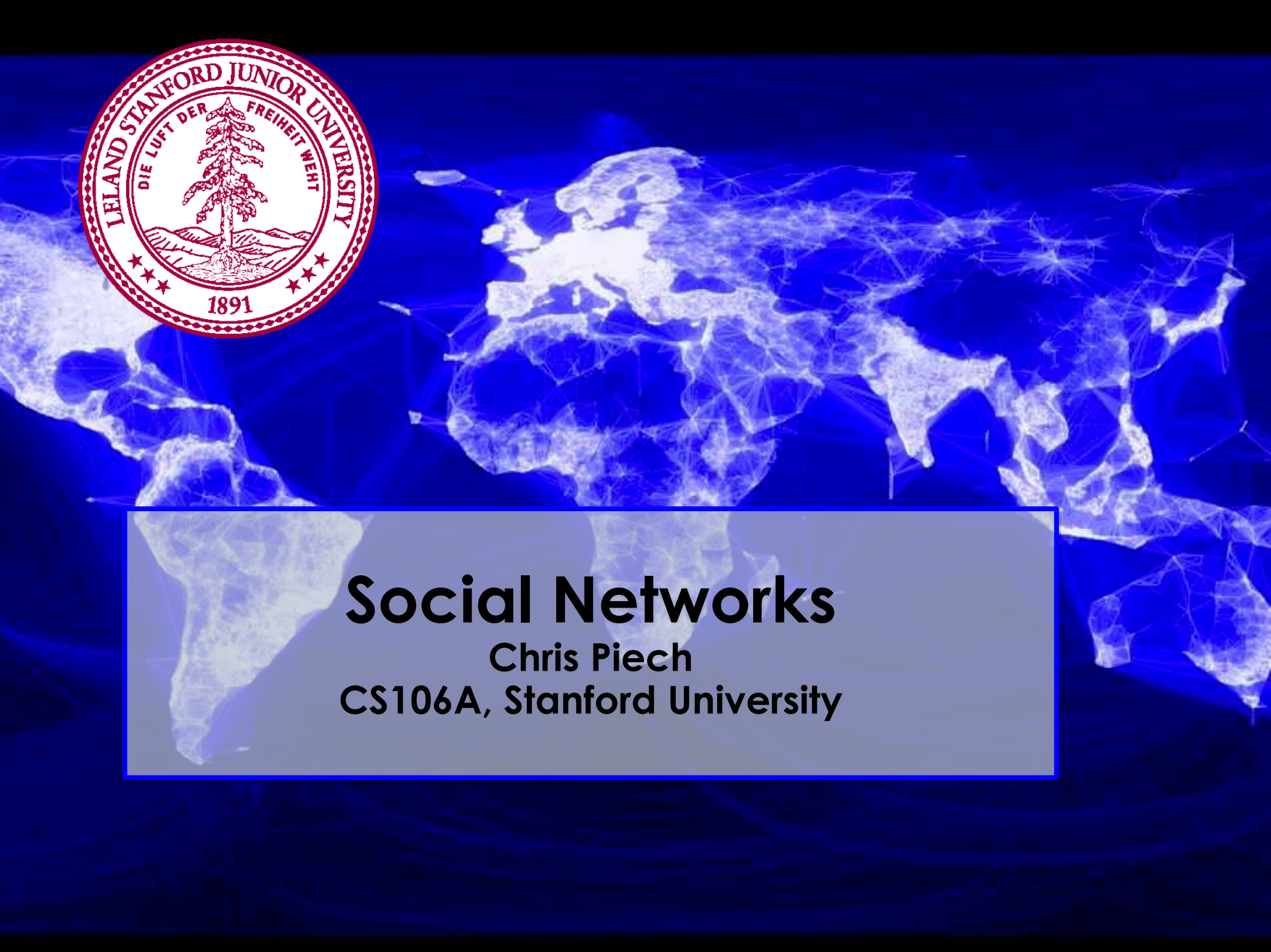



# Social Networks

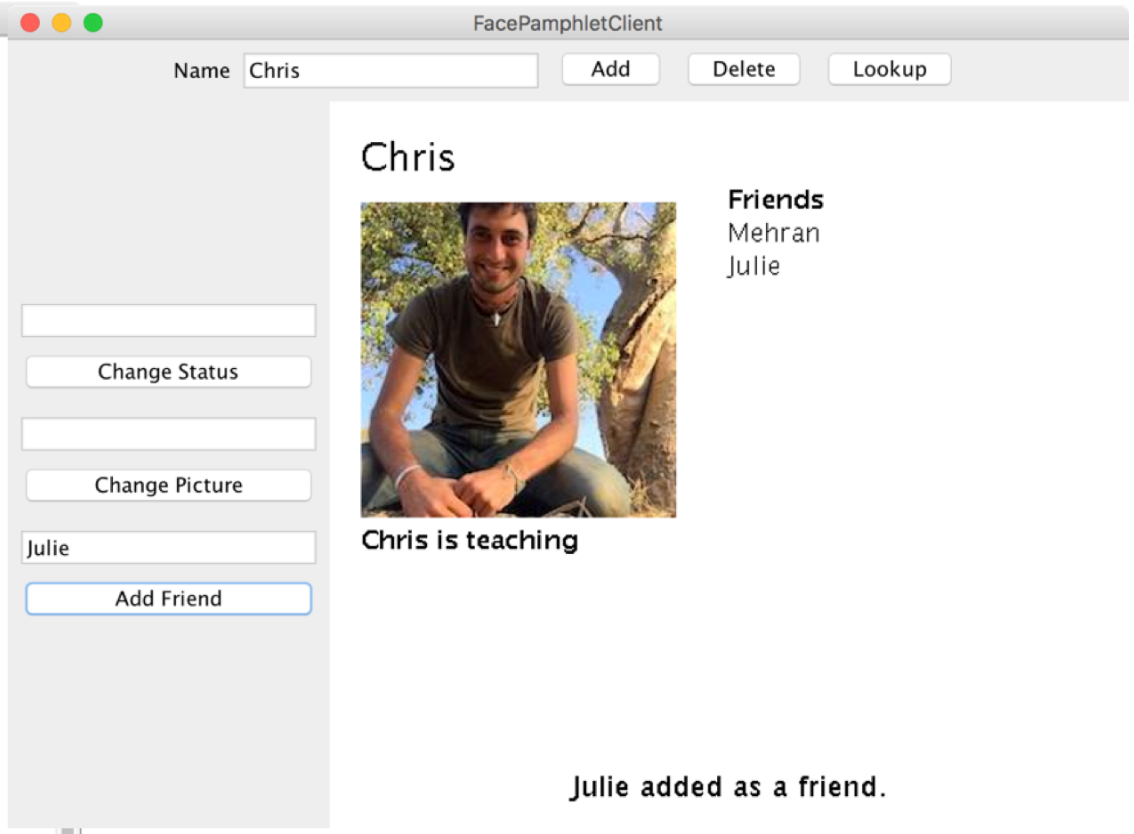
Chris Piech
CS106A, Stanford University

# Face Pamphlet

## FacePamphletServer

```
Starting server on port 8000...
addProfile (name=Mehran)
  => success
addProfile (name=Chris)
  => success
addProfile (name=Chris)
  => Error: Database already contains Chris.
getStatus (name=Chris)
  => none
setStatus (name=Chris, status=teaching)
  => success
getStatus (name=Chris)
  => teaching
addFriend (name2=Mehran, name1=Chris)
  => success
getFriends (name=Chris)
  => [Mehran]
addProfile (name=Julie)
  => success
getImg (name=Julie)
  => none
getStatus (name=Julie)
  => none
getFriends (name=Julie)
  => []
setImg (img=JulieZ.jpg, name=Julie)
  => success
getImg (name=Julie)
  => JulieZ.jpg
getStatus (name=Julie)
  => none
getFriends (name=Julie)
  => []
addFriend (name2=Chris, name1=Julie)
  => success
getImg (name=Julie)
  => JulieZ.jpg
getStatus (name=Julie)
  => none
```

## FacePamphletClient



# The Name

+

FaceBook

Thanks Mehran for the cool name

# The Name

+


FaceLittlebook

Thanks Mehran for the cool name

# The Name

+

FaceNovela

Thanks Mehran for the cool name

# The Name

+

FacePamphlet !!

Thanks Mehran for the cool name

# Some Context

- A little background on Facebook
  - Facebook founded in 2004 by Mark Zuckerberg
    - He was a sophomore at Harvard
  - Facebook in 2012
    - More than 1 billion active users
    - 10+ billion minutes/day spent on Facebook
- You can do this!
  - Mike Schroepfer (Vice President, Engineering)
  - Jocelyn Goldfein (Director, Engineering)
  - Bret Taylor (former Chief Technology Officer)
  - All three were CS majors at Stanford
  - And all are former CS106A section leaders!

# Review

# Background: The Internet

The internet is just many programs sending messages (as *Strings*)

Thanks Nick for the teaching YEAH

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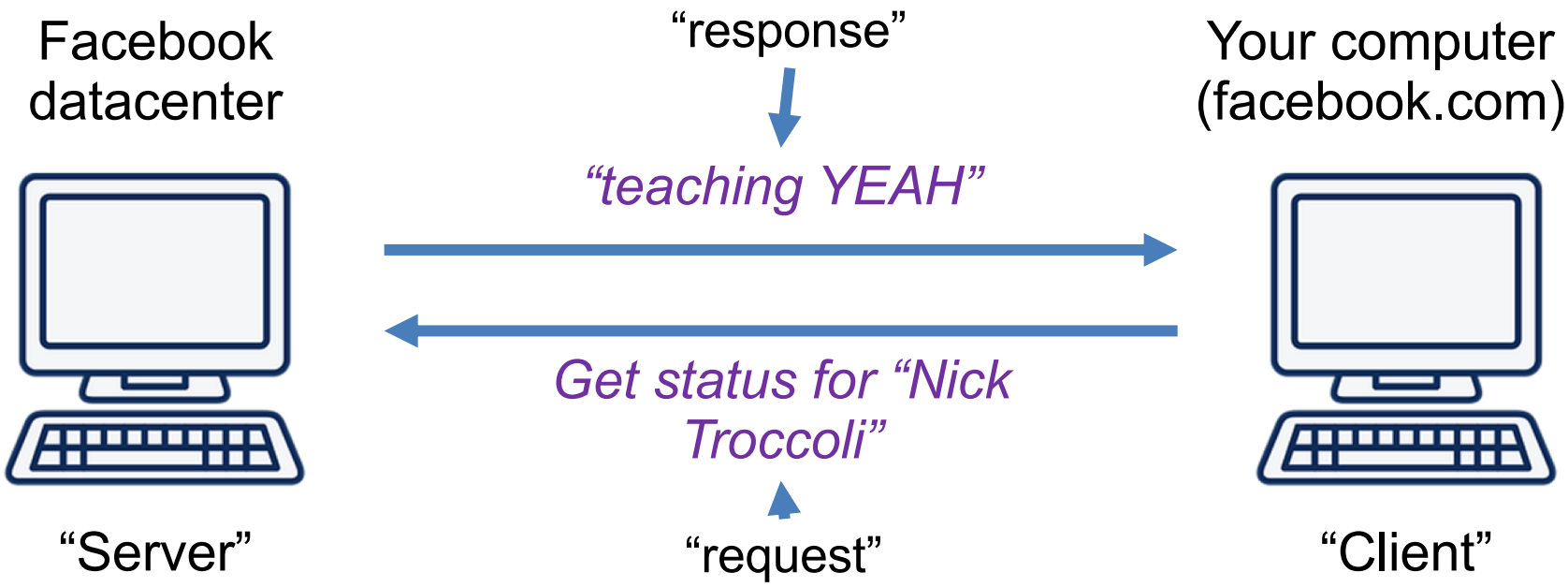
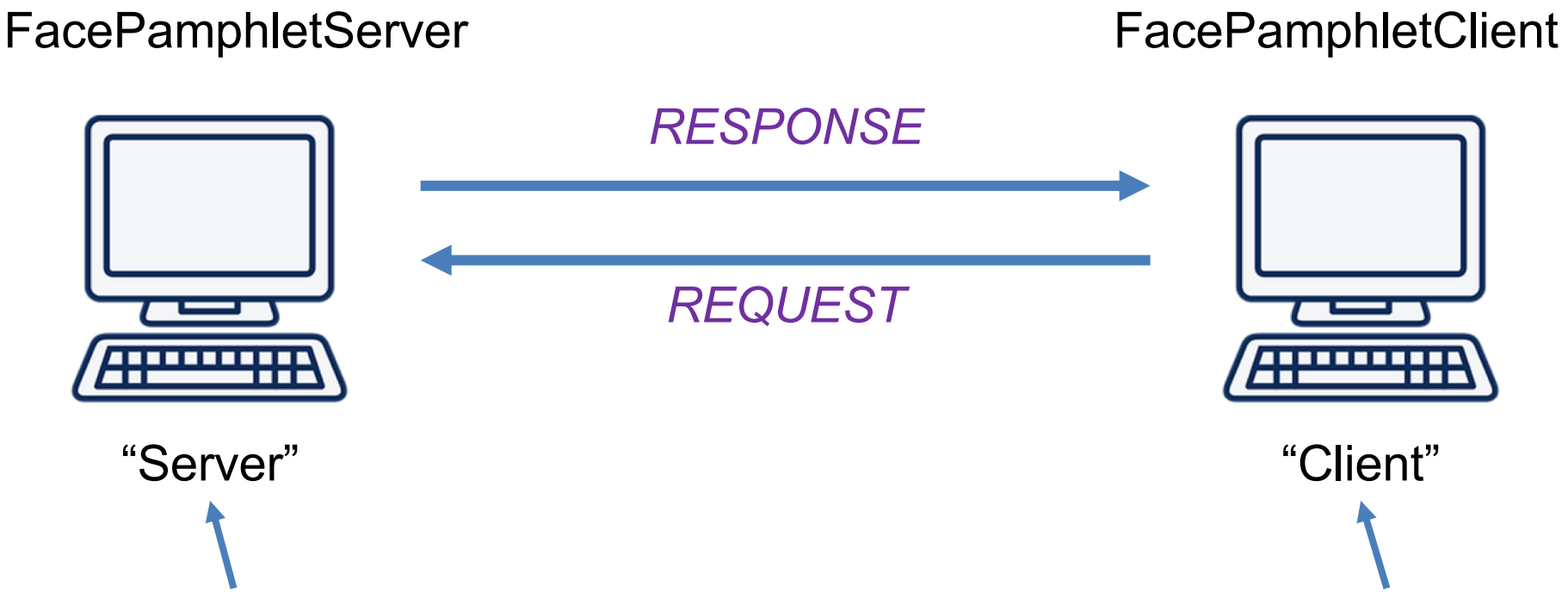
# Background: The Internet




The internet is just many programs sending messages (as *Strings*)

Thanks Nick for the teaching YEAH

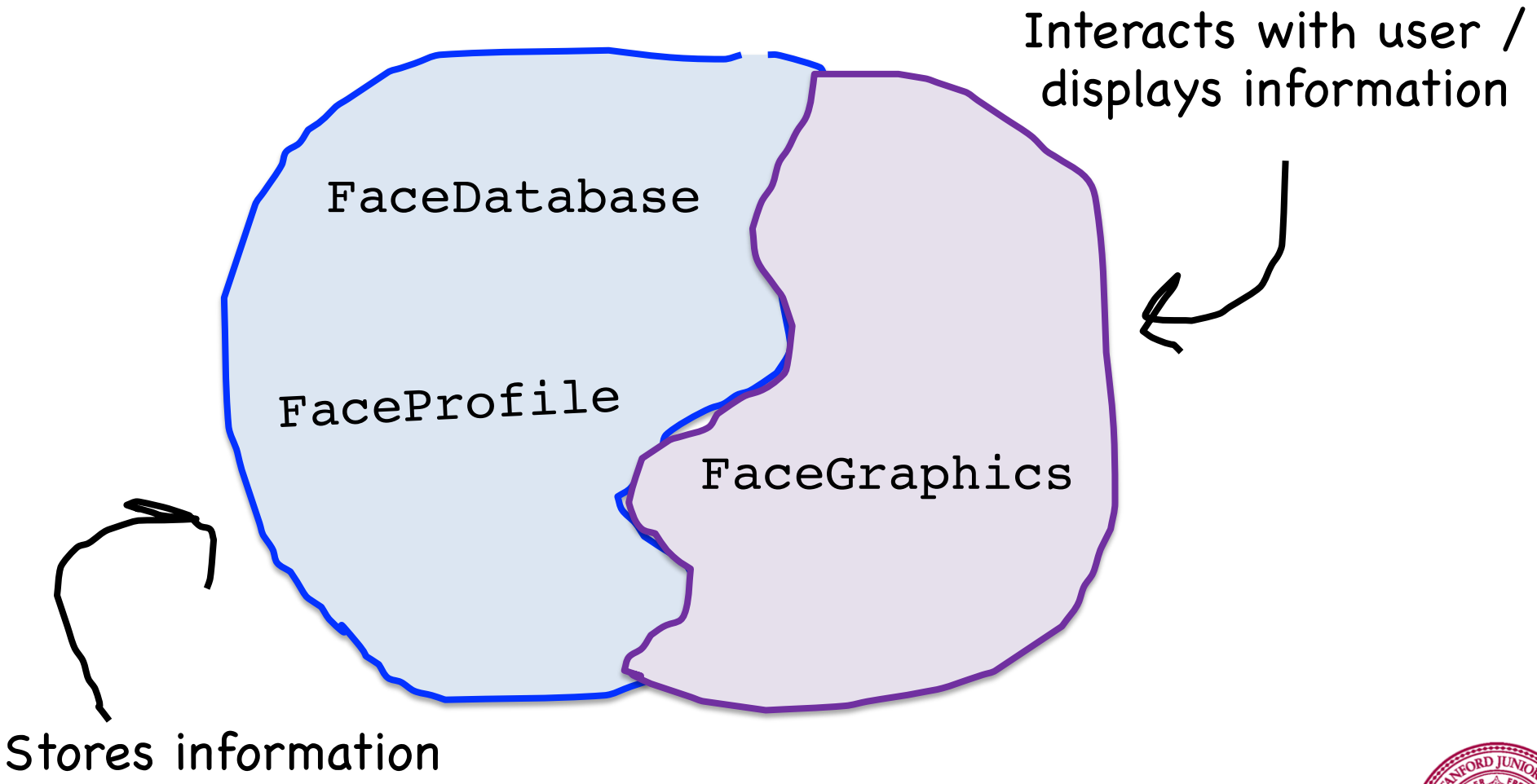
# FacePamphlet




Thanks Nick for the teaching YEAH

# Another way to get Server/Client

First, imagine a world before Server/Clients…




* This blob represents one program on one machine

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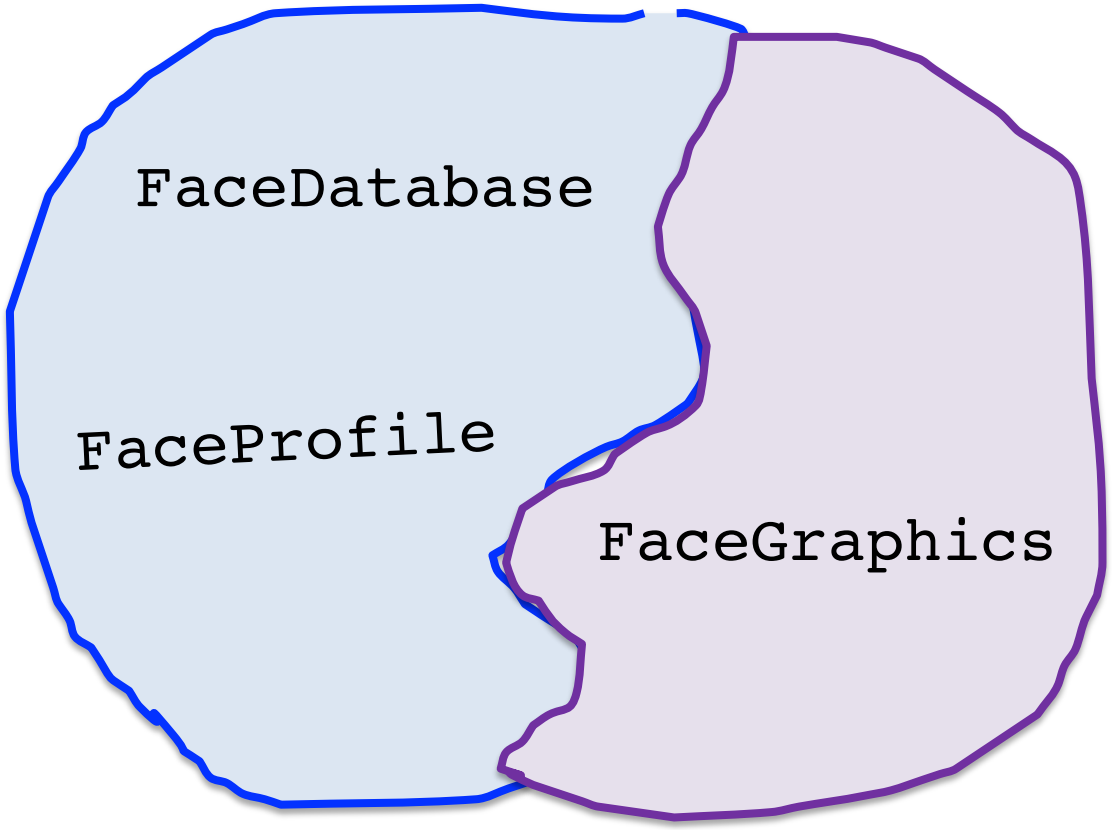
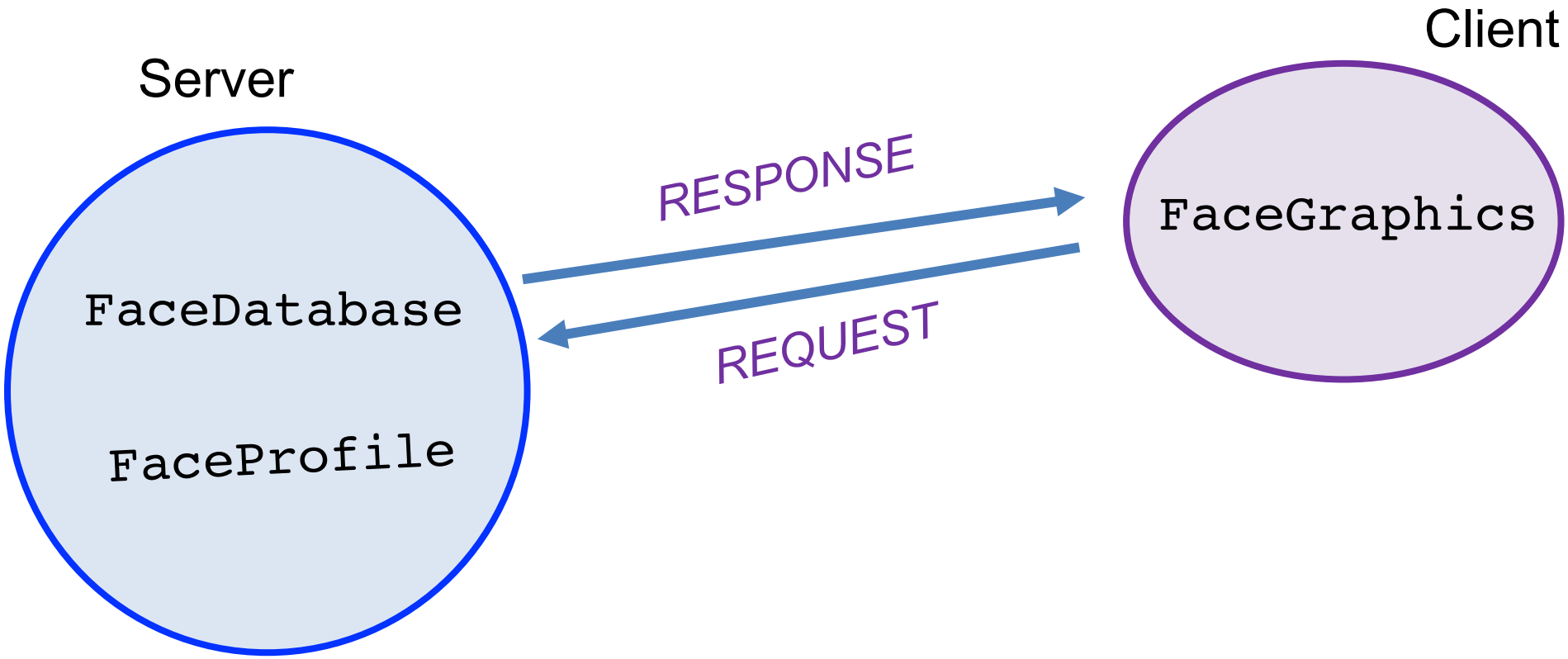



* This blob represents one program on one machine

# Another way to get Server/Client

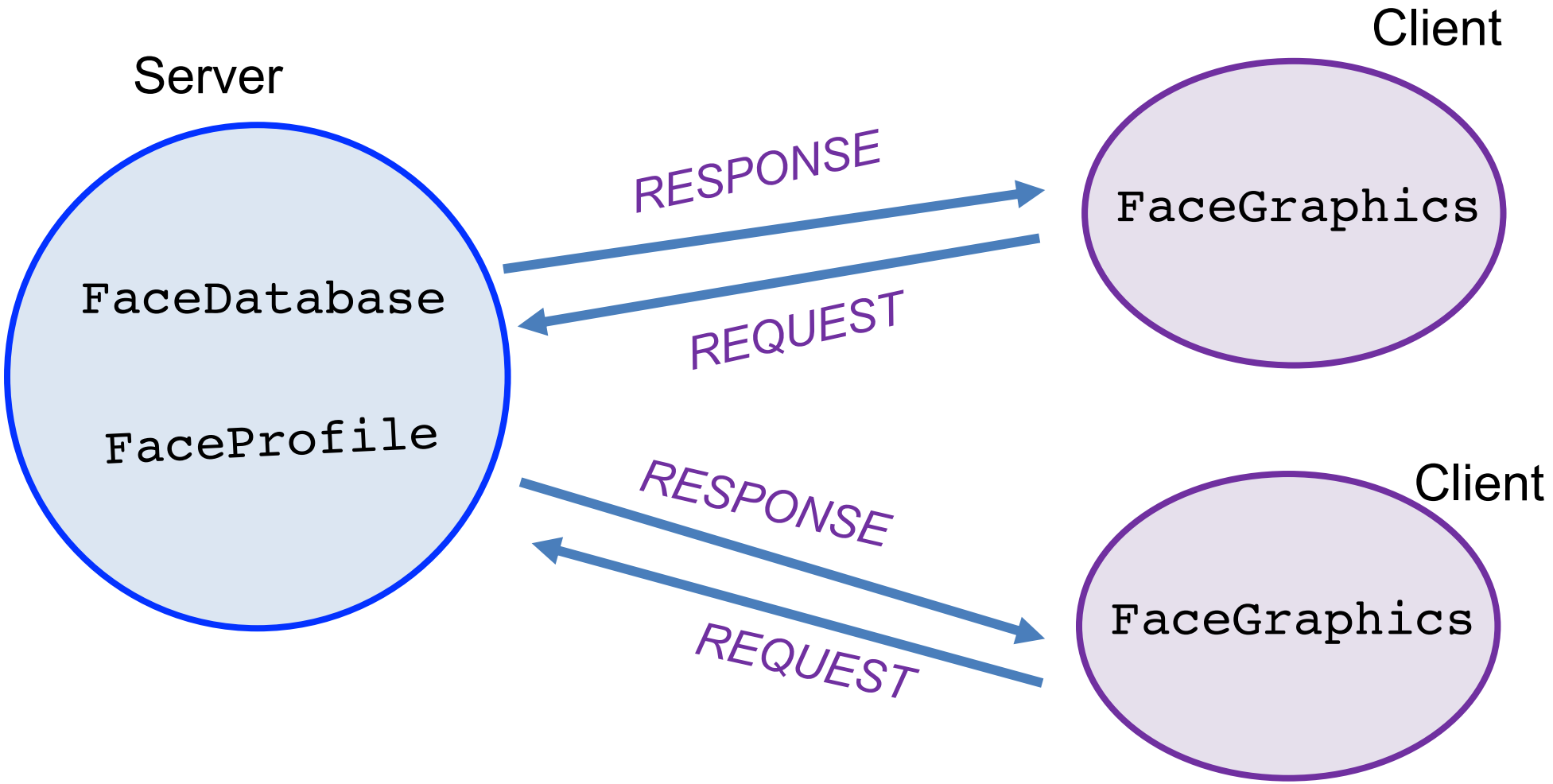
Now our application runs across two programs




* Each blob represents one program on one machine

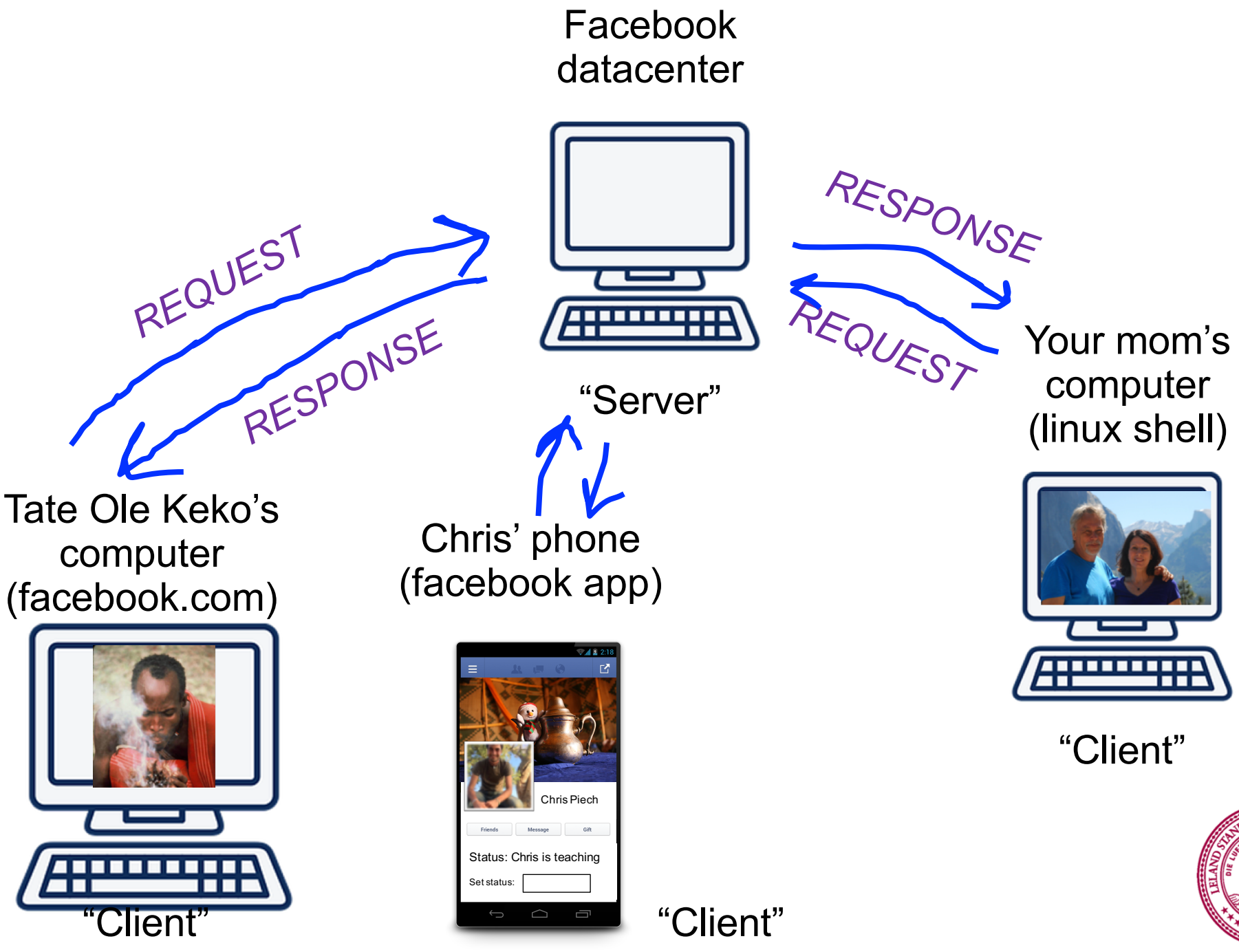
# Another way to get Server/Client

Which means many clients can connect to the data

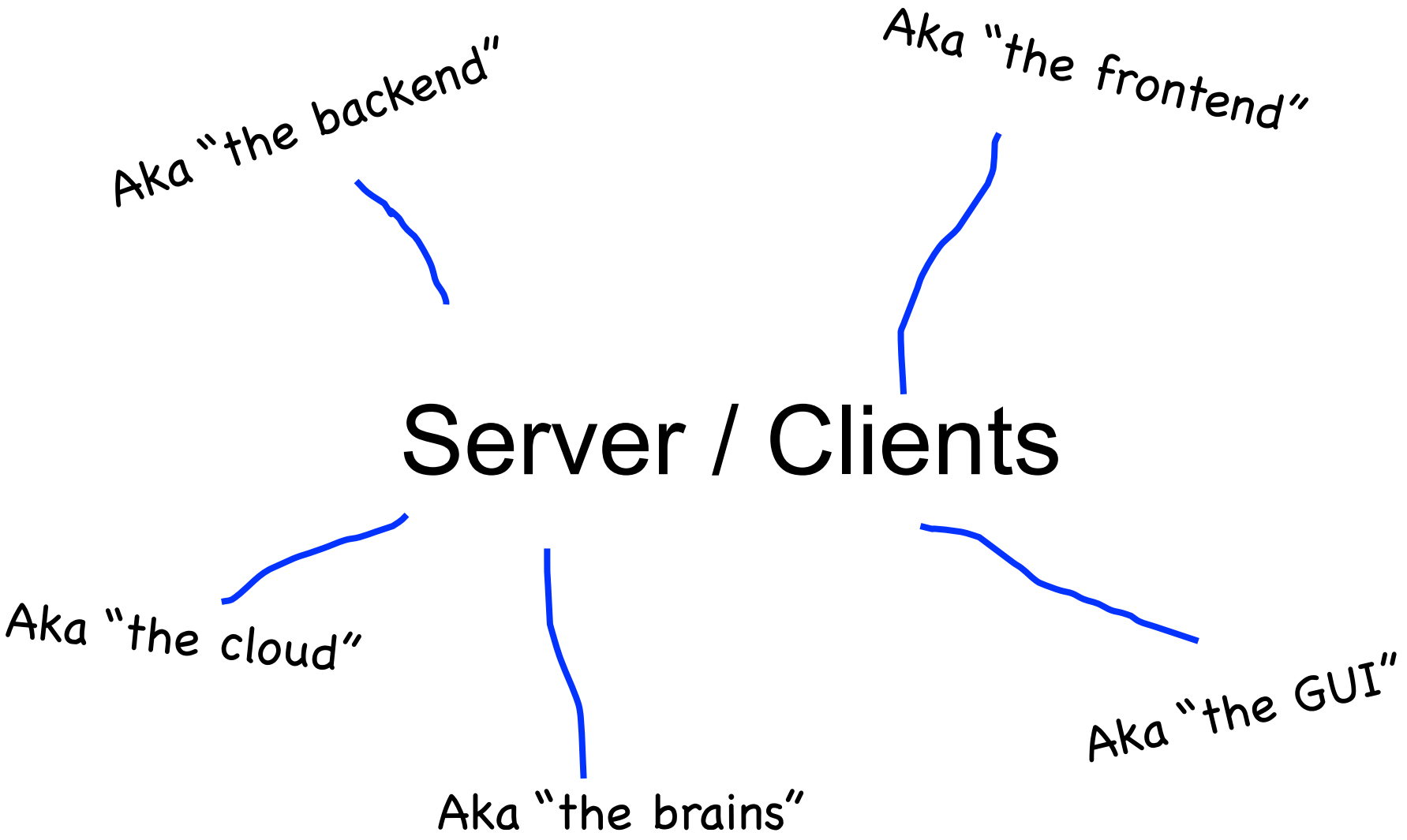



* Each blob represents one program on one machine

# The Internet



# Most of the Internet



# Servers on one slide

1

```
public String requestMade(Request request) {
    // server code goes here
}
```

2

```
// make a Server object
private SimpleServer server
      = new SimpleServer(this, 8000);
```

3

```
public void run(){
    // start the server
    server.start();
}
```



# Servers on one slide

1

```
public String requestMade(Request request) {
    // server code goes here
}
```

2

```
// make a Server object
private SimpleServer server
      = new SimpleServer(this, 8000);
```

3

```
public void run(){
    // start the server
    server.start();
}
```

# What is a Request?

```
/* Request has a command */
String command;

/* Request has parameters */
HashMap<String,String> params;
```

Request request

---

```
// methods that the server calls on requests
request.getCommand();
request.getParam(key); //returns associated value
```

# Requests are like Remote Method Calls

Server has a bunch of discrete things it can do

Server

addUser

getStatus

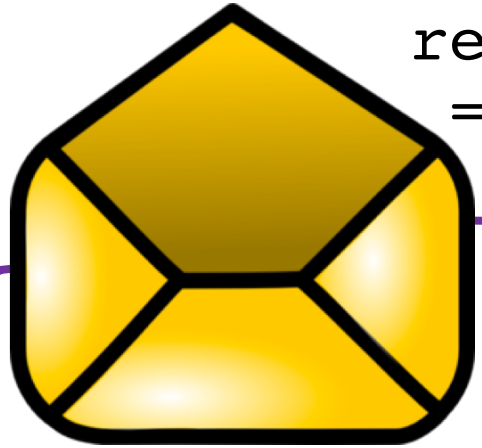
# Requests are like Remote Method Calls

Server

addUser

getStatus

# Requests are like Remote Method Calls



```
request.getCommand();
 => "makeToast"
```

Server

addUser

getStatus

# Your Server Code

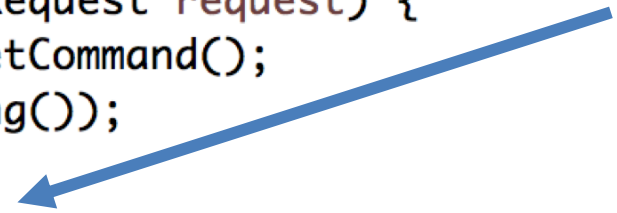
```
/**
 * Starts the server running so that when a program sends
 * a request to this computer, the method requestMade is
 * called.
 */
public void run() {
    println("Starting server on port " + PORT);
    server.start();
}

/**
 * When a request is sent to this computer, this metho
 * called. It must return a String.
 */
public String requestMade(Request request) {
    String cmd = request.getCommand();
    println(request.toString());

    // your code here.

    return "Error: Unknown command " + cmd + ".";
}
```

Respond to requests here. *The String you return will be sent as the response.*





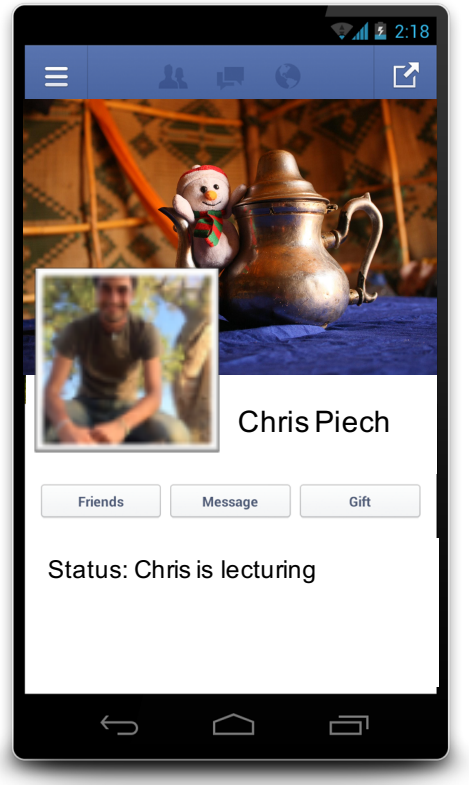
# Where we left off...

There are two types of internet programs. Servers and Clients



Now, the client

# A Clients's Purpose




1. Interact with the user

2. Get data from its server

3. Save data to its server

# Clients on one slide

```
try {

  // 1. construct a new request
  Request example = new Request("getStatus");

  // 2. add parameters to the request
  example.addParam("name", "chris");

  // 3. send the request to a computer on the internet
  String result = SimpleClient.makeRequest(HOST, example);

} catch(IOException e) {

  // The internet is a fast and wild world my friend

}
```



# Clients on one slide

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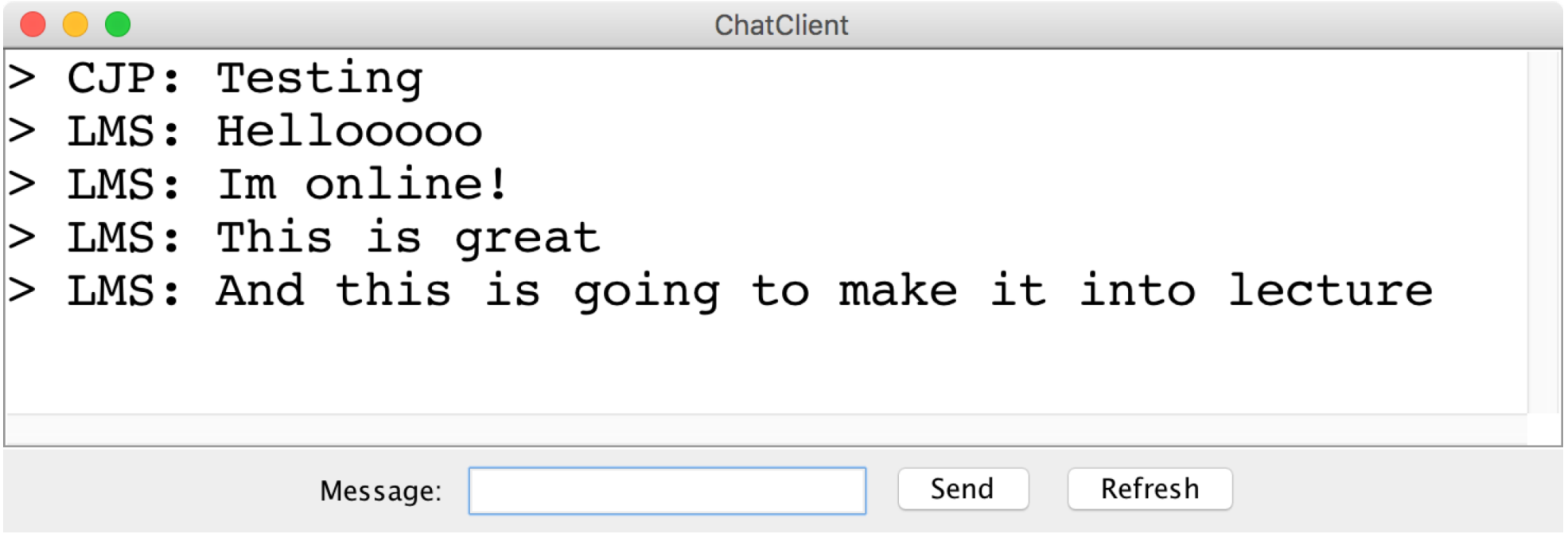
```

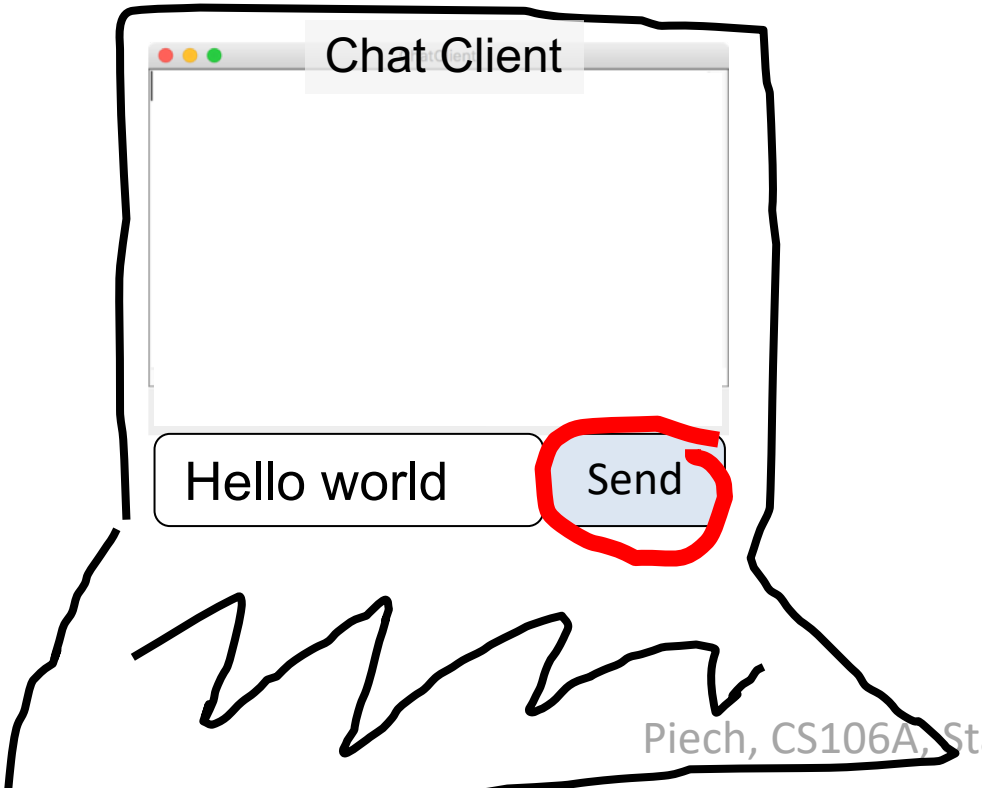


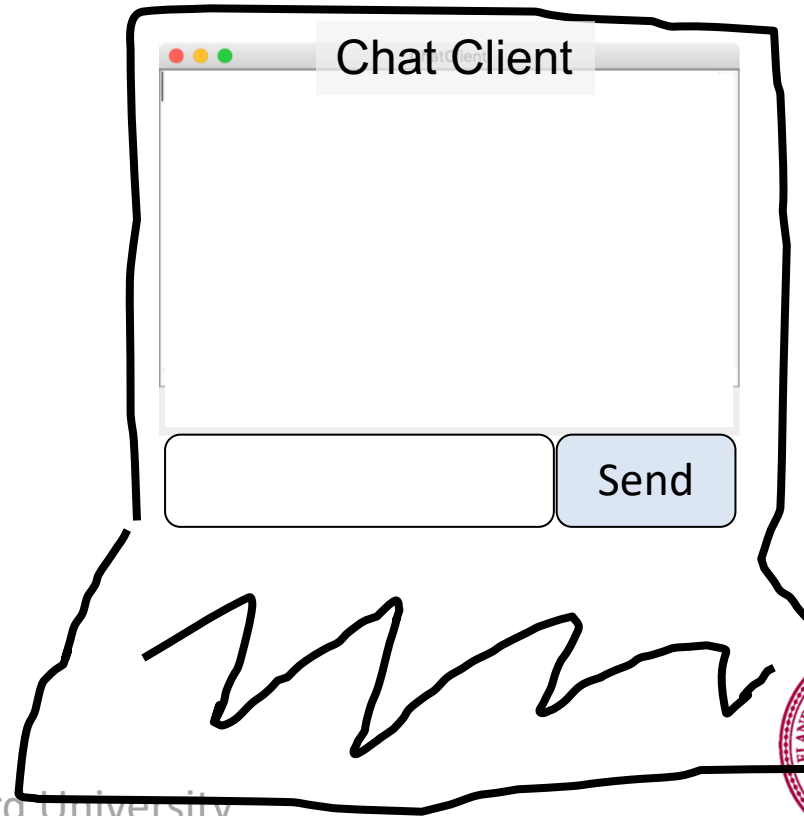
# Chat Server and Client




```
history = [
]
```

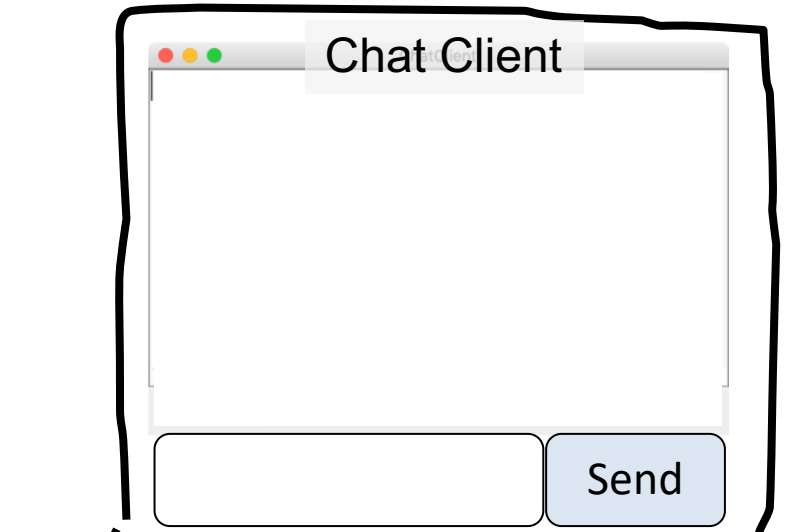
```
addMsg
msg = Hello world
```

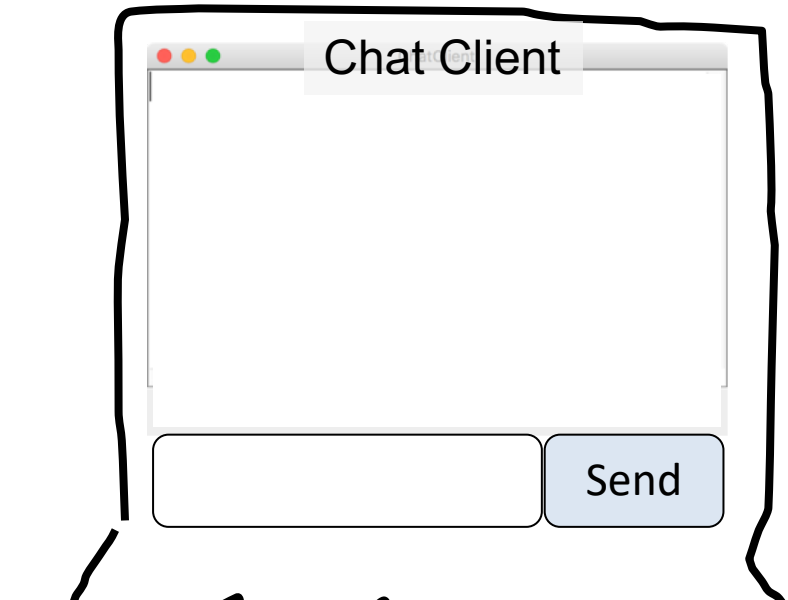



```
history = [
    Hello world
]
```

```
getMsgs
index = 0
```



# Chat Server

Chat Server


addMsg
msg = *text*

getMsgs
index = *startIndex*

There are two types of internet programs. Servers and Clients



# Chat Server

```
public class ChatServer extends ConsoleProgram
implements SimpleServerListener {

    private static final int PORT = 8080;

    private SimpleServer server = null;

    /* The server database is an ArrayList of Strings */
    private ArrayList<String> messages = new ArrayList<String>();

    public void run() {
        setFont("Courier-24");
        println("Starting server on port "+PORT+"...");
        server = new SimpleServer(this, PORT);
        server.start();
    }
```

… that's not all



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public class ChatServer extends ConsoleProgram
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        server = new SimpleServer(this, PORT);
        server.start();
    }
```

… that's not all



# Chat Server (continued)

```
public String requestMade(Request request) {
    println(request.toString());
    String command = request.getCommand();

    String result = "Error: Can't process request " + command;
    // we handle newMsg commands
    if(command.equals("newMsg")) {
        result = newMessage(request);
    }
    // we also handle getMsgs commands
    if(command.equals("getMsgs")) {
        result = getMessages(request);
    }

    println(" => " + result);
    return result;
}
```



# Chat Server (continued)

```
public String requestMade(Request request) {
    println(request.toString());
    String command = request.getCommand();

    String result = "Error: Can't process request " + command;
    // we handle newMsg commands
    if(command.equals("newMsg")) {
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    }
    // we also handle getMsgs commands
    if(command.equals("getMsgs")) {
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    }

    println(" => " + result);
    return result;
}
```



# Chat Server (continued)

```
public String requestMade(Request request) {
    println(request.toString());
    String command = request.getCommand();

    String result = "Error: Can't process request " + command;
    // we handle newMsg commands
    if(command.equals("newMsg")) {
        result = newMessage(request);
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    // we also handle getMsgs commands
    if(command.equals("getMsgs")) {
        result = getMessages(request);
    }

    println(" => " + result);
    return result;
}
```



# Chat Server (continued)

```
public String requestMade(Request request) {
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    String command = request.getCommand();

    String result = "Error: Can't process request " + command;
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    if(command.equals("newMsg")) {
        result = newMessage(request);
    }
    // we also handle getMsgs commands
    if(command.equals("getMsgs")) {
        result = getMessages(request);
    }

    println(" => " + result);
    return result;
}
```




HAPPY
CLIENT

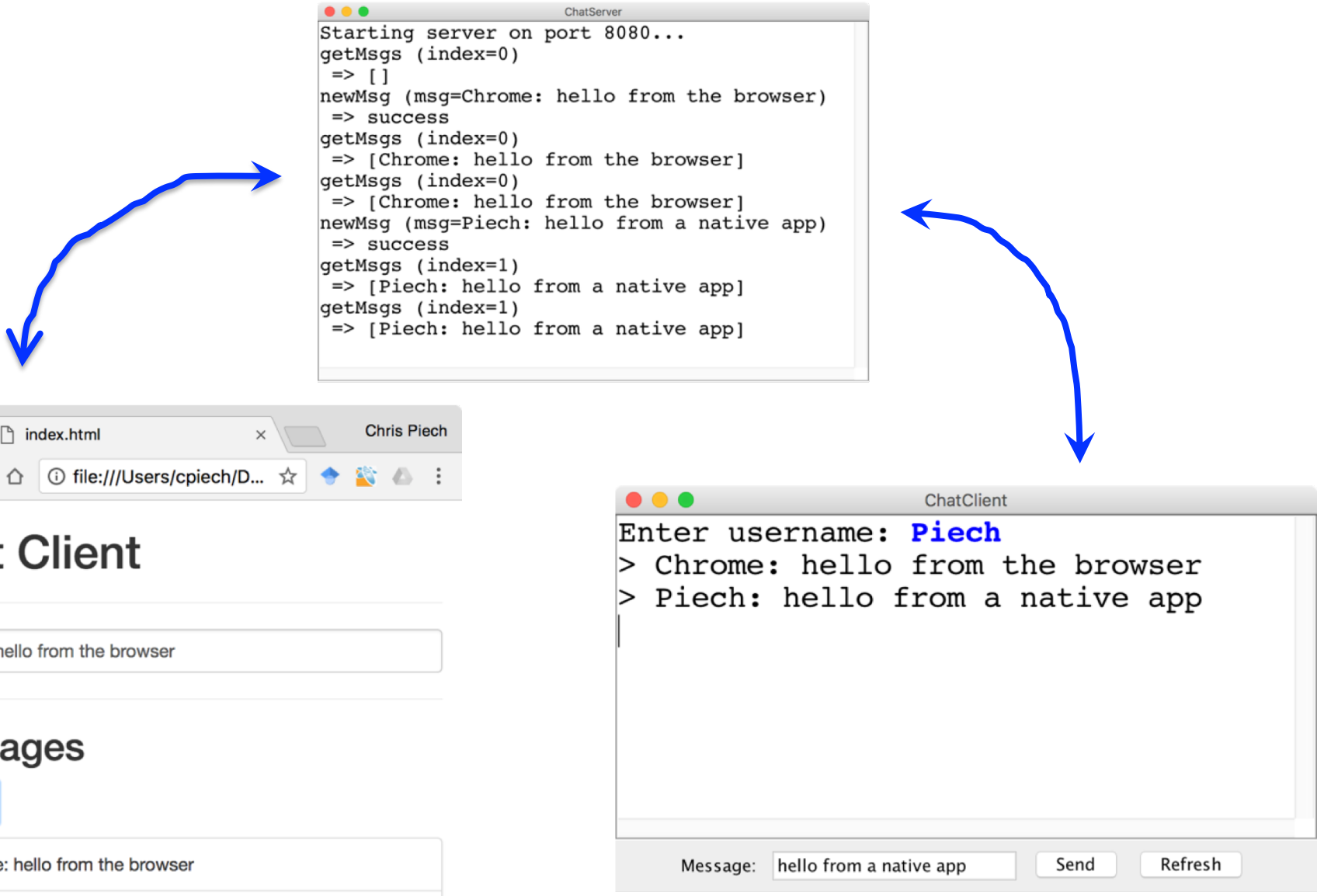
# FAQ

Question: This is cool Chris.
But didn’t you just really
dumb down servers?

Answer: No

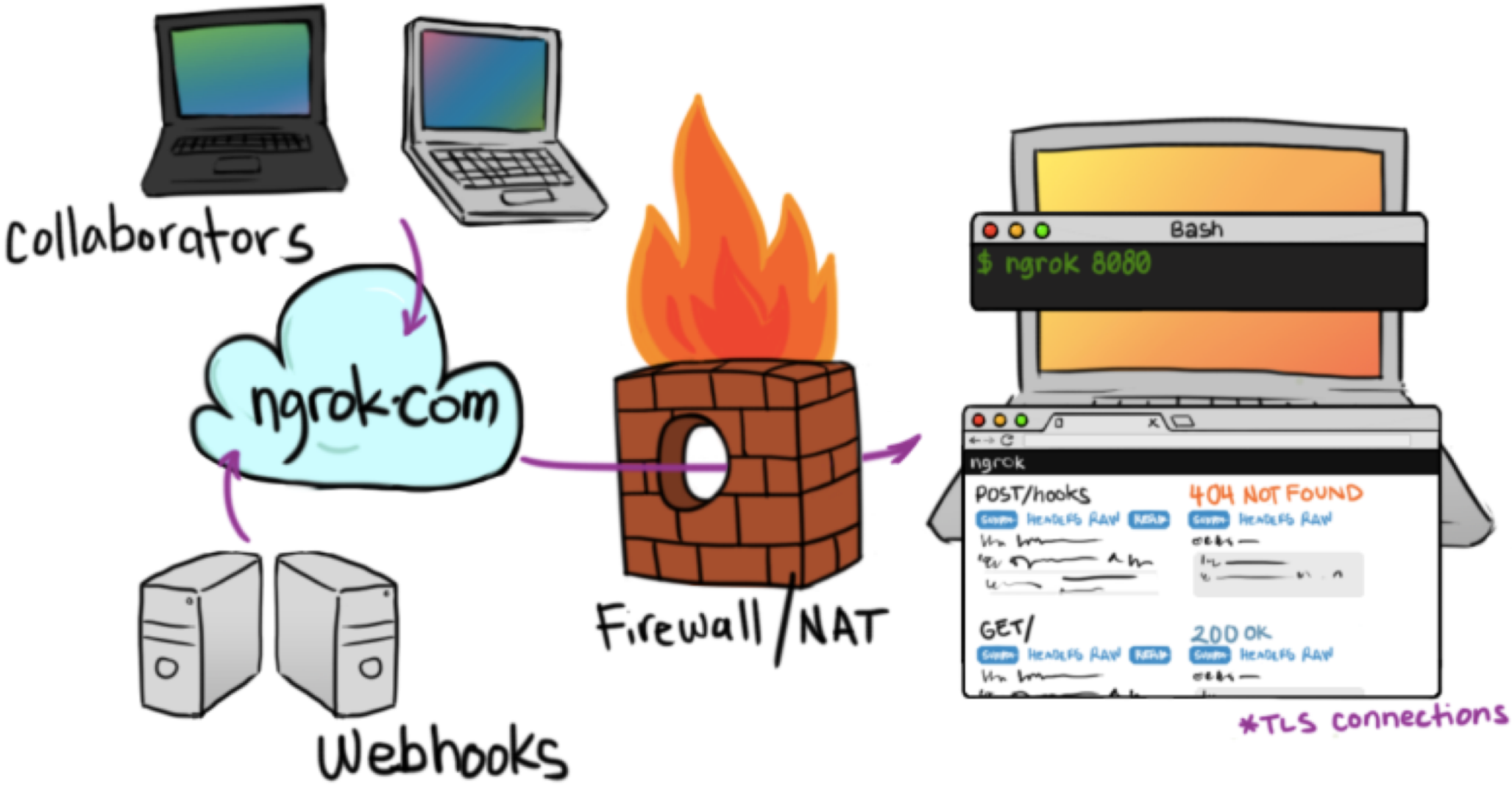
Question: Why isn’t this in a browser?

# “Native” vs “Browser”



Question: Localhost forever?

# Use ngrok to get a url



Any security holes?

# Want to learn more?

CS144 Computer Networking

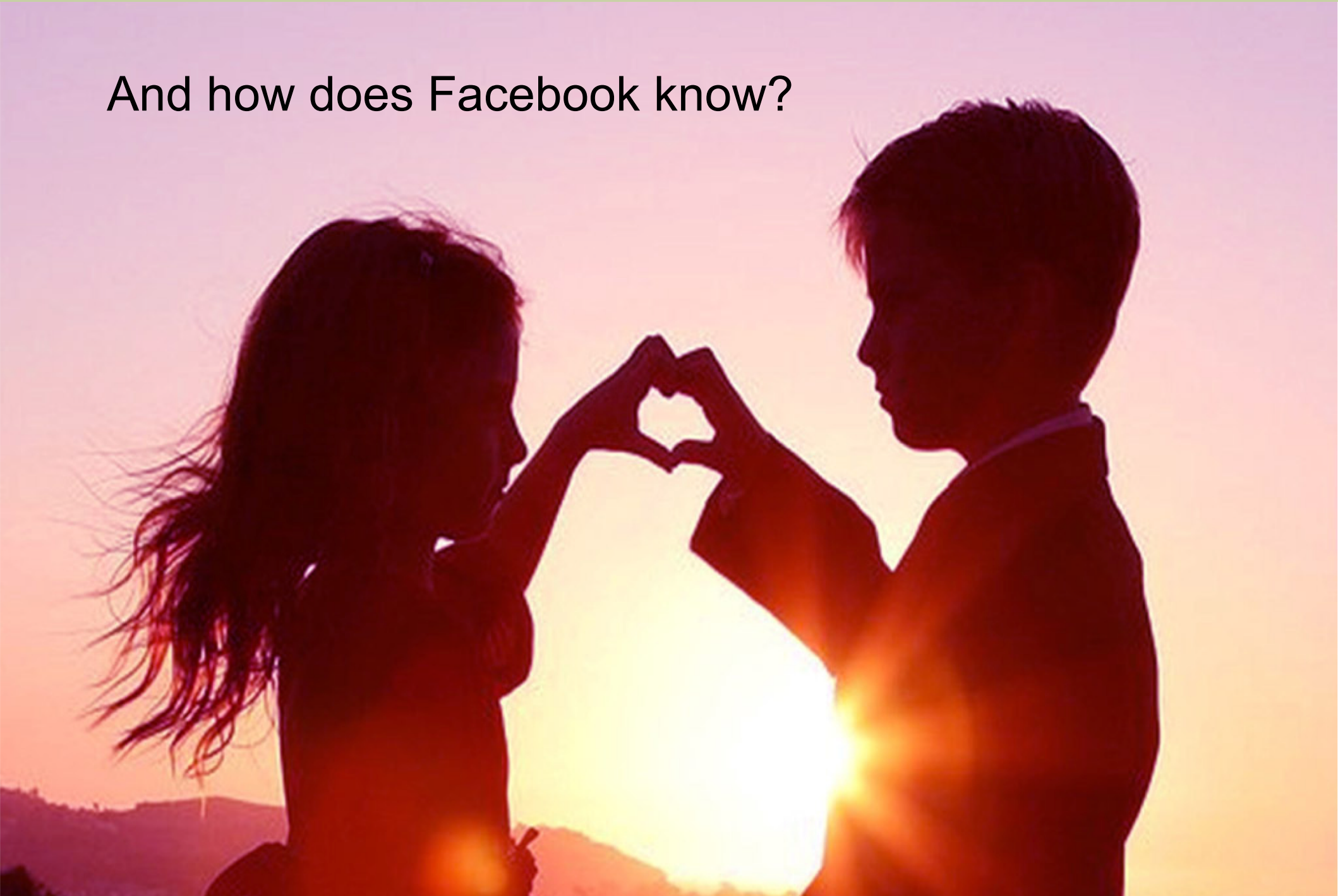
Or CS193P

Or CS193A

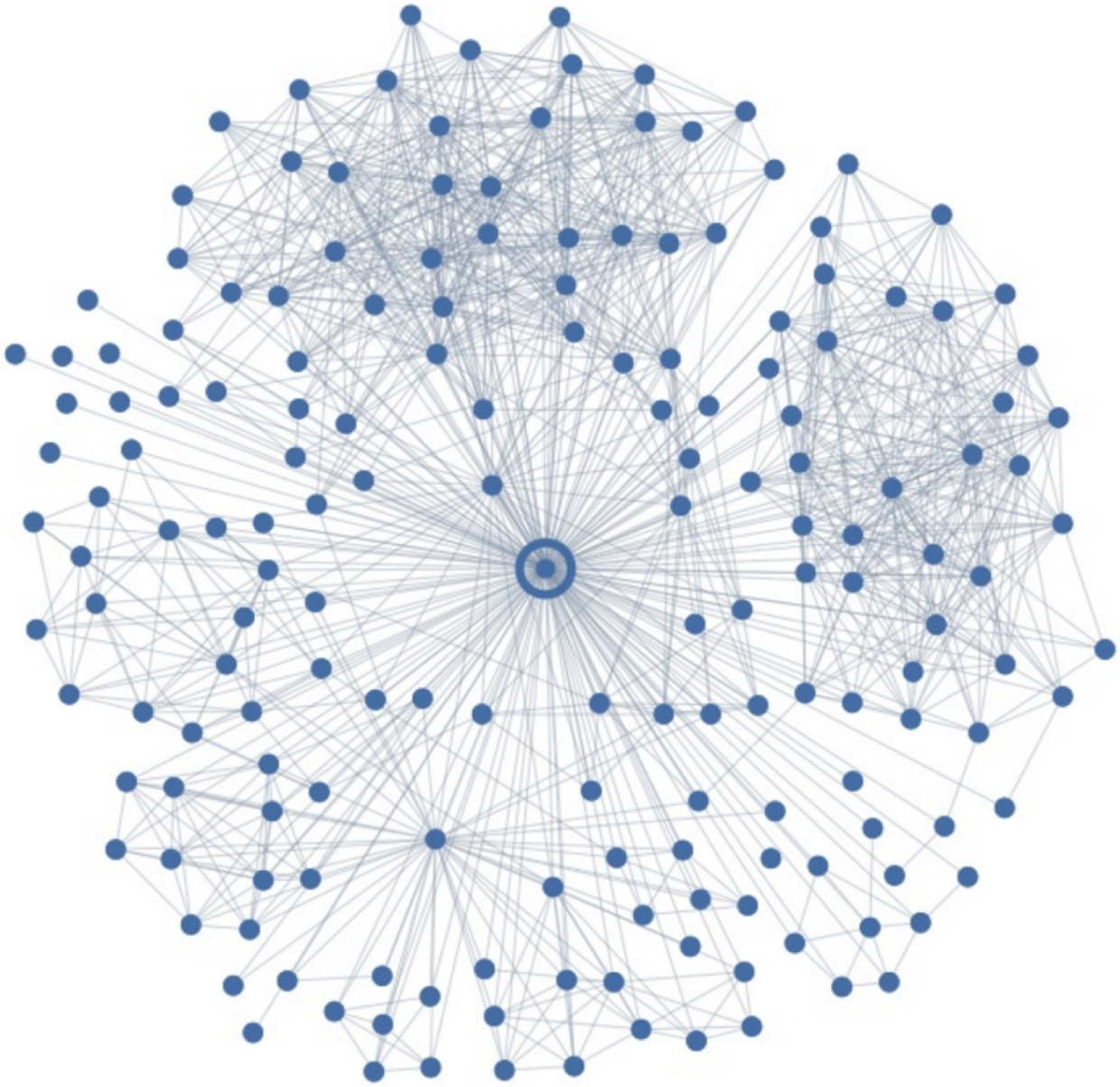
Or CS108

# Social Networks

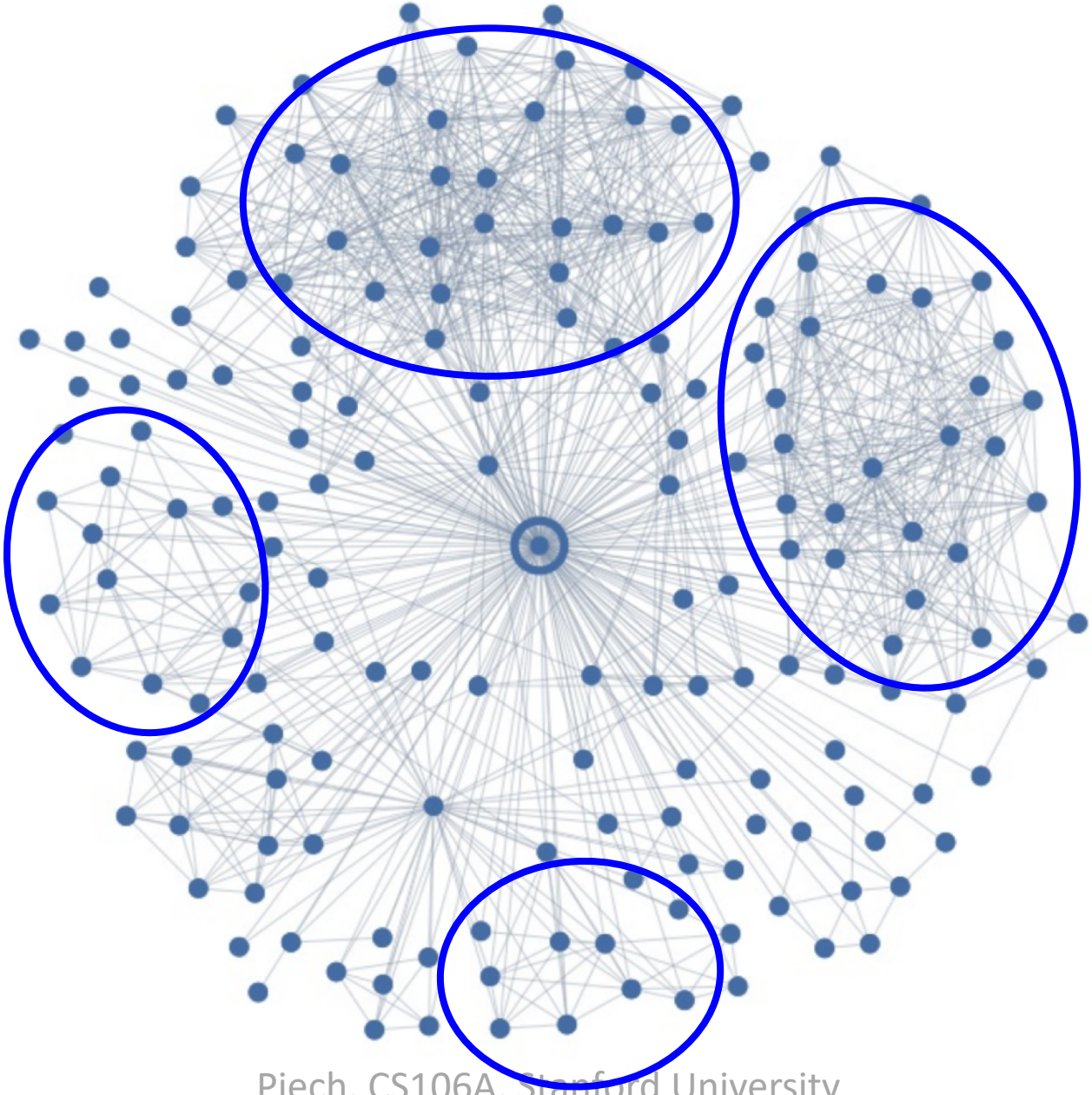
# Who do you love?



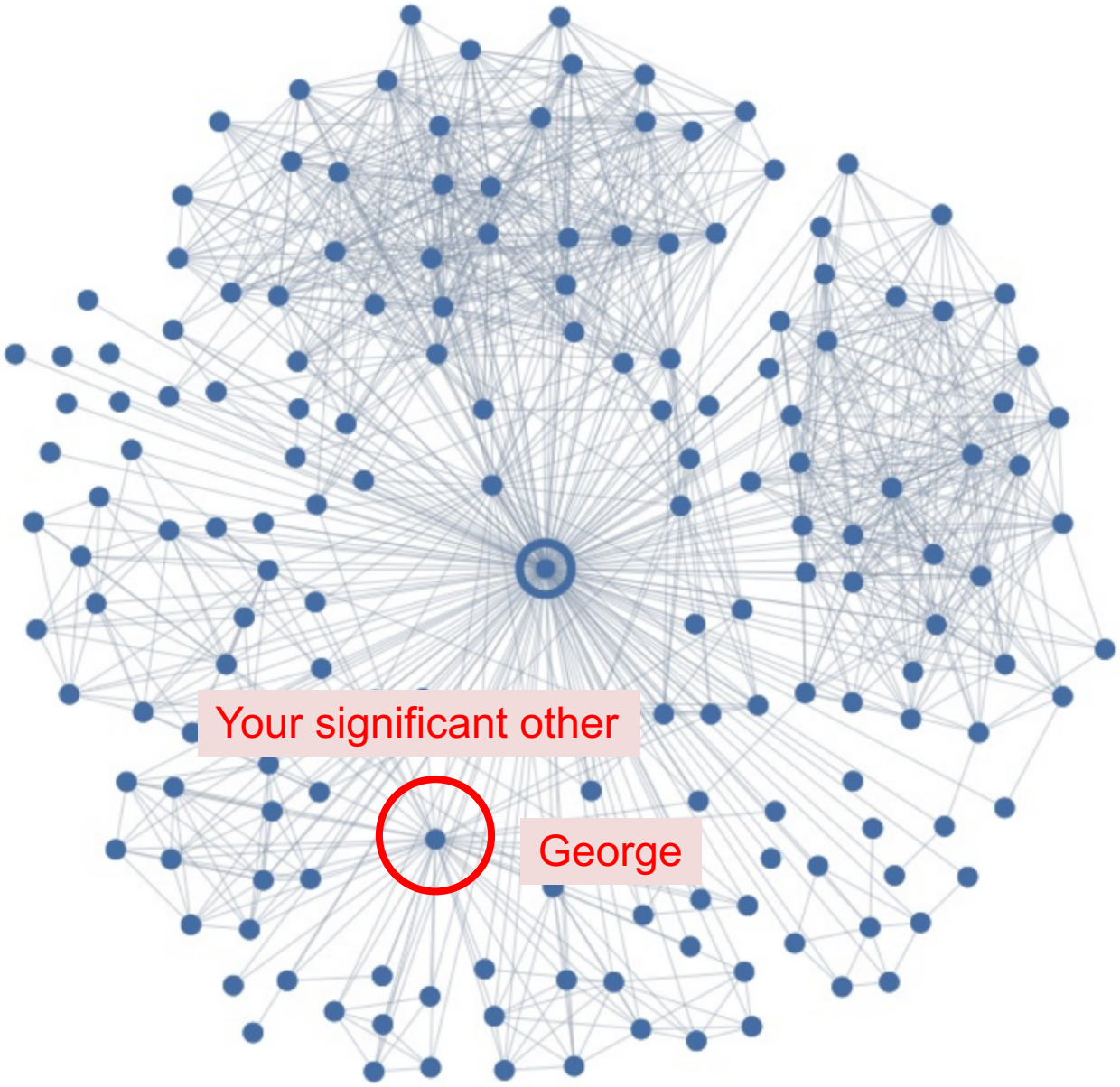
# Your local social network



# You have some “groups”



# But here is the love of your life



# Romance and Social Networks

## Romantic Partnerships and the Dispersion of Social Ties: A Network Analysis of Relationship Status on Facebook

**Lars Backstrom**
Facebook Inc.

**Jon Kleinberg**
Cornell University

**ABSTRACT**

A crucial task in the analysis of on-line social-networking systems is to identify important people — those linked by strong social ties — within an individual's network neighborhood. Here we investigate this question for a particular category of strong ties, those involving spouses or romantic partners. We organize our analysis around a basic question: given all the connections among a person's friends, can you recognize his or her romantic partner from the network structure alone? Using data from a large sample of Facebook users, we find that this task can be accomplished with high accuracy, but doing so requires the development of a new measure of tie strength that we term 'dispersion' — the extent to which two people's mutual friends are not themselves well-connected. The results offer methods for identifying types of structurally significant people in on-line applications, and suggest a potential expansion of existing theories of tie strength.

**Categories and Subject Descriptors:** H.2.8 [**Database Management**]: Database applications—*Data mining*
**Keywords:** Social Networks; Romantic Relationships.

they see from friends [1], and organizing their neighborhood into conceptually coherent groups [23, 25].

**Tie Strength.**

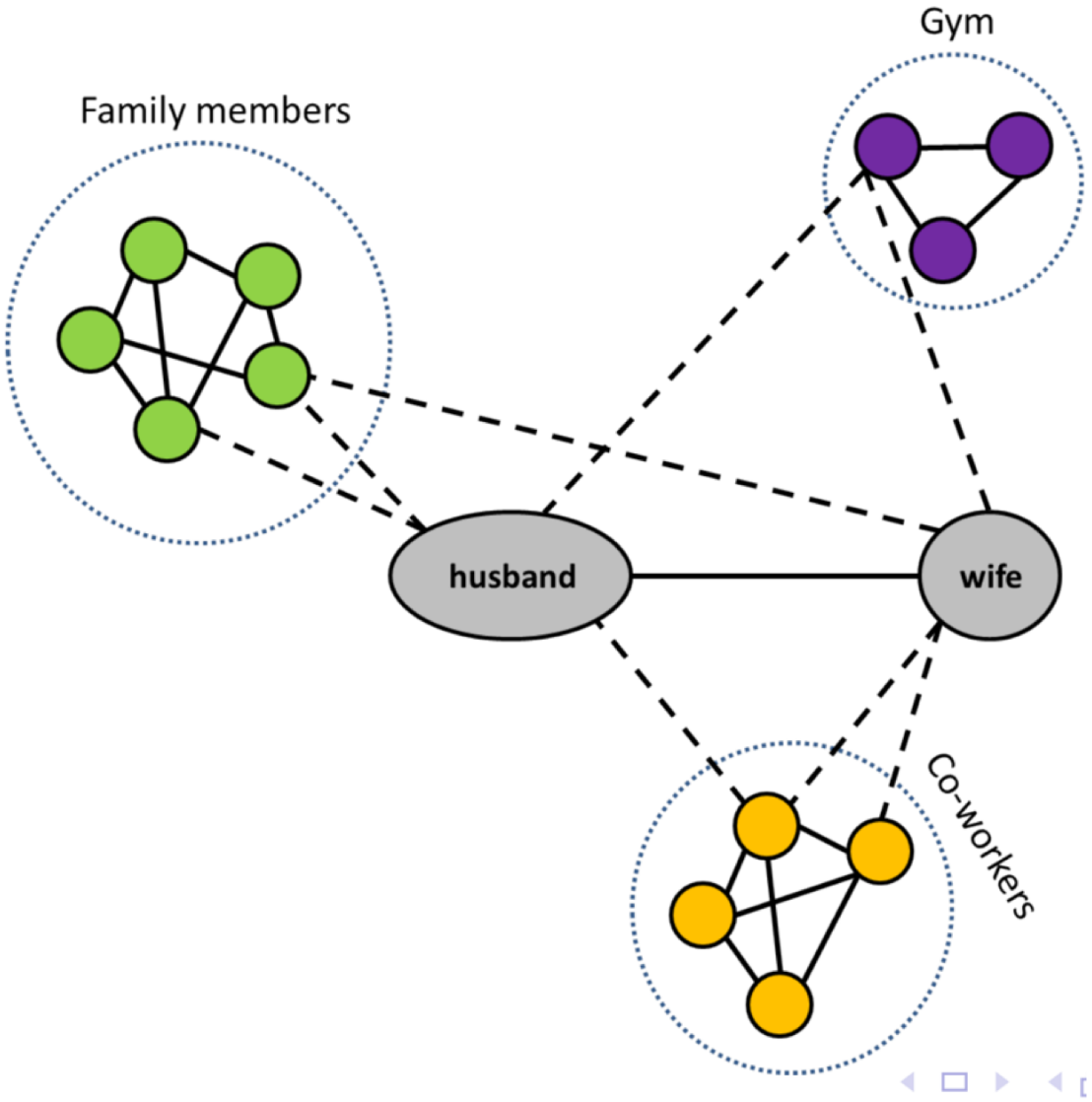
*Tie strength* forms an important dimension along which to characterize a person's links to their network neighbors. Tie strength informally refers to the 'closeness' of a friendship; it captures a spectrum that ranges from strong ties with close friends to weak ties with more distant acquaintances. An active line of research reaching back to foundational work in sociology has studied the relationship between the strengths of ties and their structural role in the underlying social network [15]. Strong ties are typically 'embedded' in the network, surrounded by a large number of mutual friends [6, 16], and often involving large amounts of shared time together [22] and extensive interaction [17]. Weak ties, in contrast, often involve few mutual friends and can serve as 'bridges' to diverse parts of the network, providing access to novel information [5, 15].

A fundamental question connected to our under
strong ties is to identify the most
person's social network

October 2013

http://arxiv.org/pdf/1310.6753v1.pdf

# Romance and Social Networks




Dispersion: The extent to which two people's mutual friends are not directly connected

# Mining Massive Datasets

CS246: Mining Massive Datasets

Or CS106B or CS103 or CS109

Dispersion: The extent to which two people's mutual friends are not directly connected

# The filter bubble

Elections, now hackable

The end.