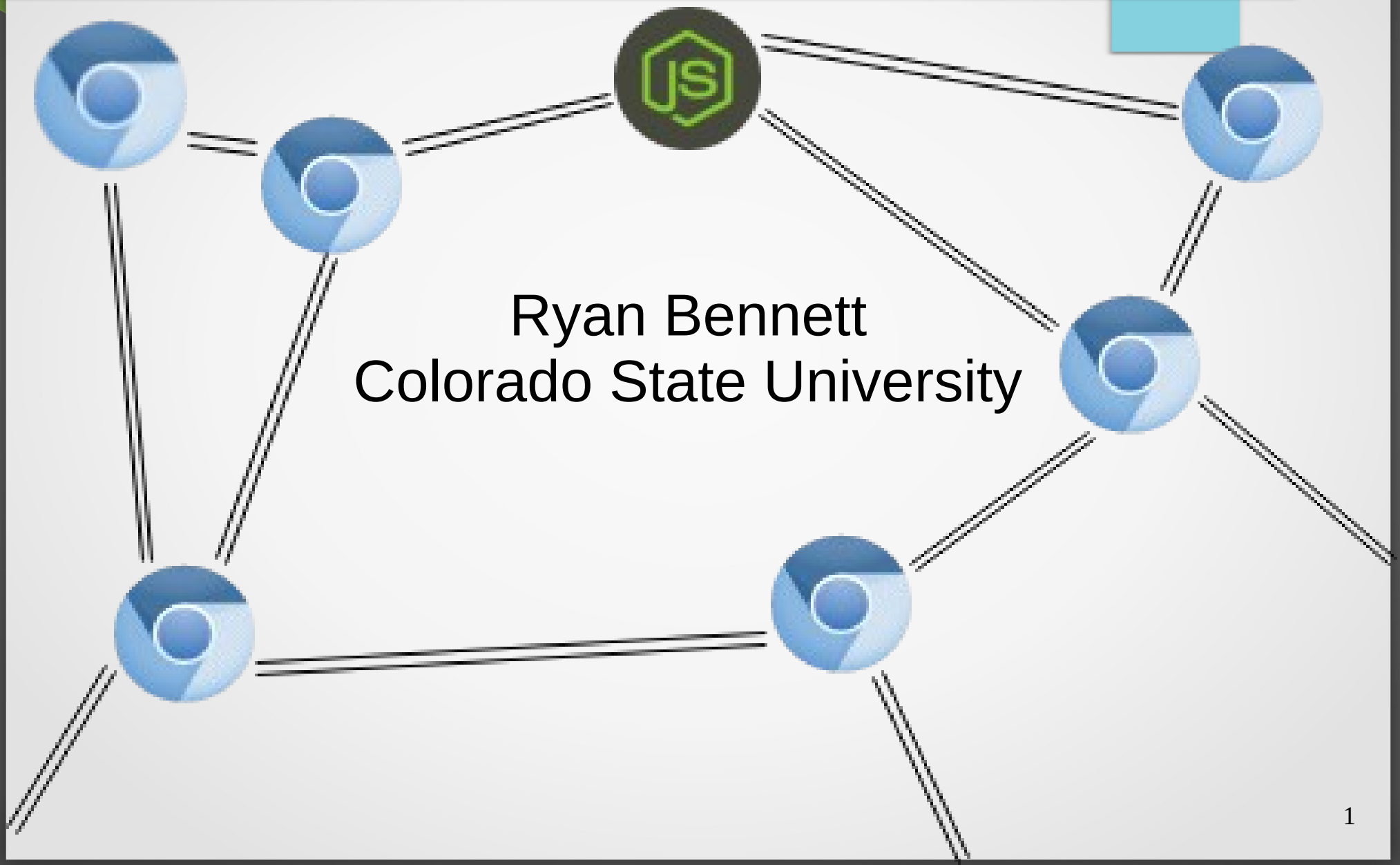
NDN in Javascript



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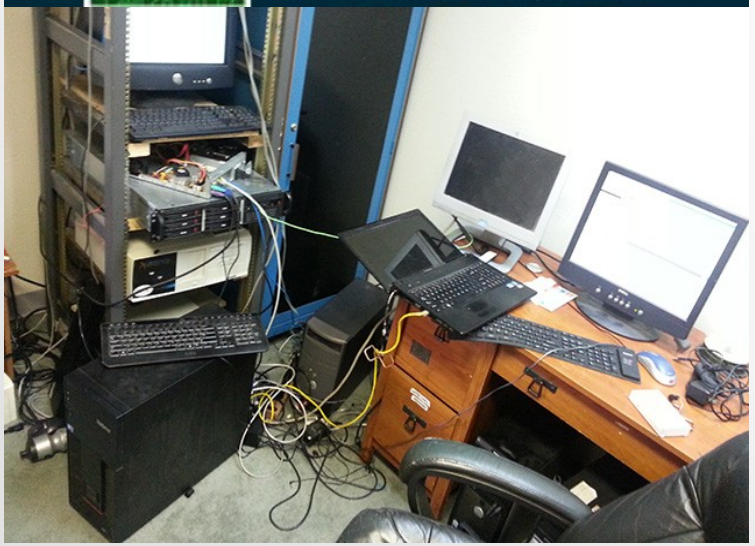
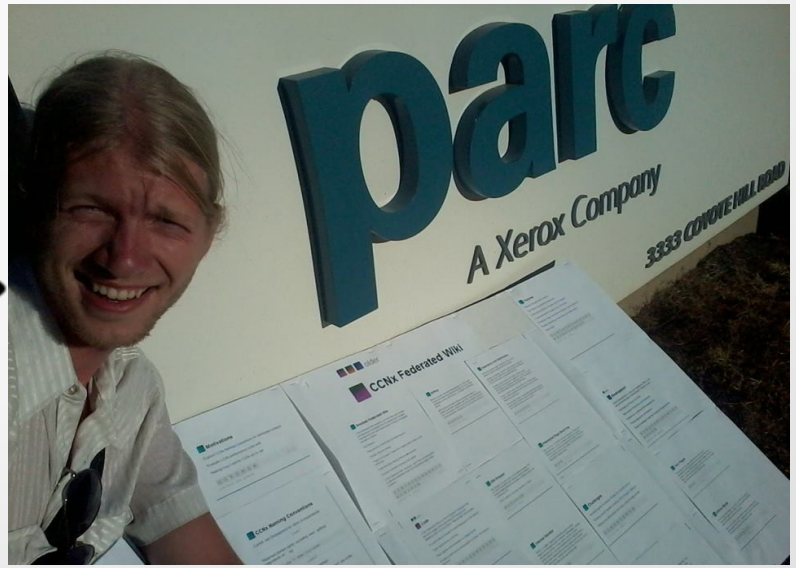
Colorado State University

A Bit of Background

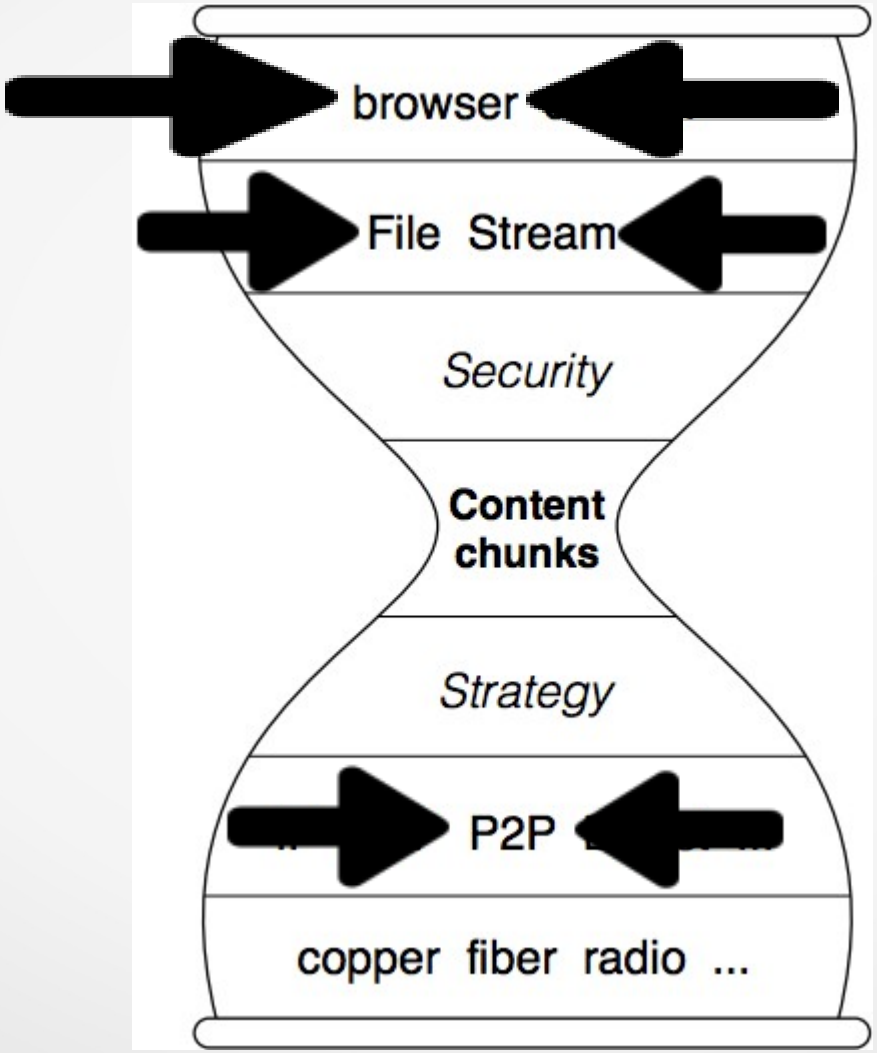




Why Javascript?

- A fertile ground for NDN adoption
  - Low deployment overhead in the browser
  - JavaScript is moving from front-end to full stack
    - Node.js – over 80,000 packages on npmjs.org
  - Browsers are becoming more featurefull
    - IndexedDB : Large, persistent storage
    - WebRTC : Peer to Peer data channels
    - Moving from Web-app front-ends to Browser based Apps

A Note on Potential



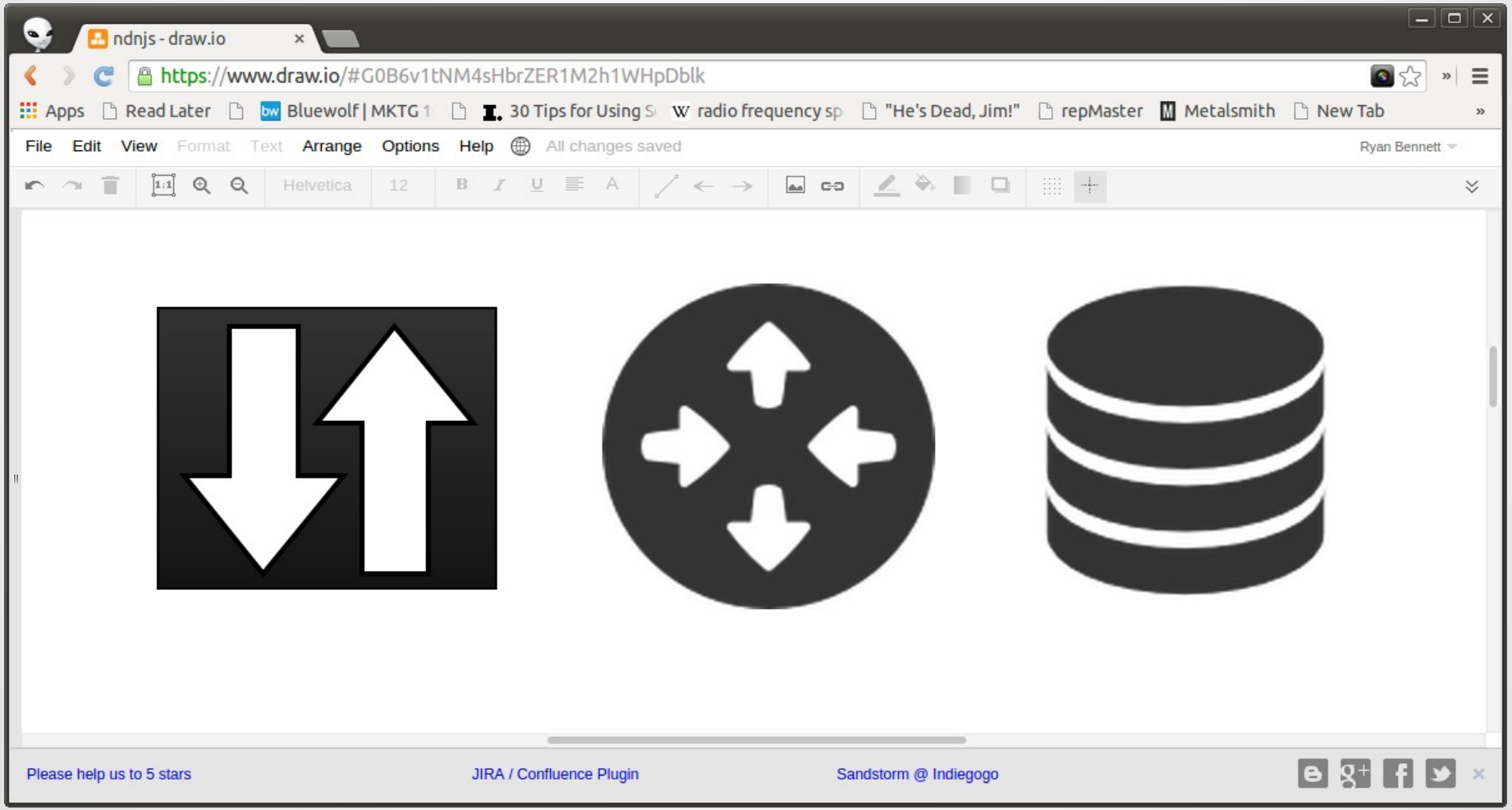
NDN-js: Common Client in Javascript

- Provides the primitives for NDN in Node.js and browser
  - WebSocket, TCP transports
  - Data signing/verification
  - Tlv packets
  - Basic PIT and FIB functionality
- From a pure JavaScript App developer perspective:
  - Packet level = too complicated, too much boilerplate
  - Requires NFD, Repo to build functional apps

The Dream

```
var Pony = require("ndn-in-a-box")

  , myNameSpace = new Pony("com.example/")

  , chat = myNameSpace.cd("chatRoom");

chat.join(3)
    .setDataType("json")
    .subscribe( /* function */ displayChatMessage)
    .steward();

var fileShare = chat.cd("sharedFiles").setDataType("file");

fileShare.listen(function(err, fileSuffix){
  if(!err){
    if (fileSuffix === "theFileIWant.zip"){
      fileShare.fetch(fileSuffix, /*function*/ handleFileObject);
    }
  }
});
```

NDN in a Box


ndnjs - draw.io
https://www.draw.io/#G0B6v1tNM4sHbrZER1M2h1WHpDblk
Apps
Read Later
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radio frequency sp
"He's Dead, Jim!"
repMaster
Metalsmith
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File
Edit
View
Format
Text
Arrange
Options
Help
All changes saved
Ryan Bennett
Helvetica
12
Please help us to 5 stars
JIRA / Confluence Plugin
Sandstorm @ Indiegogo

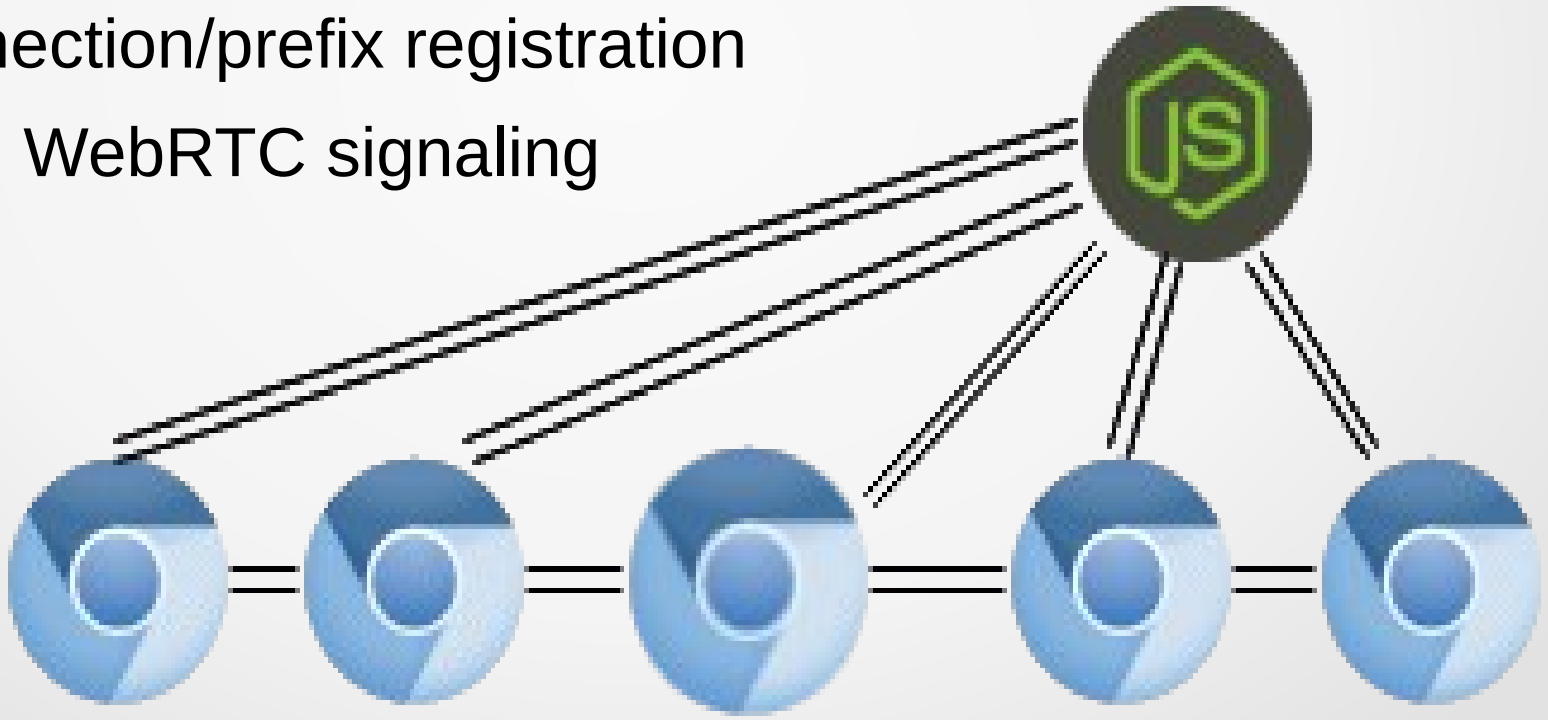
I/O: Simple enough for me to use

- Dead Simple Publish/Fetch API
  - Developer deals with URIs and app data
    - File objects, Object URLs, JSON, Text
    - MediaStreams would be nice
- Settable announcers/listeners
  - Roll your own Pub/Sub

```
// fetch a file, presenting it as an HTML5 object URL
io.fetch("url://some/large/image.png", function responseCB(error, image){
  if (error){
    console.log("unable to fetch for some reason: ", error);
  } else {
    document.getElementByID("highRes").src = image;
  }
});
```

Forwarding Gremlin

- Browser/Node.js NDN Forwarder
  - WebRTC & WebSocket transports
- Flexible Listener API
  - connection/prefix registration
- In-band WebRTC signaling



Data Steward

- NDN repository for full stack JS developers
  - Node.js (backed by levelDB)
  - Browser (backed by IndexedDB)
- Programmatic API
  - Use existing authorization schemes to trigger data storage

A Hackable Codebase

- Common Data Structures
  - NameTree, ContentStore, PIT, FIB, Interface Manager
- Transports
  - WebRTC, WebSocketServer, TCPServer, Telehash, IPC, MessageChannel,
- Layered npm modules
  - Easy to remix/repurpose

Will this even work?

- Try it for yourself....
  - http://ndn.io:8000

“Any application that can be written in JavaScript, will eventually be written in JavaScript.”

-Atwood's Law

Deployment Status

- NDN-Contrib @ version 0.1.x, mostly stable
- Versions 0.1.x of IO, Gremlin released on NPM (Data Steward Coming soon):
  - Basic feature set, a bit buggy: “Something to Chew On”
- Version 0.0.2 of “ndn-in-a-box”:
  - One of many possible API wrappers above Gremlin, IO, and Data Steward
- Short Term Roadmap
  - Get Stable and write docs (Felix???)
- Long Term Roadmap
  - HTML5 integration
    - WebWorkers, MediaStreams, Web Components.
  - Code optimization, security models,
    - I'm an amateur, remember?
  - Native Browser API? Node.js C++ NFD bindings?

Moving Forward

- It's an exciting time to be a JavaScript Developer
- It's an exciting time to be involved with NDN
- It's the right time to target JS devs as early adopters.

Thank You.

“When the only language you know is JavaScript, everything starts to look like a web app.”