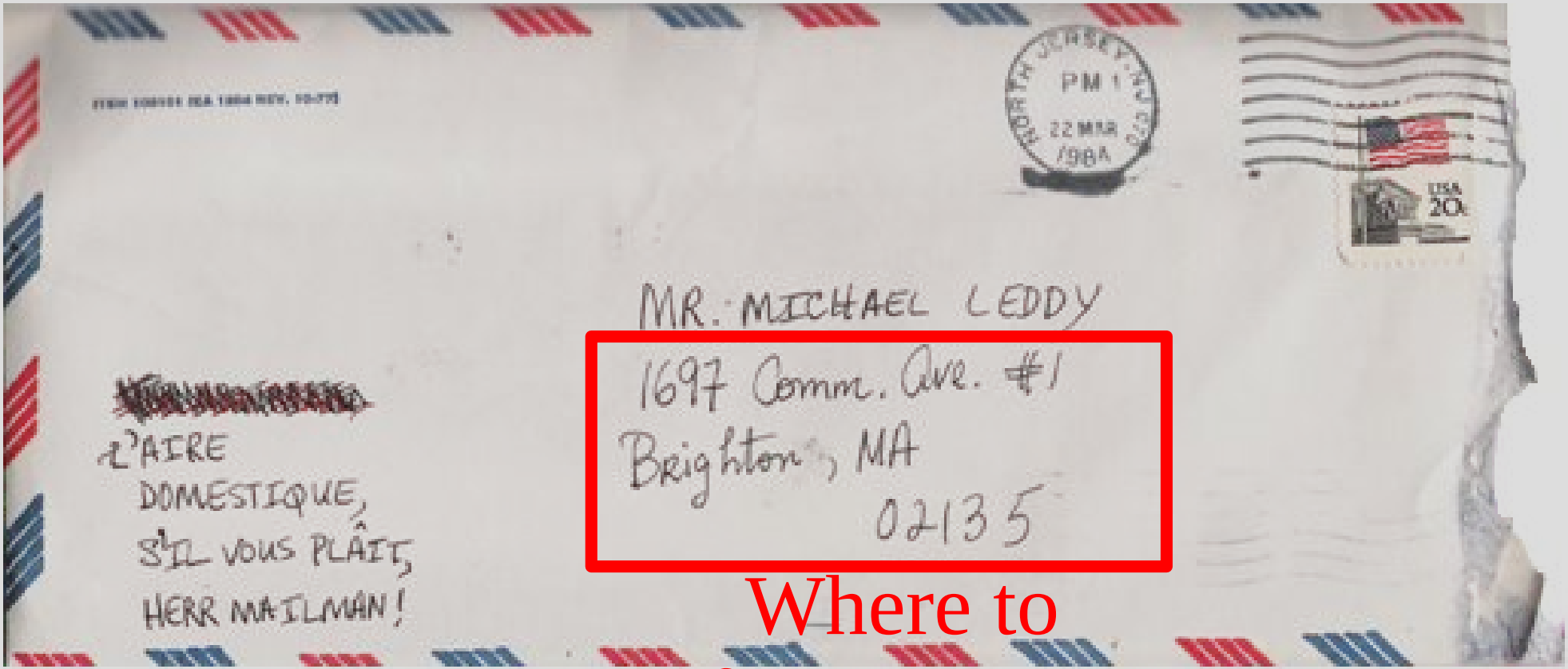
To understand where each station will pass it on to, you need an agreed upon layout/format

This is very similar to the normal/snail mail

Packet

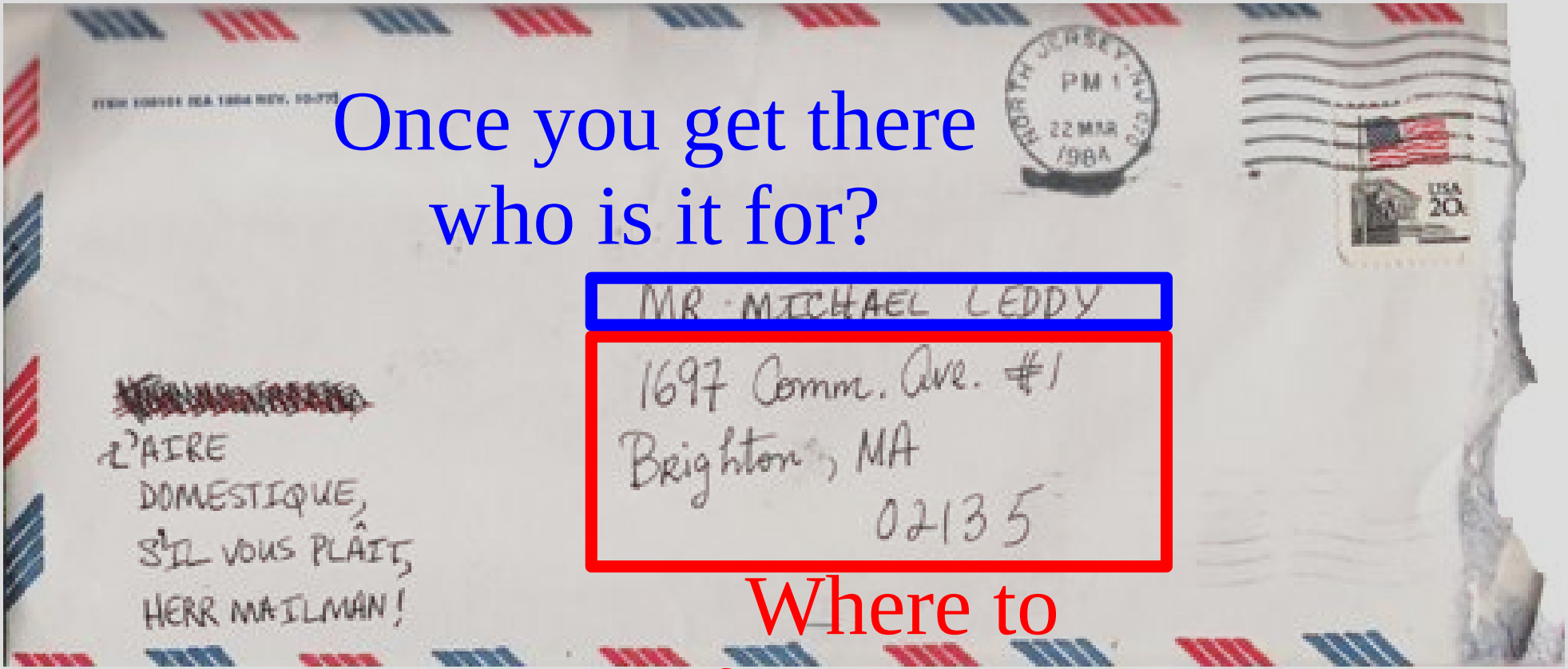

PM 1
22 MAR
1984
USA
20
MR. MICHAEL LEDDY
1697 Comm. Ave. #1
Brighton, MA
02135
L'AIRE
DOMESTIQUE,
S'IL VOUS PLÂIT,
HERR MAILMAN!

Packet



Where to
(standard format with zip code)

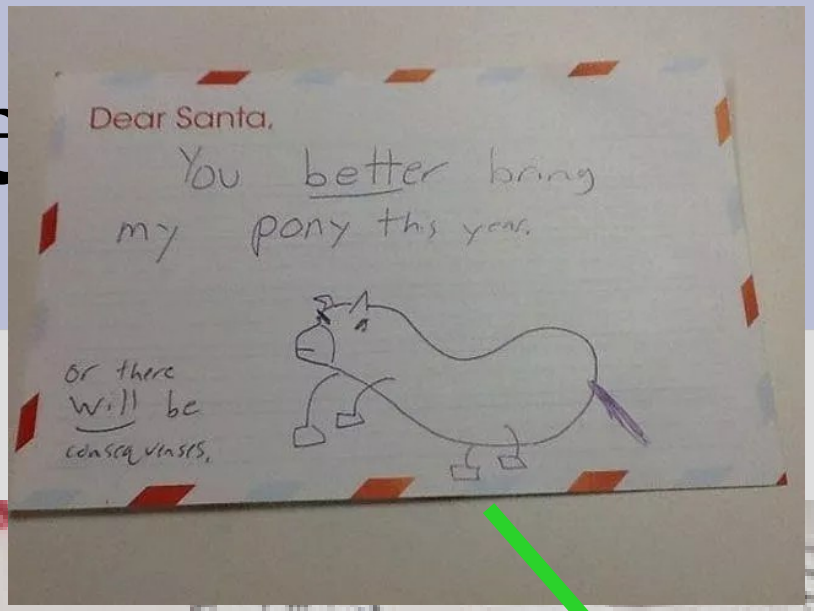
Packet



Once you get there who is it for?

Where to (standard format with zip code)

Packe



Message goes inside

Once you get there
who is it for?

MR MICHAEL LEDDY
1697 Comm. Ave. #1
Brighton, MA
02135

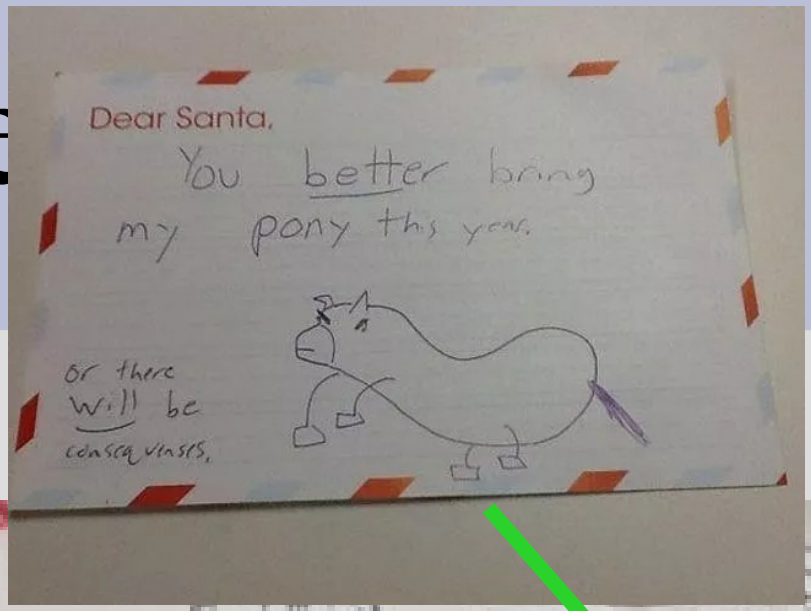
L'AIRE
DOMESTIQUE,
S'IL VOUS PLAÎT,
HERR MAILMAN!

Where to
(standard format with zip code)

Packe

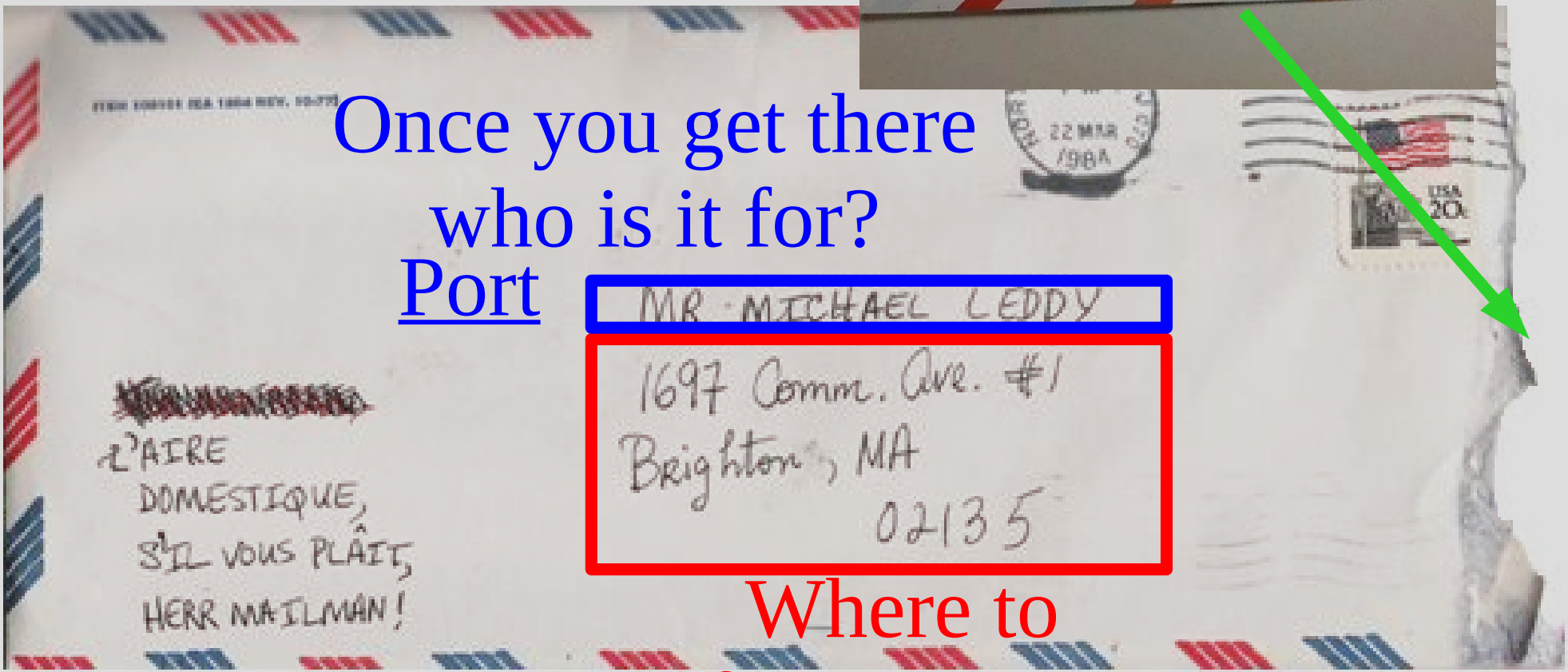
(Payload)

Message goes inside



Once you get there
who is it for?

Port



Where to
(standard format with zip code)
IP address (34.22.123.45)

Packet

The “IP address” is where on the Internet you want to send the information (what computer)

The “Port” is which app/program on the computer the data is for

Typically both the port and IP address are represented by numbers (or a set of numbers) (No real representation other than the rules we impose, like where “zip codes” are)

Packet

All these things together:

- Message (Payload)
- IP address (where)
- Port (who)

... is what we call a packet

Packets have a fixed size, so larger messages are broken up over multiple packets

Sockets

In order to send in C++ over the Internet, you also need a variable for the “connection”

This is very similar to ifstream and ofstream where the variable represents the “file”

These variables that represent the connection are called sockets and you have to set them up much like how you .open() files in C++

Sockets

Since we are sending things over the Internet, we actually need to make two programs:

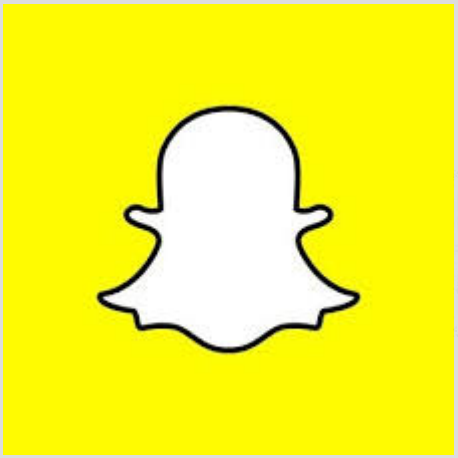
- Server = one who receives (sorta)
- Client = one who sends (sorta)

Technically, they both transfer information, but the servers need to be setup first and listen for the clients to send them a message

Sockets

IP address:
216.239.34.21

Server



Port: 443

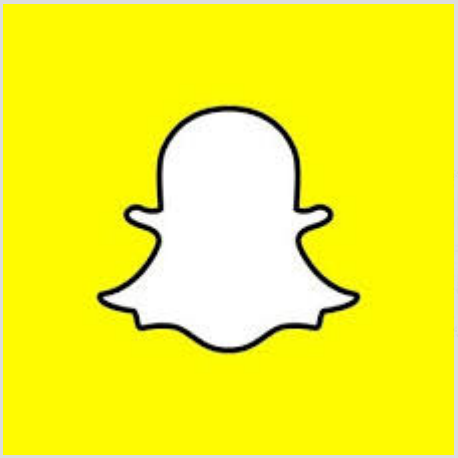
IP address:
123.45.67.89

Client

Sockets

IP address:
216.239.34.21

Server



IP address:
123.45.67.89

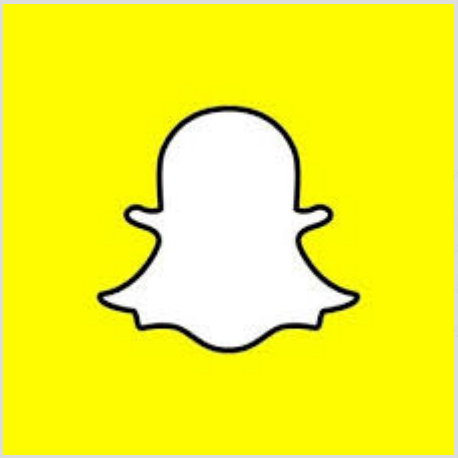
Client

Port:
443

Sockets

IP address:
216.239.34.21

Server

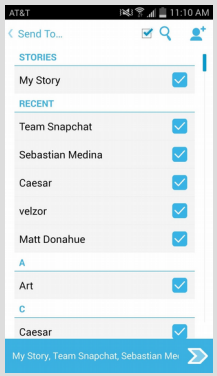


IP address:
123.45.67.89

Client

Send: 443

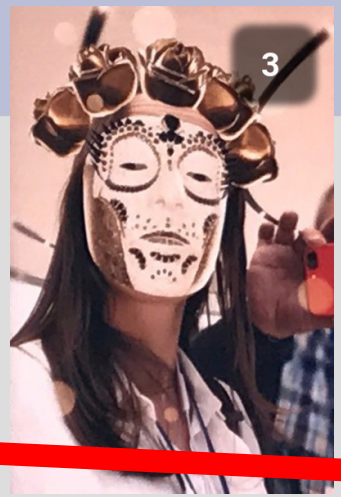
Port:
443



Sockets

IP address:
216.239.34.21

Server

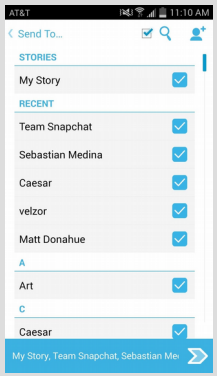


IP address:
123.45.67.89

Client

Send: 443

Port:
443



Sockets

There are quite a bit of technical details to setting up the variables in C++...

To make the server run, you need to:

- make a “socket” number
- “bind” the socket number to an actual spot
- start “listening” for people to connect
  (i.e. program is ready to take requests)
- “accpet” an incoming request
- send data back and forth (“read”&”write”)

Sockets

Clients are slightly easier as they don’t need to be setup to listen

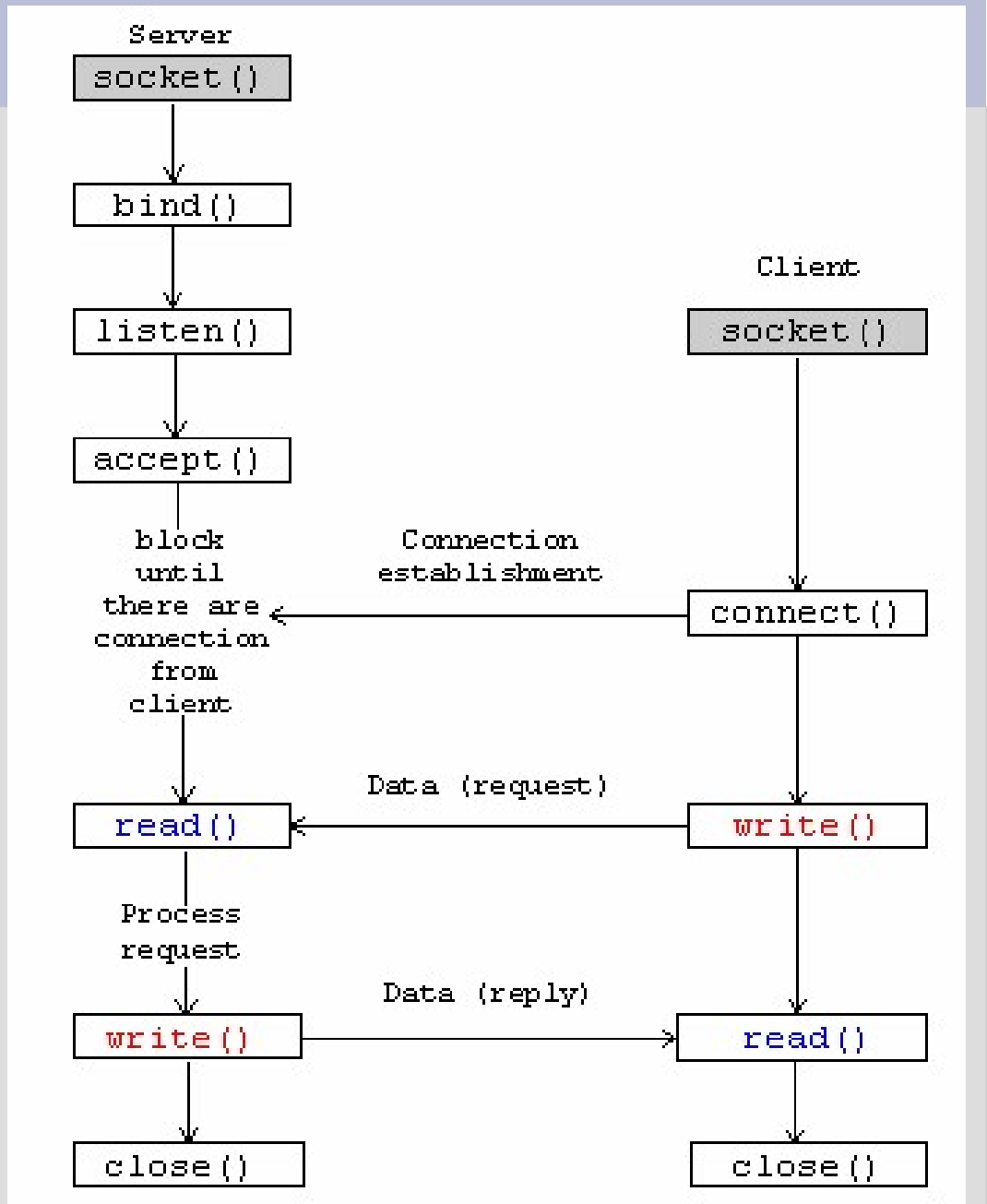
To make the client run, you need to:

- make a “socket” number
- “bind” the socket number to an actual spot
- try to “connect” to a server
- send data back and forth (“read”&”write”)

- (close connection at end)

Sockets

(see: server.cpp)
(see: client.cpp)




WHAT IS YOUR ADDRESS?
173.168.16.11
NO, YOUR LOCAL ADDRESS
127.0.0.1
I MEAN YOUR PHYSICAL ADDRESS !
28:05:FF:58:31:05