

Distributed Applications Open Source Applications & Libraries

Developing & Designing Interactive Devices
February 6, 2018

Lab #1 Review

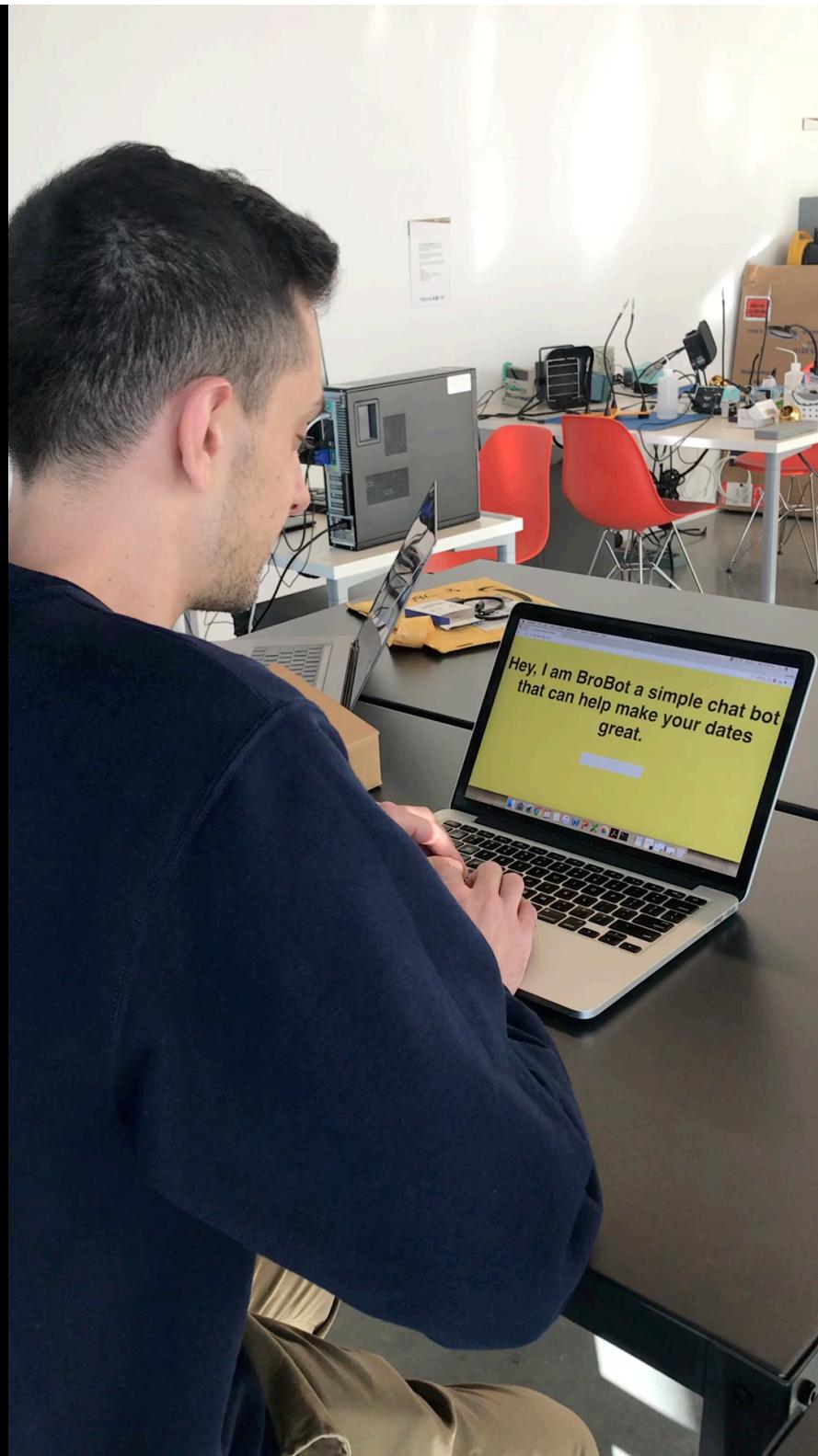
Po Yen Tseng

Boba Tea Bot



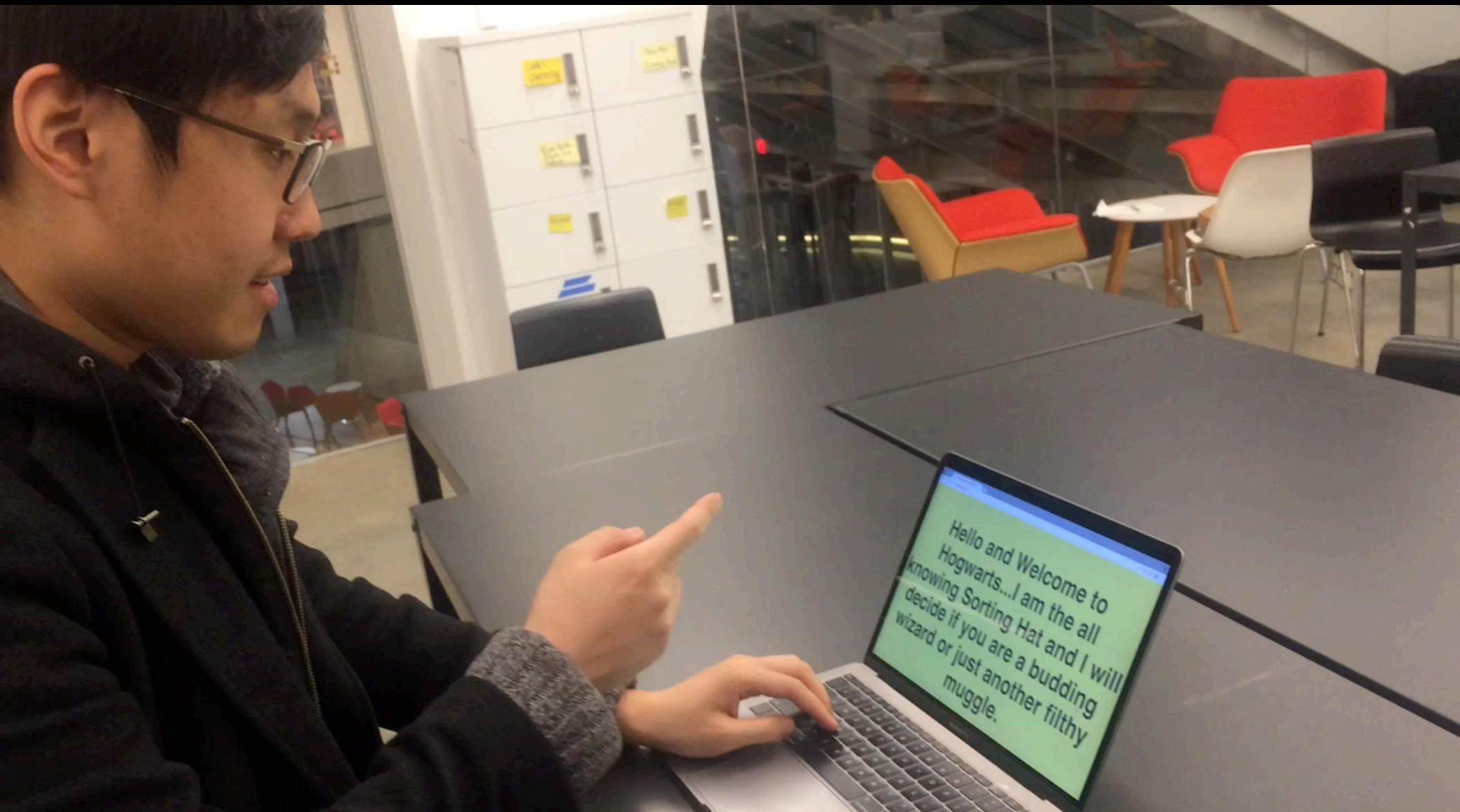
Jennifer Ding

BroBot



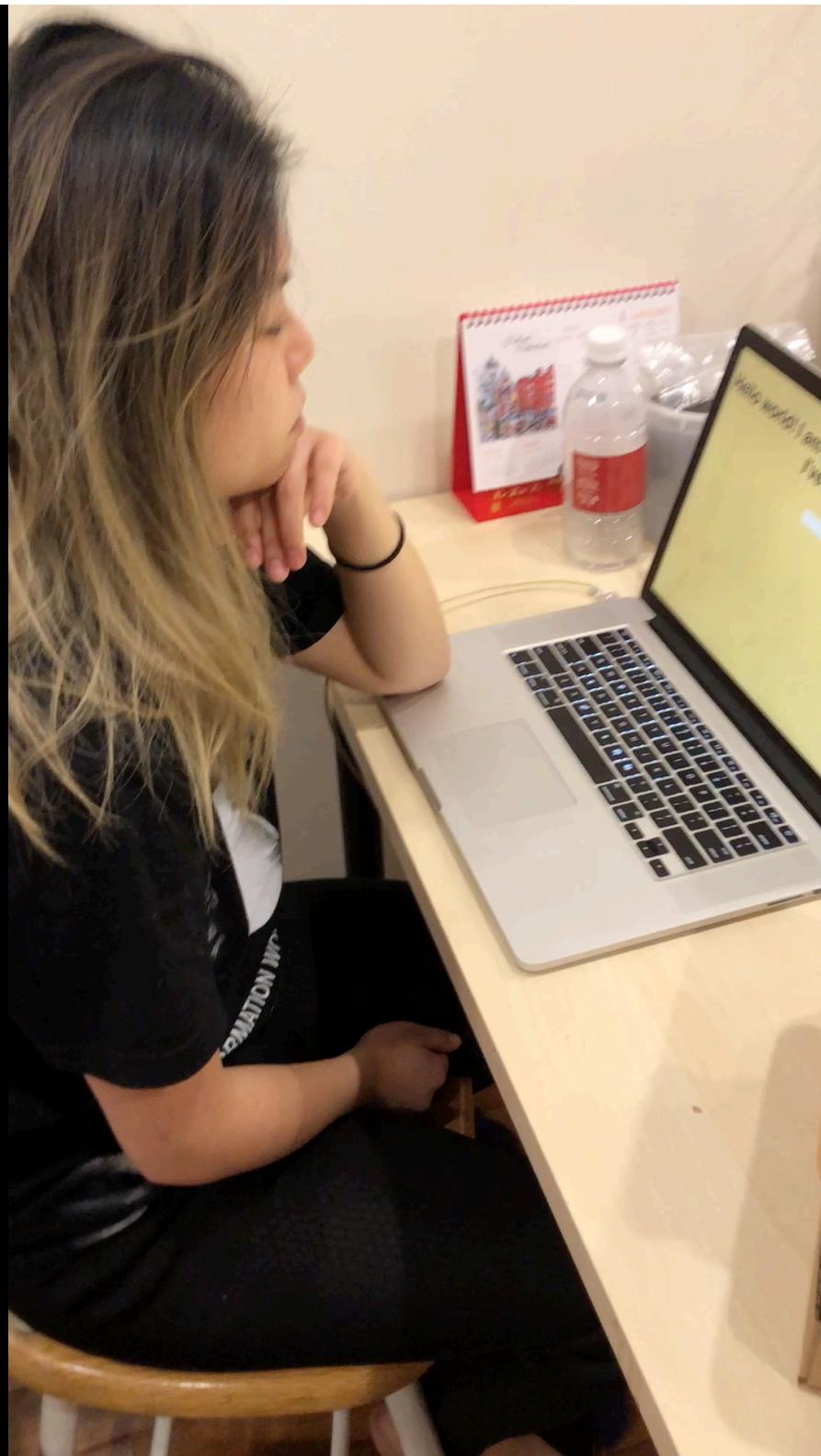
Tanuj

Hogwarts Sorting Hat



Emily Tseng

ThiefBot



Good designers borrow
Great designers steal

How can you make the lab your own?

Cornell Github Issue

What do we want to do as a group?

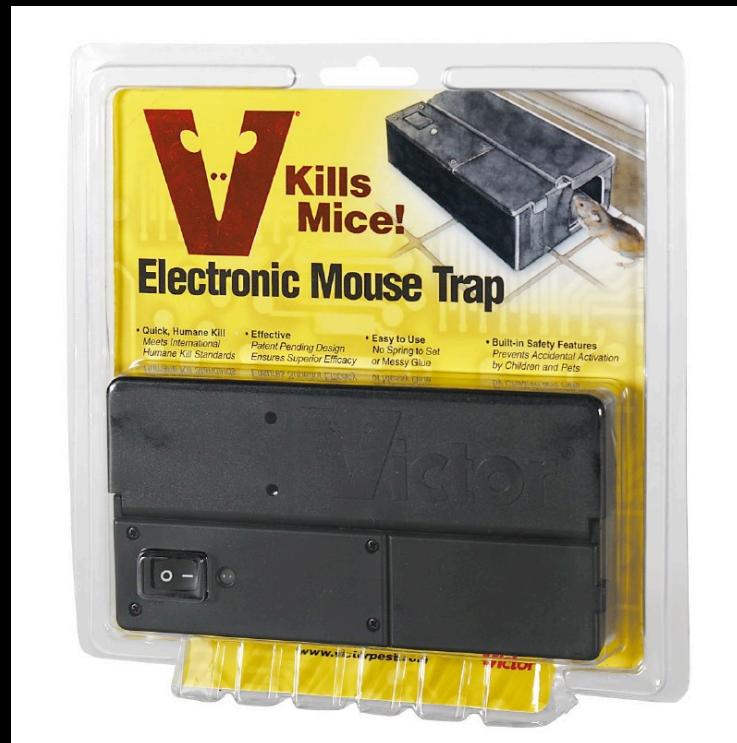
Point of View



<https://en.wikipedia.org/wiki/Mousetrap>



<http://www.vegangirl.com/humane-mouse-trap.html>



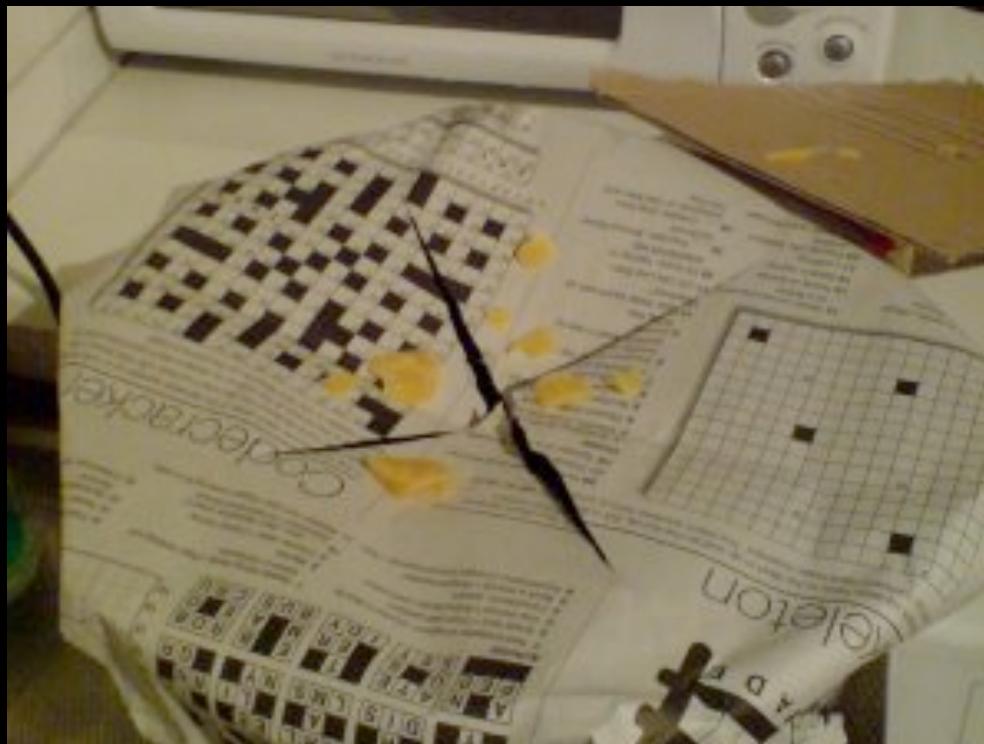
<http://www.biconet.com/critter/elecMouseTrap.html>



<http://www.trapman.co.uk>



<https://www.intruderinc.com/products/the-better-mousetrap>



<http://reluctantnomad.blogspot.com/2007/02/unwelcome-visitor.html>

Distributed Applications

Key design aspects

What are the components of the distributed application?

How are the components connected?

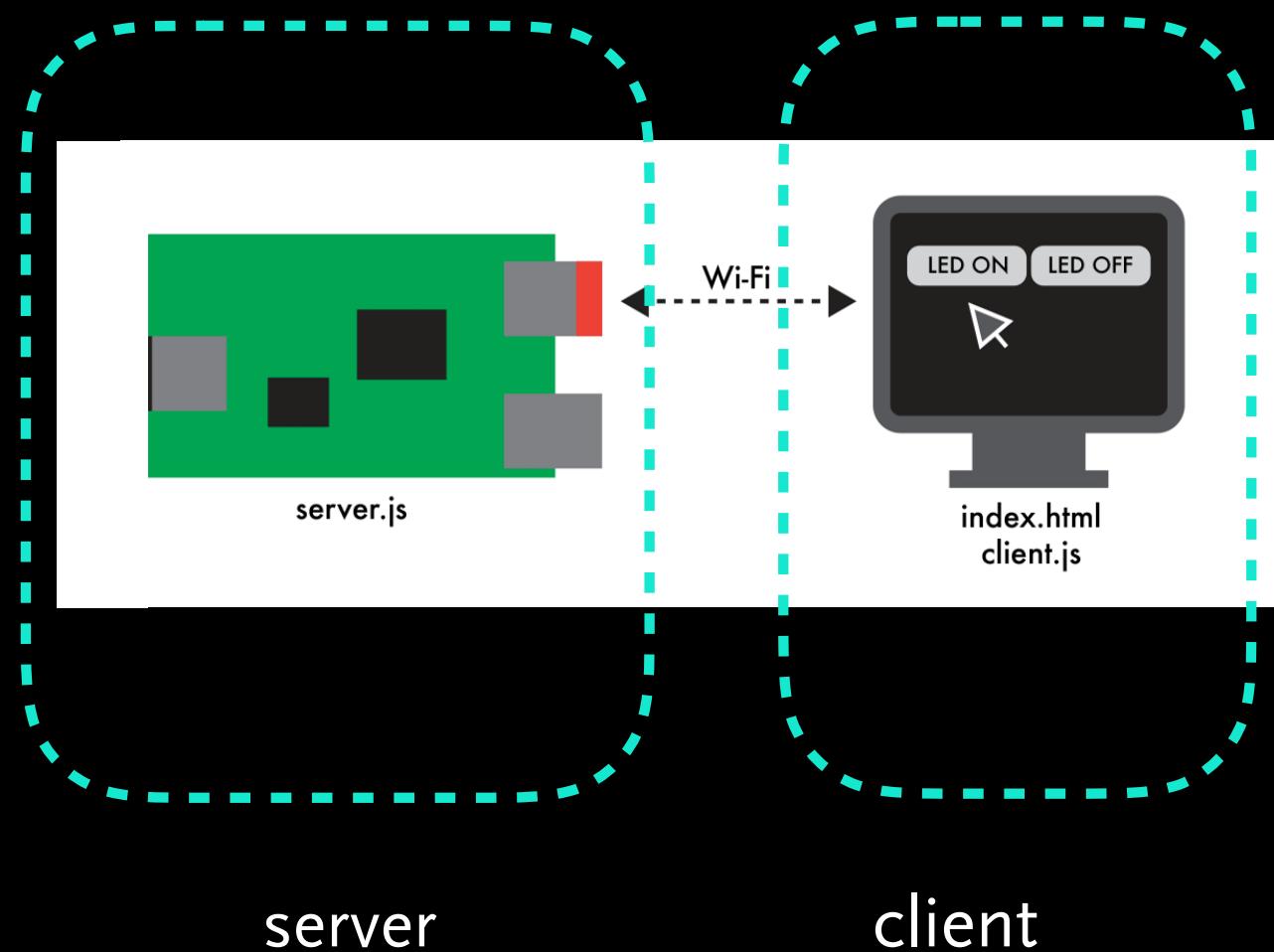
How and how often do the components pass information?

Where does sensing, computation, display, actuation, & data collection occur?

How does addressing and configuration occur? How is it repaired?

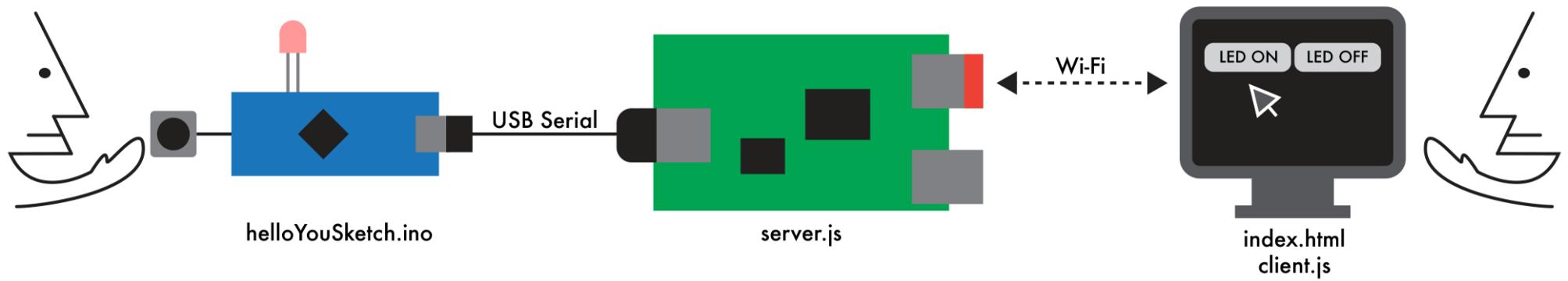
What language and platform is used at each node of the application?

Distributed computing architectures



modified from <https://github.com/nikmart/interaction-engine/wiki>

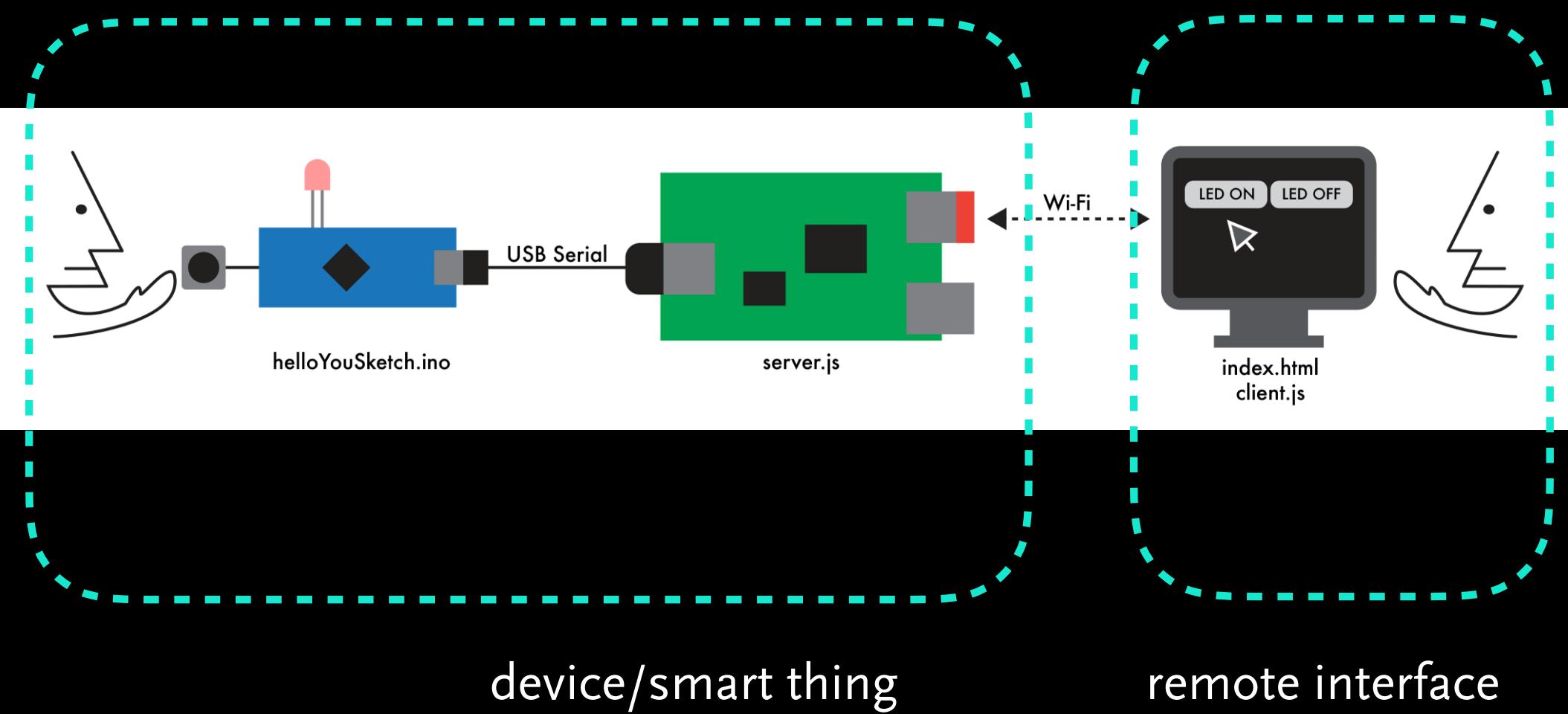
Distributed computing architectures



Hello You

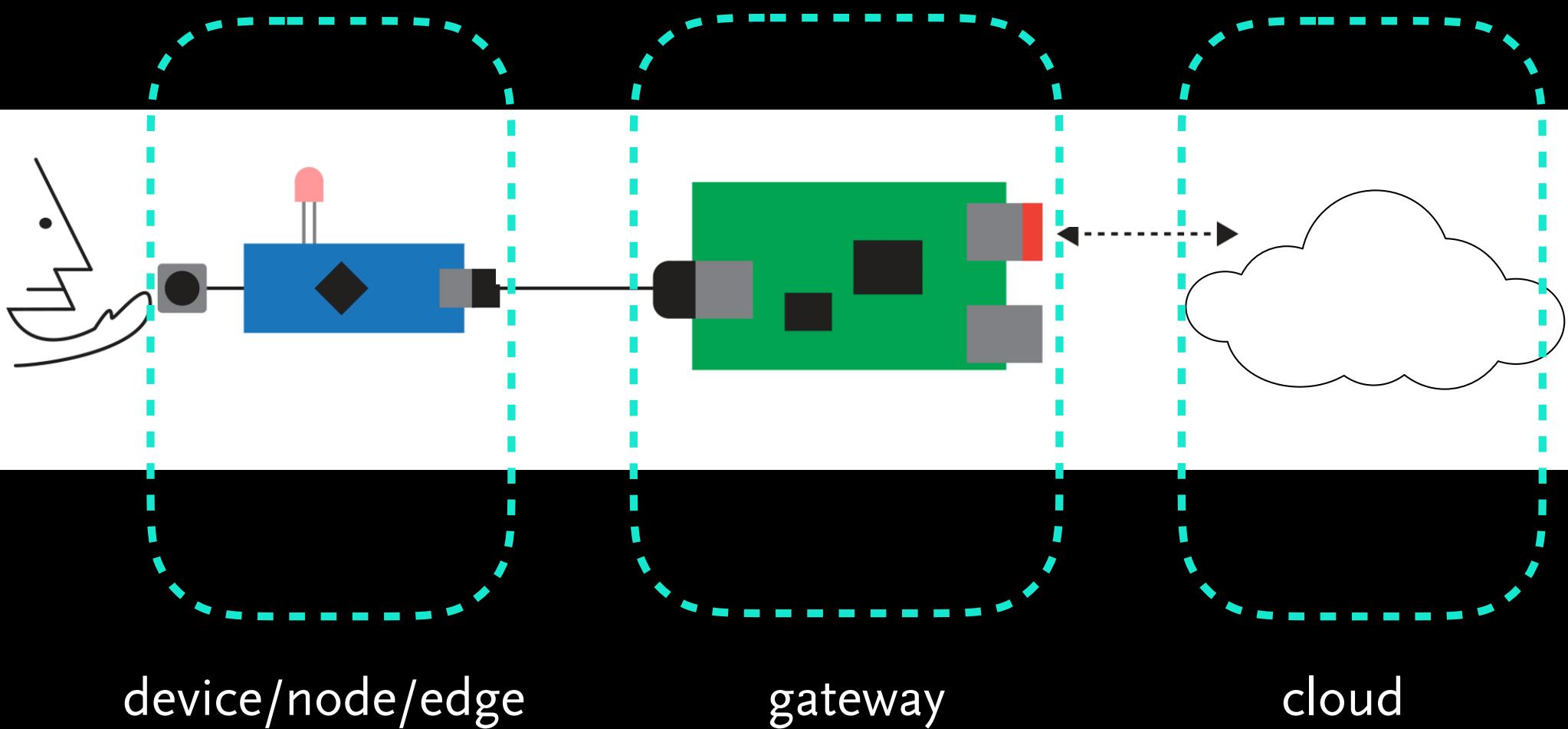
from <https://github.com/nikmart/interaction-engine/wiki>

Distributed computing architectures



modified from <https://github.com/nikmart/interaction-engine/wiki>

Distributed computing architectures



modified from <https://github.com/nikmart/interaction-engine/wiki>

Considerations

Latency

Throughput

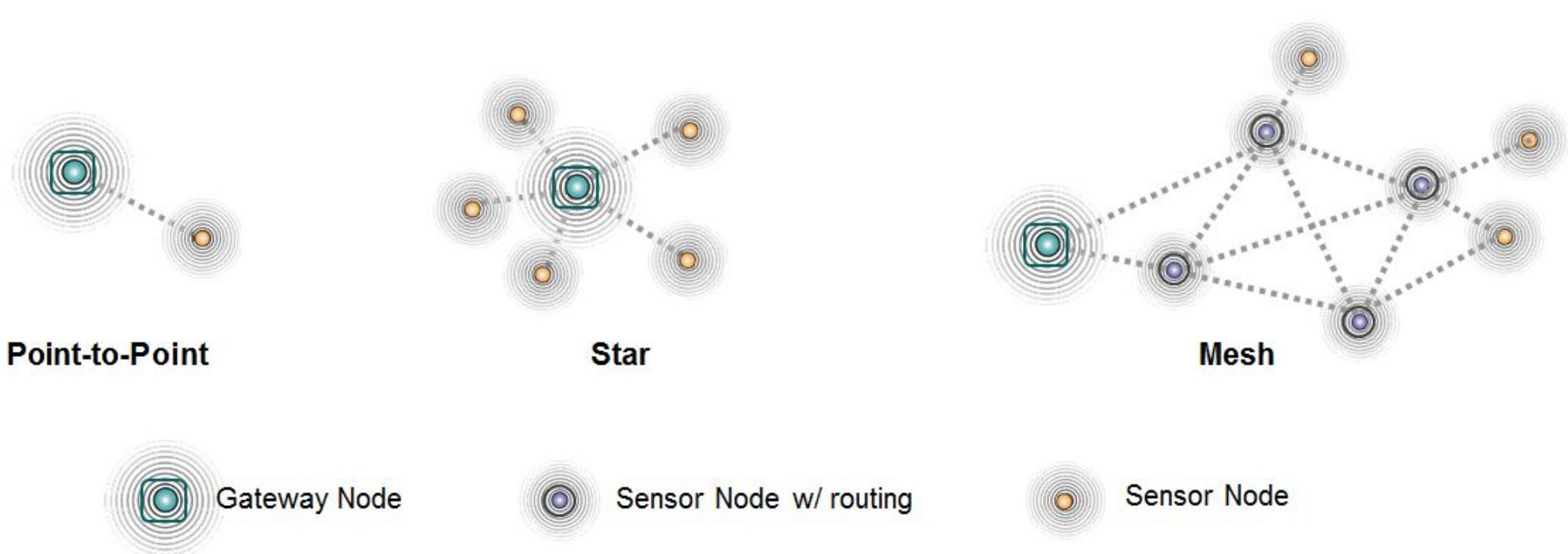
Fault resiliency

Scalability

Hops

Range

Topologies



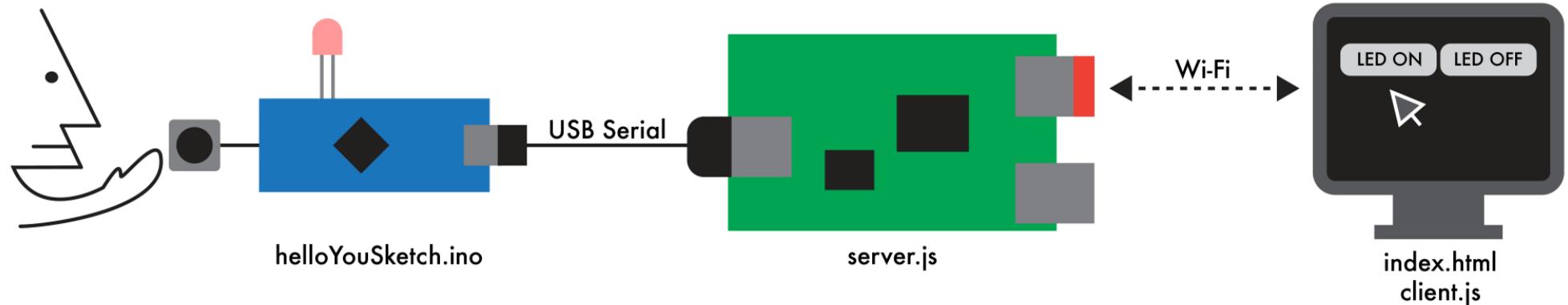
from: <http://radar.oreilly.com/2014/04/3-topologies-driving-iot-networking-standards.html>

IoT Technologies

- Short Range Wireless
 - Bluetooth Low Energy
 - Near Field Communication
 - RFID
 - Thread
 - WiFi, WiFi Direct, WiMAX
 - Z-Wave, Zigbee
- Medium Range Wireless
 - HaLow
 - LTE, NB-IoT,
- Long Range Wireless
 - LPWAN
 - LoRA
 - Very Small Aperture Terminal
 - Cellular 2G, 3G, 4G Mobile Technologies
- Wired
 - Serial Port, Ethernet, Firewire
 - Power Line Communication

Interaction Engine

“Hello You”



helloYouSketch.ino (The Arduino code)

The Arduino code written in C++. It may be written or edited on the IxE itself, but it is compiled, uploaded and run on the Arduino board.

server.js (The RPi code)

The server.js code is written in javascript. It is run on the IxE using node.js.

index.html and client.js (The browser code)

Index.html is written in html, but with javascript embedded. The client.js code acts as a library for the functions called in index.html, and is written in javascript. These files are served from the IxE when node.js is running server.js. Both run on the web browser.

IxE Filesystem Preview

Overview: tree -L 3

Home directory

HelloYou poke around

cd helloYou/

cat server.js

cat client.js

Arduino sketchbook

HelloWorld with Node.js

Applications & Libraries



find packages

sign up or
log in

Build amazing things

npm is the package manager for JavaScript and the world's largest software registry. Discover packages of reusable code — and assemble them in powerful new ways.

[Sign up for npm](#)

npm Orgs is powerful collaboration — for free

- Encourage code discovery and re-use within teams
- Publish and control access to your own namespace
- Manage public and private code with the same workflow

[Sign up for Orgs](#)or, [Learn more about Orgs](#)

What is npm?

Use npm to install, share, and distribute code; manage dependencies in your projects; and

<https://www.npmjs.com>



find packages

sign up or
log in

Build amazing things

npm is the package manager for JavaScript and the world's largest software registry. Discover packages of reusable code — and assemble them in powerful new ways.

[Sign up for npm](#)

npm Orgs is powerful collaboration — for free

- Encourage code discovery and re-use within teams
- Publish and control access to your own namespace
- Manage public and private code with the same workflow

[Sign up for Orgs](#)or, [Learn more about Orgs](#)

What is npm?

Use npm to install, share, and distribute code; manage dependencies in your projects; and

<https://www.npmjs.com>

System Diagramming

Steps

1. Identify the components

- sub components
- various names

2. Identify the linkages

- physical connection
- flows of energy
- flows of information

3. Check relevant pathways to make sure they can be mapped on the system

4. For interactive systems, include the people

- physical input
- displays
- conceptual models

ITERATE !



