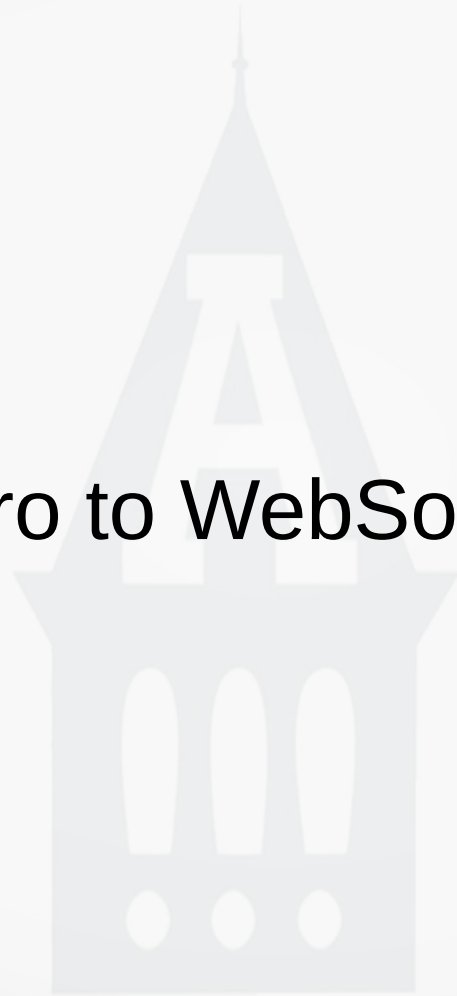


CS 5410

Intro to WebSockets



Overview

- WebSockets is an API specification for a persistent, low(er) latency, and low(er) overhead protocol.
 - MDN Ref: https://developer.mozilla.org/en-US/docs/Web/API/WebSockets_API
 - Simple API: open, send, close
 - Events: onopen, onmessage, onclose, onerror
- Implementations & Wrappers exist for
 - JavaScript (client and server) : socket.io, ws
 - Java : Jetty
 - Python: pywebsocket, tornado
 - C++ : cpprestsdk, libwebsockets
 - C# : Part of the System.Net.WebSockets namespace

Getting Started

- Client (browser) initiates connection with server

```
GET /socket.io/?EIO=3&transport=websocket&sid=is98WkFKrfmDSsAnAAAA
HTTP/1.1
Host: localhost:3000
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Sec-WebSocket-Version: 13
Origin: http://localhost:3000
Sec-WebSocket-Extensions: permessage-deflate
Sec-WebSocket-Key: At7IfHg0uB4tAFIgqzDVzA==
Connection: keep-alive, Upgrade
Upgrade: websocket
```

Getting Started

- Server responds

```
HTTP/1.1 101 Switching Protocols
Upgrade: websocket
Connection: Upgrade
Sec-WebSocket-Accept: z19FY4JpcG5v3qKXUpTfmc4BIrs=
Sec-WebSocket-Extensions: permessage-deflate; client_no_context_takeover
Sec-WebSocket-Version: 13
WebSocket-Server: uWebSockets
```

- Communication occurs over same TCP connection that HTTP is using

Socket.io - Server

- npm package – “socket.io”: “4.4.*”

1. Establish listener

- `let io = require('socket.io')(server)`

2. Listen for incoming connection

- `io.on('connection', socket => { ... });`

3. Listen for messages from the client

- `socket.on('move', data => { ... });`
- `socket.on('rotate', data => { ... });`

Socket.io - Client

- Use socket.io script

- `<script src = "/node_modules/socket.io/client-dist/socket.io.min.js"></script>`

1. Create an io instance; connects to server

- `let socket = io();`

2. Send messages to the server

- `socket.emit('move', { dir: 'left', elapsedTime: time });`
 - `socket.emit('move', { dir: 'right', elapsedTime: time });`

Communicating Between Browsers

