A WebSocket-based Approach to Transporting Web Application Data

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Background

- Transporting data to clients
  - Server rendering

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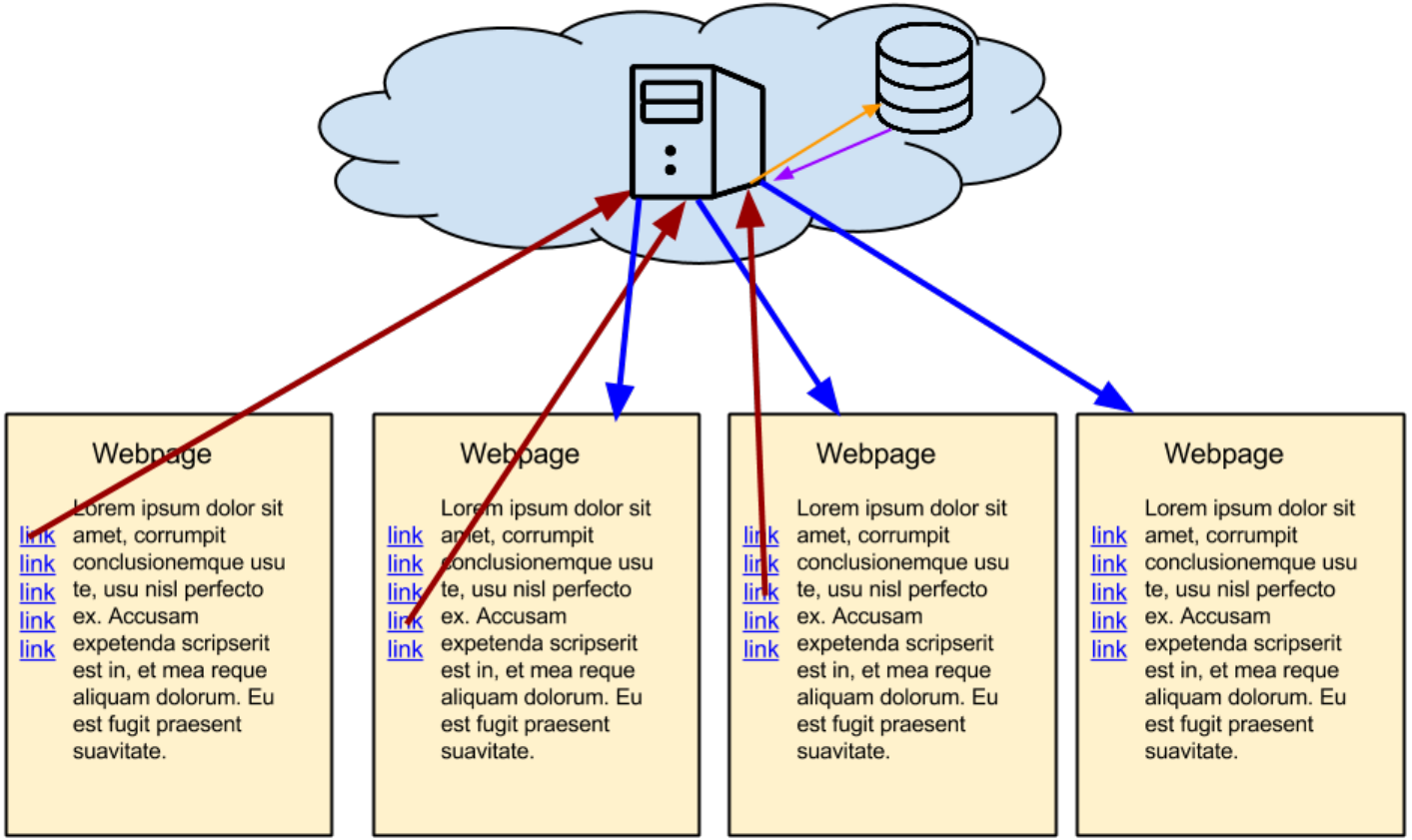
Typical Server Interaction, 1990's



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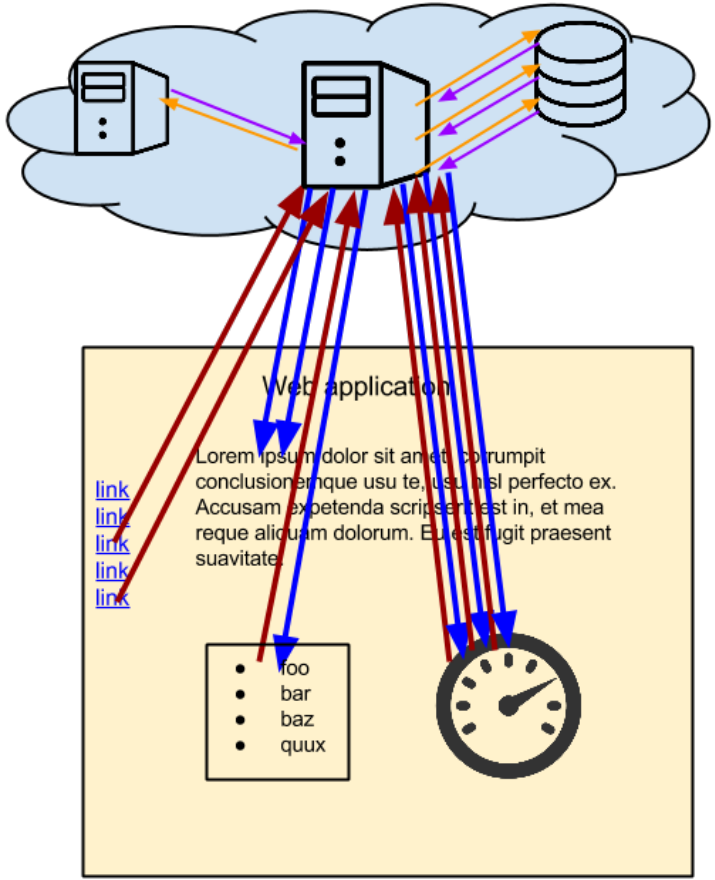
Background

- Transporting data to clients
  - Server rendering
  - AJAX

Typical Server Interaction, 2010



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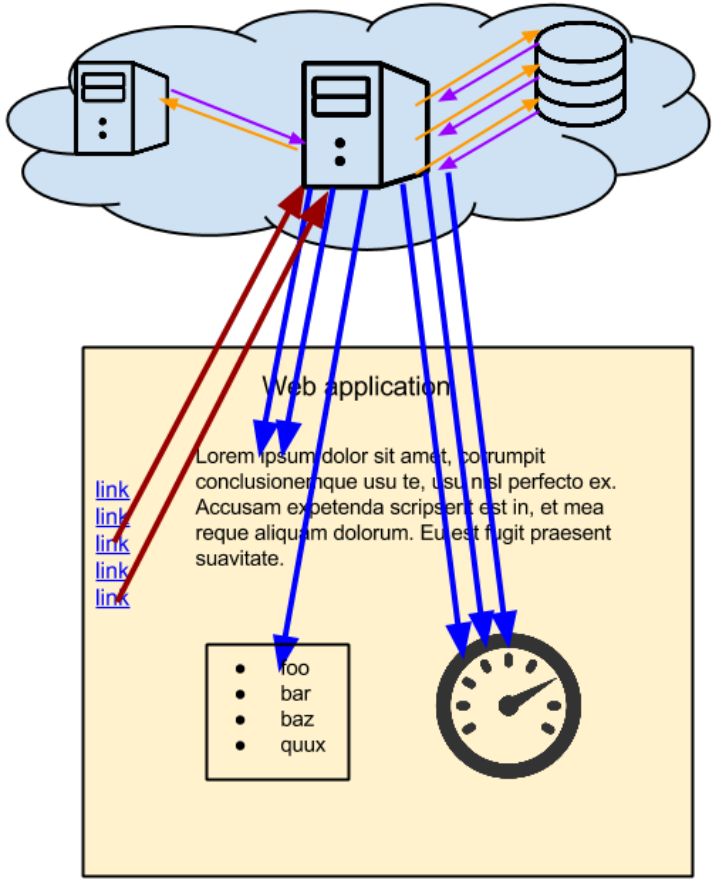
Background

- Transporting data to clients
  - Server rendering
  - AJAX
  - WebSockets

Typical Server Interaction, 2015



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Motivation

Maybe we can improve on AJAX!

- Reduce request gap
- Reduce request latency
- Utilize Cornerstone for convenient experimentation

Overview

AJAX method

1. Client makes endpoint request
2. Server responds immediately
3. Client loads
4. Client fetches data
5. Client receives data when ready

Thesis method

1. Client makes endpoint request
2. Server responds immediately
3. Server fetches data
4. Client loads
5. Client receives data when ready

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Theoretical Advantages

- No request gap
- Fewer requests; same responses

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Implementation

```
// someController.js

let someController = {

    someRoute(req, res) {

        res.view({

            foo: "hello",

            bar: "world"

        });

    }

};
```

```
{{! someController/someRoute.hbs }}

<p>{{foo}}</p>

<p>{{bar}}</p>
```



```
<p>hello</p>

<p>world</p>
```

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Implementation, continued

- `Promise`
- WebSocket connection listener
- `{{{stream}}}` helper

```
// someController.js

let delayedData = new Promise(function(resolve, reject) {

    // resolves the promise after 5000 ms

    setTimeout(function() {

        resolve("delayed data!");

    }, 5000);

});


let someController = {

    someRoute(req, res) {

        res.view({

            foo: "hello",

            bar: delayedData

        });

    }

};
```

```
<p>{{{stream "bar"}}}</p>
```



```
<p><var data-promise="bar"></var></p>
```

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Testing Methods

- Server
  - relatable benchmark
- AJAX
  - modern practice
- Stream
  - thesis

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Testing Scenarios

- Local file
- Local database
- Timeout
- Series
- Parallel

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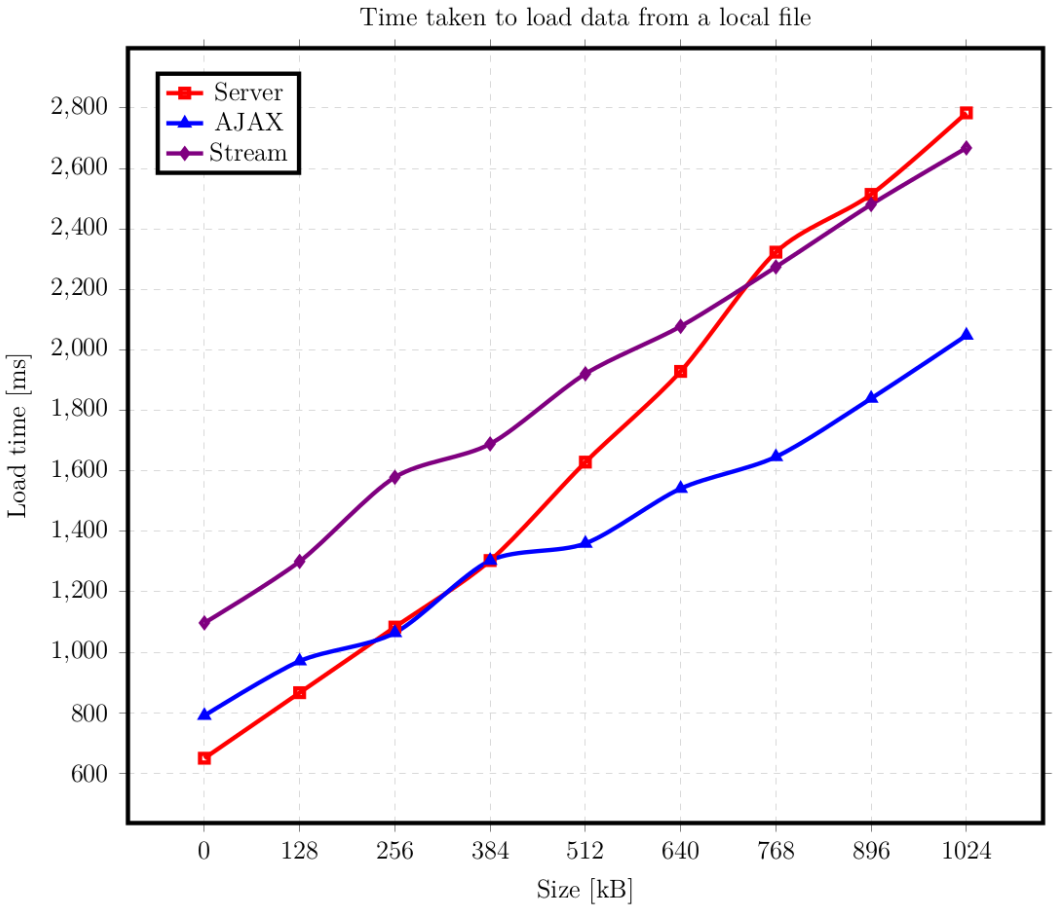
Data - Local File



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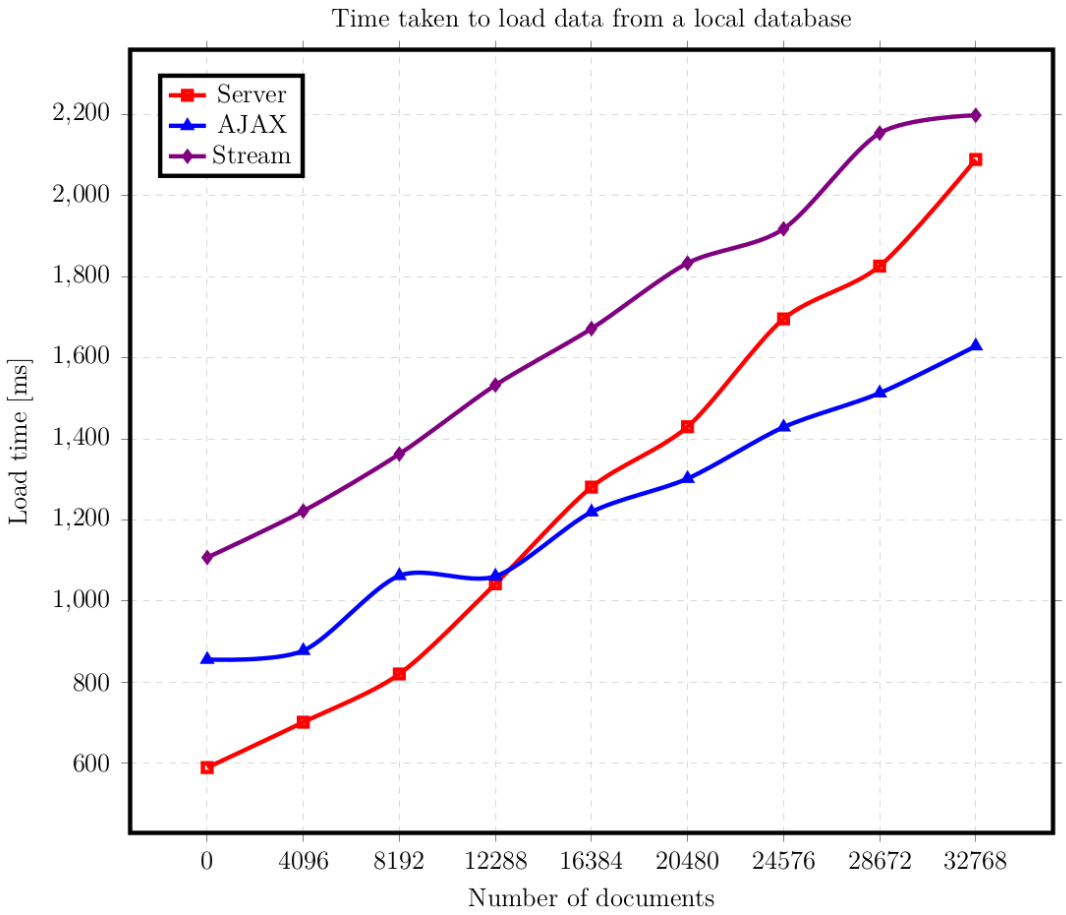
Data - Local Database



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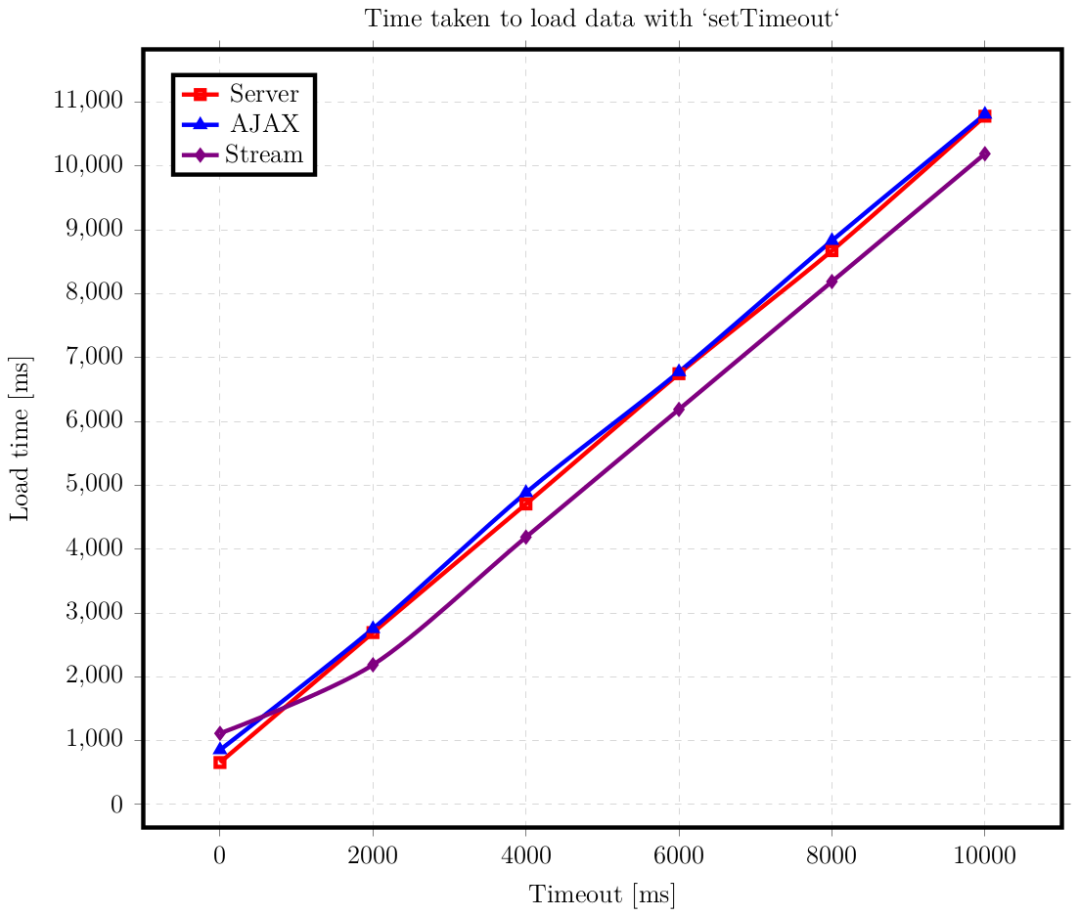
Data - Timeout



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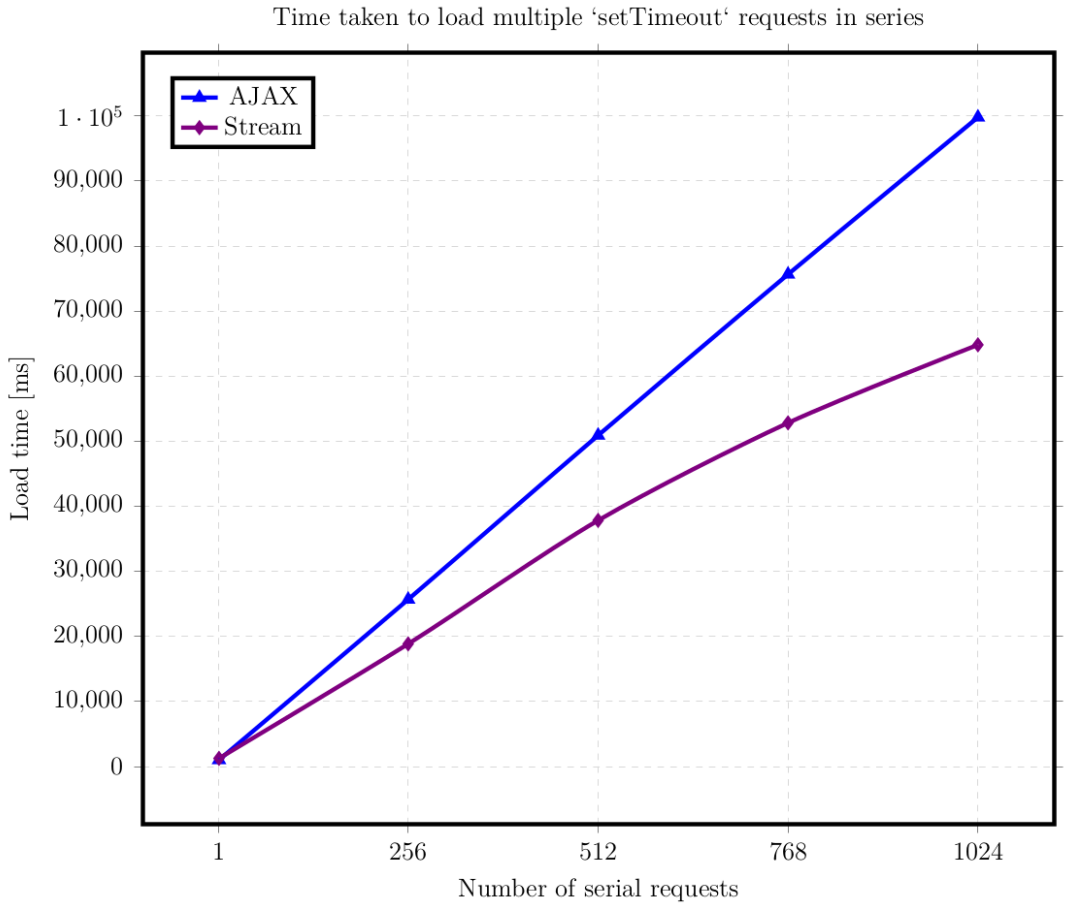
Data - Series



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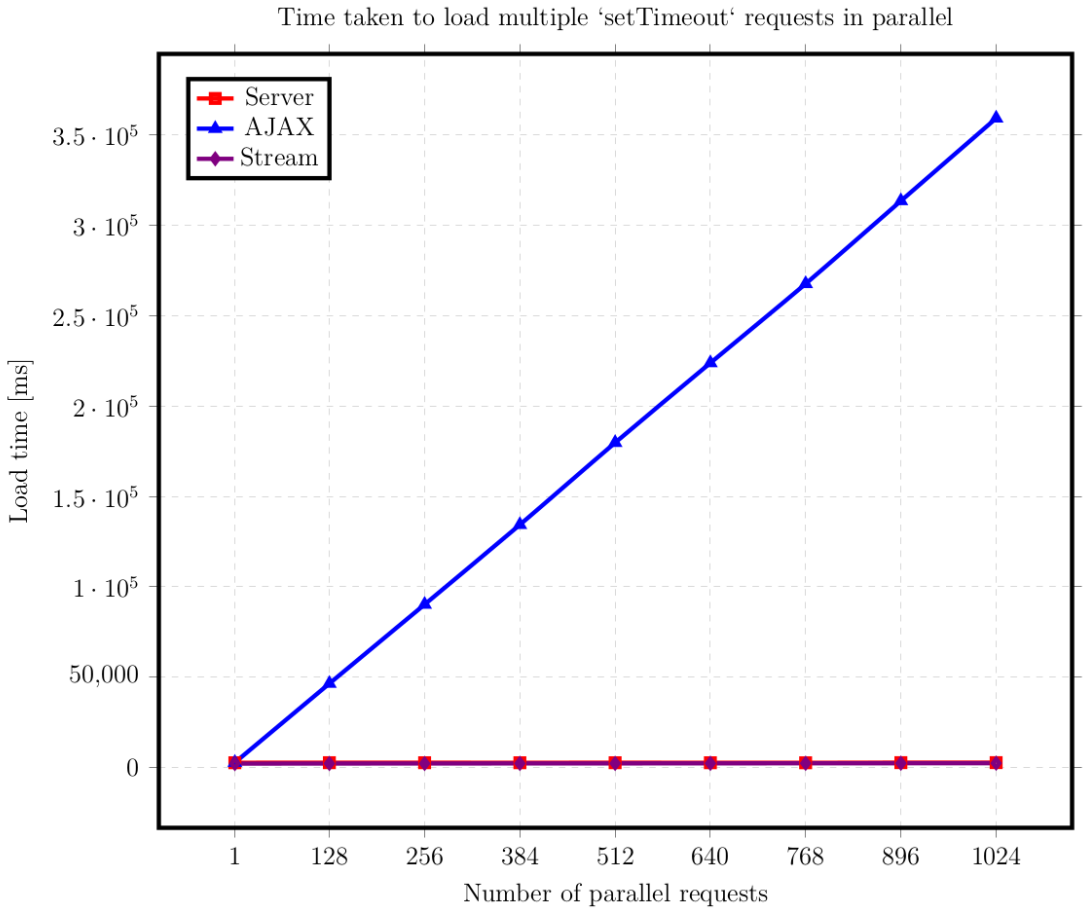
Scenarios - Parallel



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Analysis

- Number of HTTP requests, responses
  - Server: `1, 1`
  - AJAX: `n+1, n+1`
  - WebSockets: `2, n+2`

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Analysis, continued

- File and database tests
- Timeout test
- Series test
- Parallel test

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Conclusions

- Parallel requests → WebSockets
- Sequential requests → WebSockets
- Large data → AJAX
- Both?

Related Work

- MeteorJS
- HTTP pipelining (in `HTTP/1.1`)
  - bizarre vendor support
- `HTTP/2` (formerly Google SPDY)
  - bizarre vendor support

Future Work

- stream data in chunks
- stream data updates

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Questions?

Feel free to ask me anything

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