

The Client-Side Apocalypse

Joe Barnes

@joescii

Follow along at <http://172.20.10.4:8080>

Powered by



AoI.

- Started Scala in 2012
- Built PartQuest.com 2014-16
- Developed lift-ng in parallel
- Lift committer 2015
- Currently backend and devops for go90 at AOL

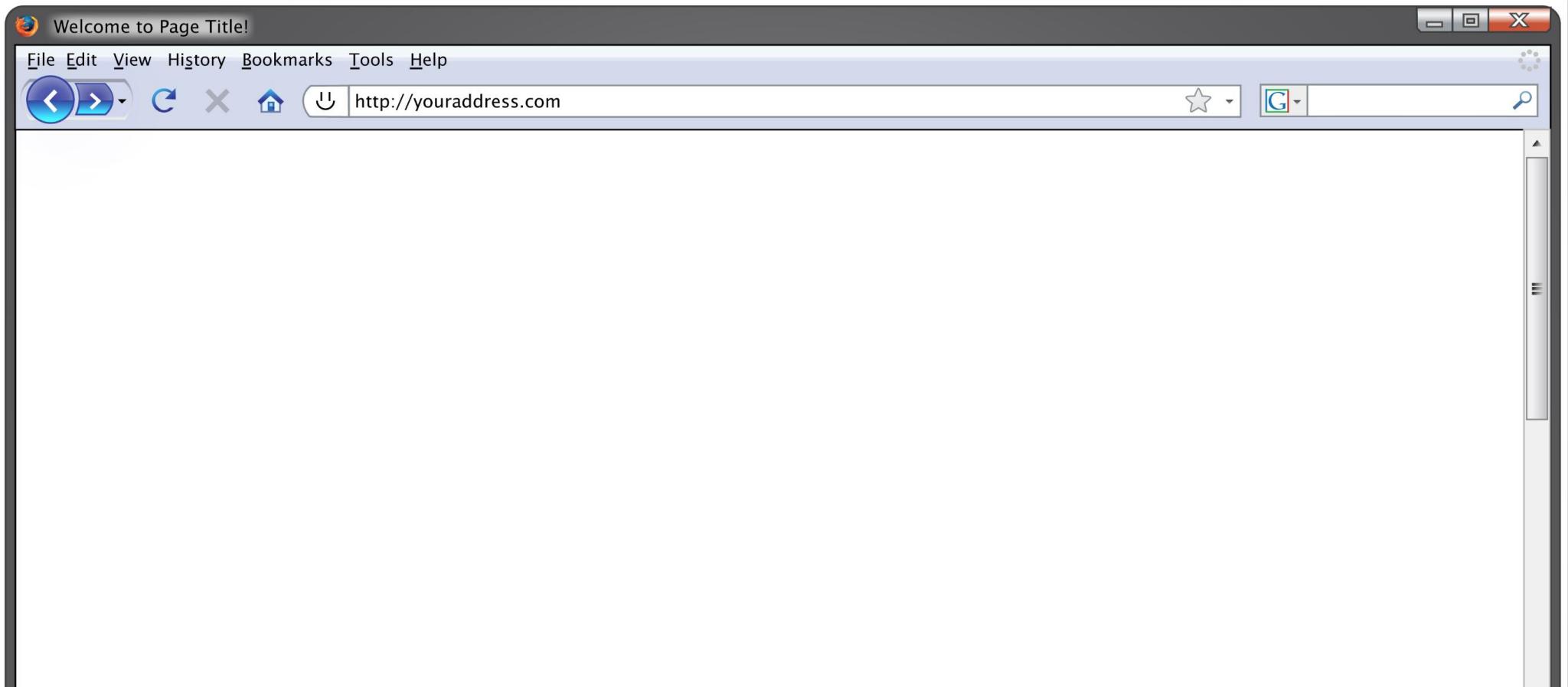
An apocalypse, translated literally from Greek, is
through the concealed

meaning a disclosure of knowledge, i.e.,
a lifting of the veil or revelation.

-wikipedia

ἀποκάλυψις

So what happens when we render client-side?



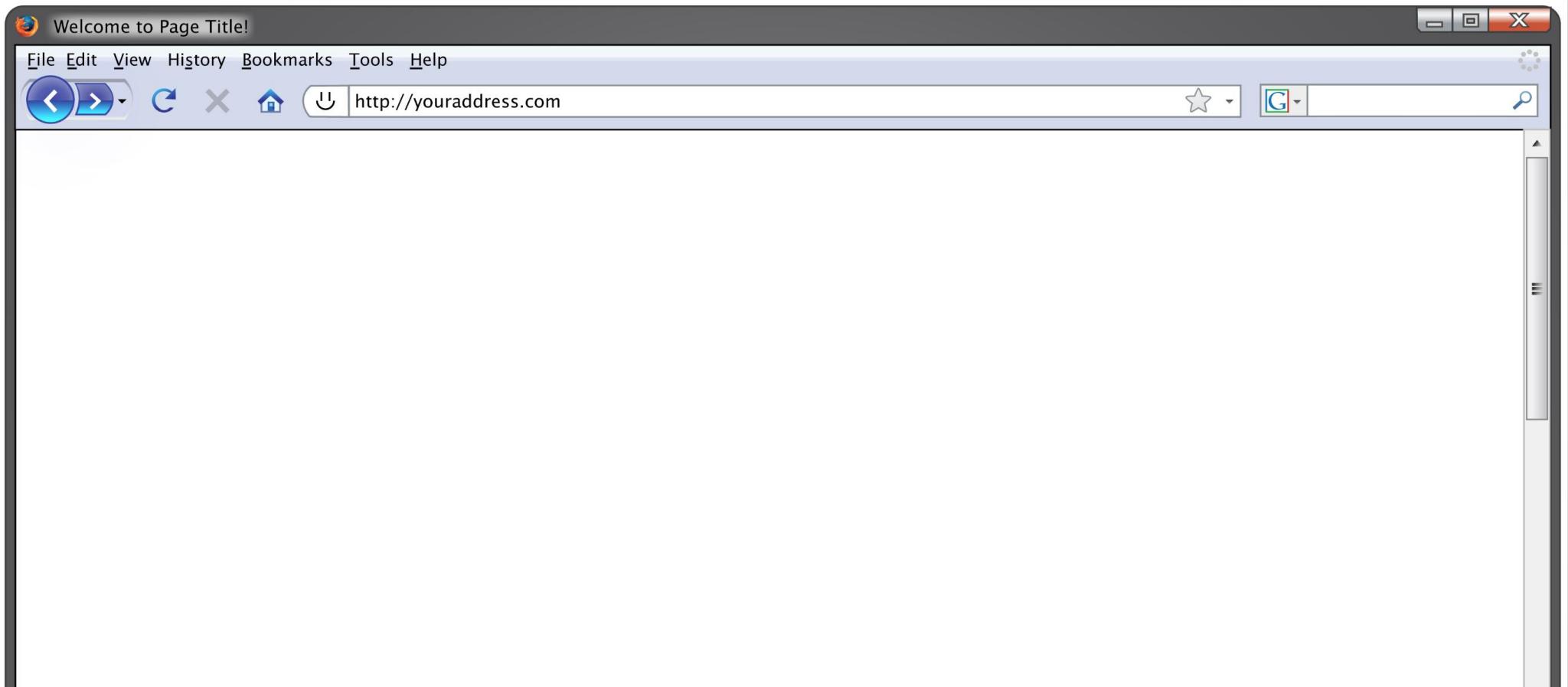
A large, semi-transparent green arrow points from the right towards the center-left of the image. It has a thick outline and a lighter fill.

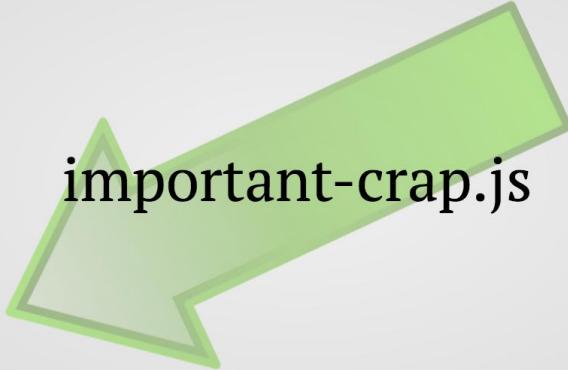
<http://youraddress.com>



```
<html>
  <head></head>
  <body style="display:none;">
    <!-- Some non-content skeleton crap -->
  </body>
  <script type="text/javascript"
    src="important-crap.js"></script>
</html>
```



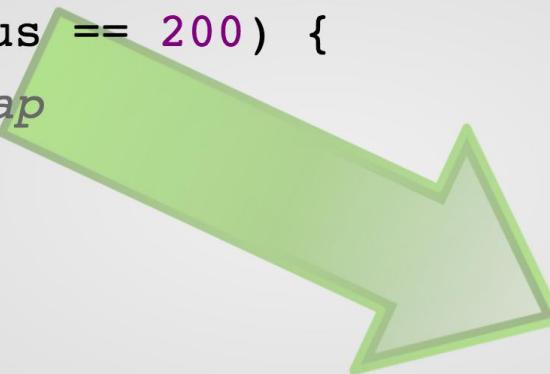


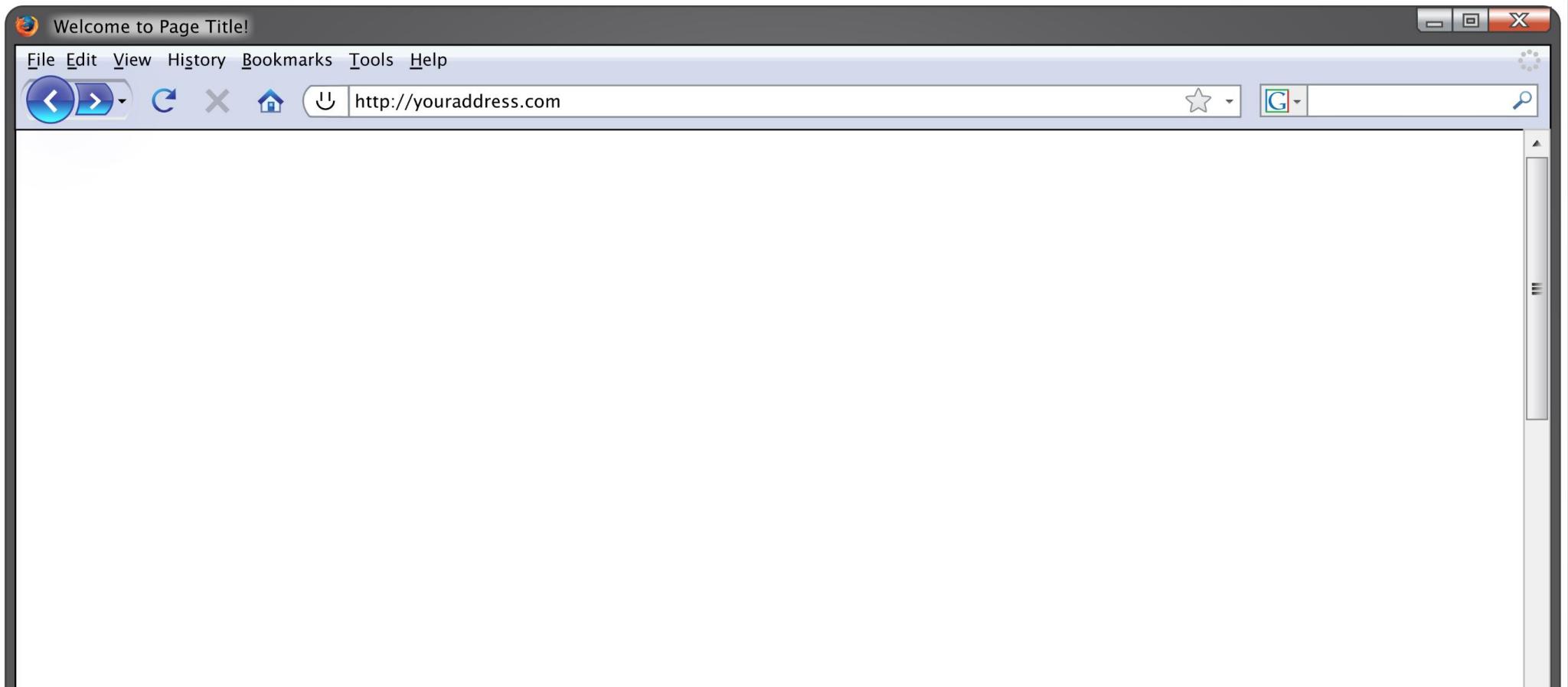


important-crap.js



```
function loadContent() {  
    var xmlhttp = new XMLHttpRequest();  
  
    xmlhttp.onreadystatechange = function() {  
        if (xmlhttp.readyState == XMLHttpRequest.DONE) {  
            if (xmlhttp.status == 200) {  
                // Load the crap  
            }  
        }  
    };  
  
    xmlhttp.open("GET", "actual-important-crap", true);  
    xmlhttp.send();  
}
```





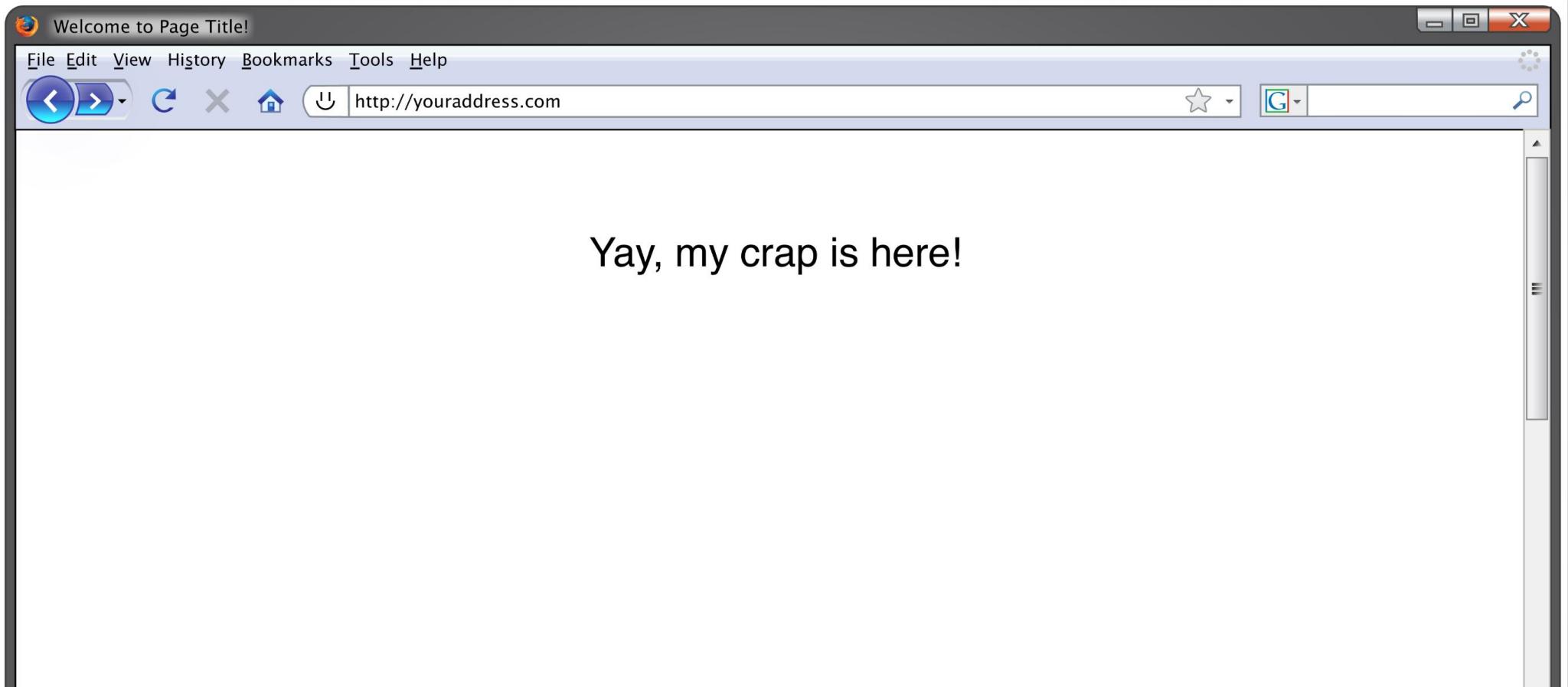


/actual-important-crap

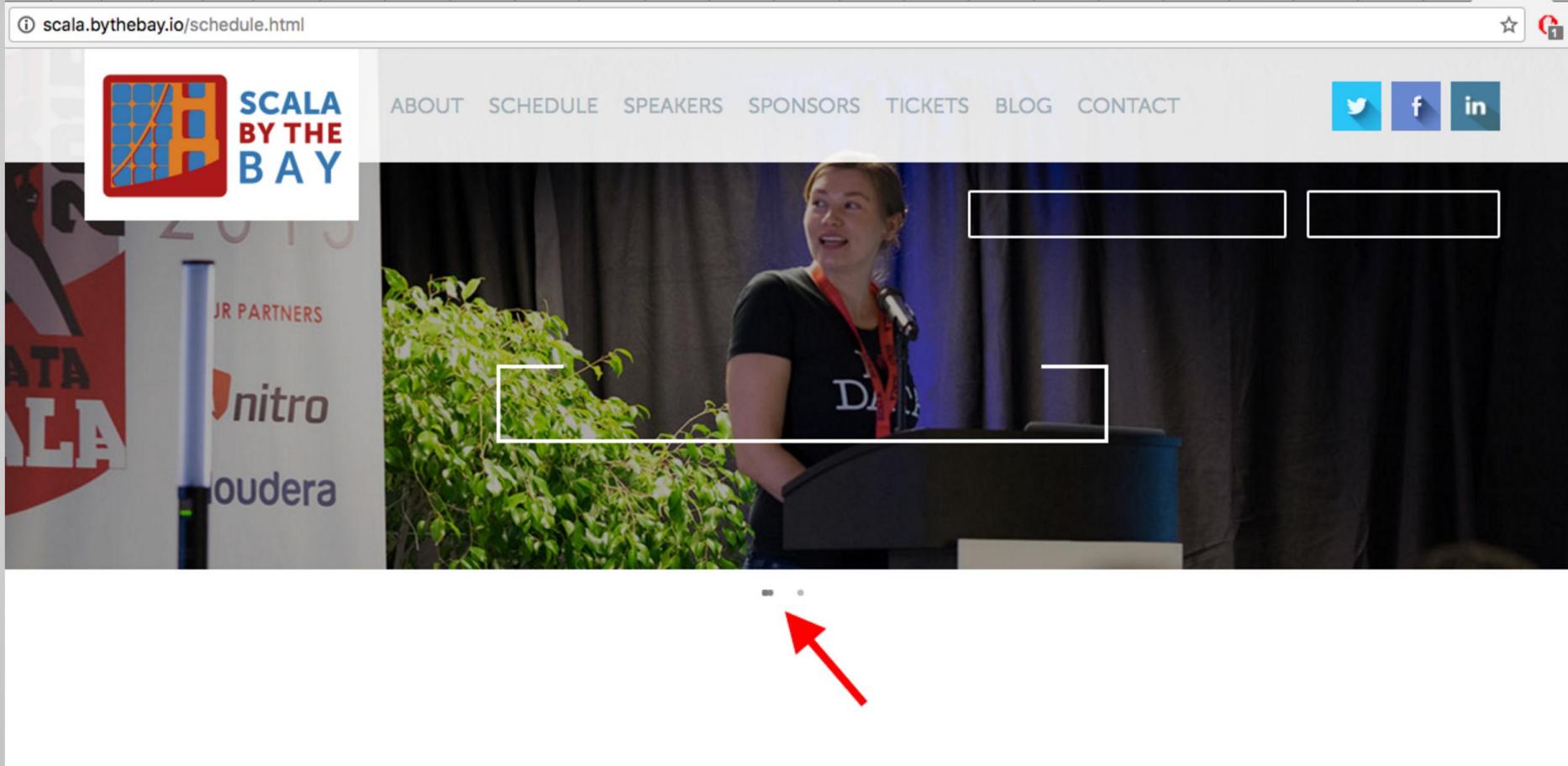


```
{  
  "content": {  
    "crap": "Yay, my crap is here!"  
  }  
}
```





Keep 'em entertained with a spinner!
(Don't mention we had to fetch it too)



No big deal, it's 2016 and the internet is fast and reliable

2016 internet



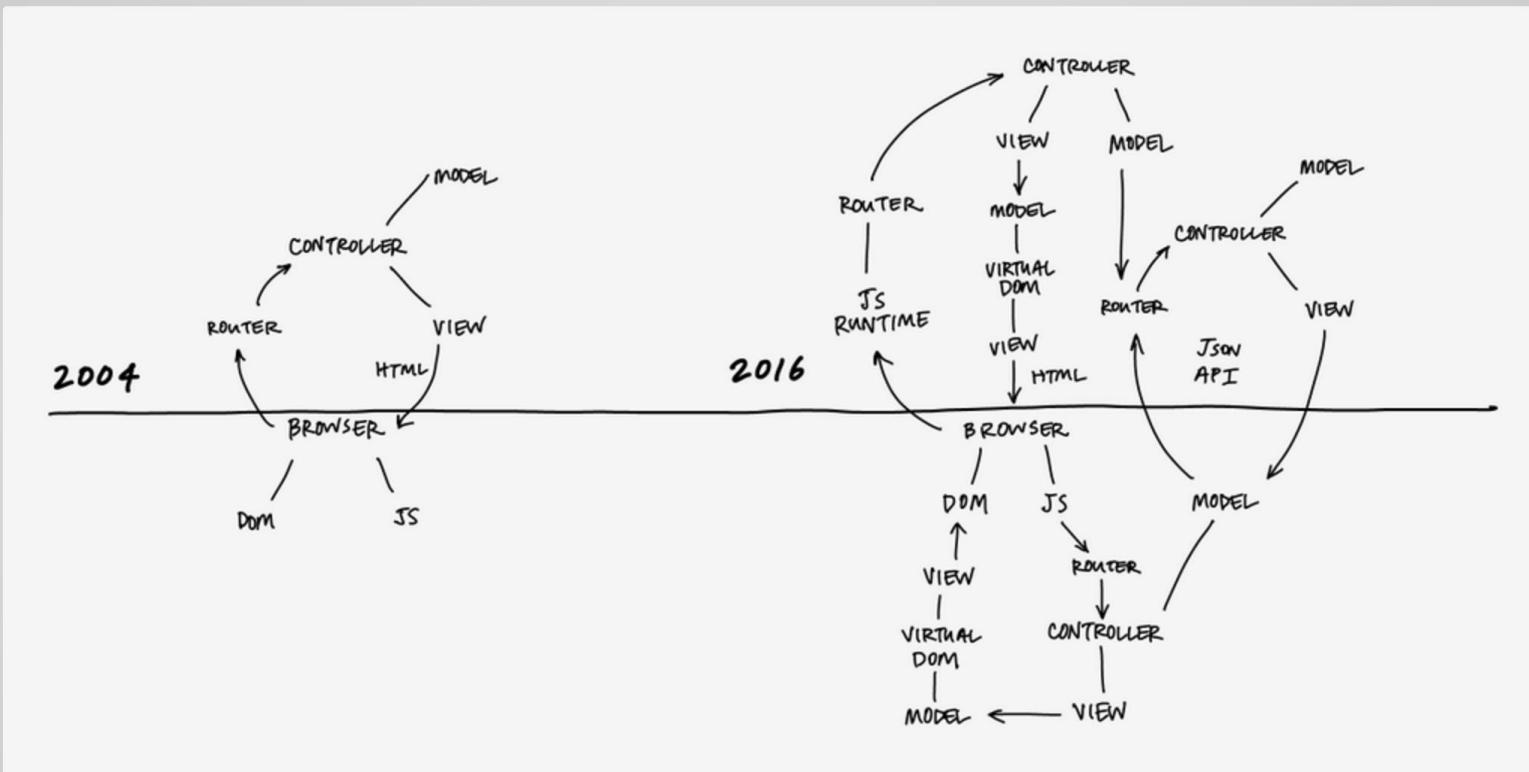
Somewhere IRL, probably



True story



Even if the internet WAS always fast and reliable...



Who here loves JS???

NO ONE!!!



Thank you, Sébastien!

- Transpilation => Bloated JS payload
- Not a compiled language
- Transmitted and distributed globally
- To inefficient devices producing heat

Global warming...



...and it is YOUR fault

Jokes aside, lots of opportunities for failure
What if any of those round-trips fail?

Progressive enhancement

- The HTML alone *just works*
- If other capabilities are available, it works better

For instance... did you know...
a browser can redirect without javascript?
See

Did you know...

a browser can send data without javascript?

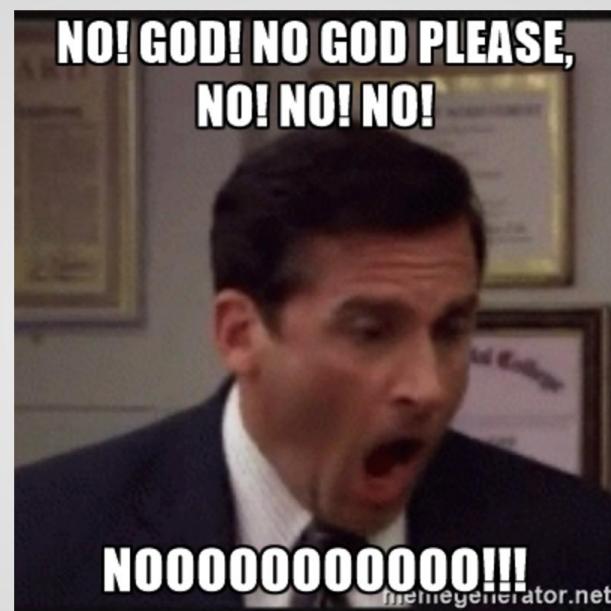
See <form>

Three things you can send to define your application:

- HTML
- JavaScript
- Cascading Style Sheets

How do they compare in terms of capability/power?

Clearly JS is the most powerful
So that's what we should use, right?





Scala World 2015

20-22 September, Lake District, UK

Constraints
are Freedom

— Rúnar Bjarnason



Rule of Least Power

[choose] the least powerful language suitable for a given purpose

- W3C "The Rule of Least Power"

Client-side rendered apps are only useful for a human with a powerful heat-producing device on a reliable network.

Kinda like applets and flash!



Other consumers such as search engines, blog readers, etc. can't readily consume your content

Do we *really* want a stateful client??
Effectively gives us a distributed system

Synchronizing data in a distributed system is an enormous challenge

- Rylan Dirksen, 8th Light

Anybody here like to update the view and tell the server in the background?

What if that fails?

And your user isn't tech savvy
And they're using AOL dialup?

And they're ordering THIS!



Gun Cleaning Kit: Gun Maintenance Brass Cleaning Kit w/Wood Box by Precision Tactical Systems. Features universal brush system to remove crud. Will polish any firearm.

by [Precision Tactical Systems](#)

45 customer reviews | 3 answered questions

Price: \$44.95

Sale: \$31.95

You Save: \$13.00 (29%)

i Your cost could be **\$26.95**: Qualified customers get \$5 in Gift Card funds on first \$100 reload of their Amazon Gift Card Balance. [Learn more](#)

In Stock.

Want it Tuesday, Nov. 1? Order within **28 hrs 30 mins** and choose **Two-Day Shipping** at checkout. [Details](#)

Sold by [Precision Tactical Systems](#) and [Fulfilled by Amazon](#).

- Universal - Kit will clean any firearm. 3-step cleaning system ensures your firearms will be free of crud
- Easy to Use - Brass adjustable rod system means cleaning is a cinch. You no longer have to spend hours cleaning your firearms.

Share [Email](#) [Facebook](#) [Twitter](#) [Pinterest](#)

Qty: 1 ▾

Add to Cart

Turn on 1-Click ordering for this browser

Add to List ▾

Have one to sell?

[Sell on Amazon](#)

And you *insist* you put it in the cart



Upon searching for something else, the cart is empty!



Now what do you expect this user to think?

BITCH SNATCHED IT FROM MY BUGGY!!!



Oh and she was buying a gun cleaning kit...

What if instead of depending on facebook to teach the world to not trust
web apps...

...we built trust worthy apps?

It turns out we can write such apps and enjoy writing them

Review of problems:

- Multiple round trips, app can fail
- Be slow to render when not failing
- Creates state to synchronize
- Can confuse users, eroding trust

Lift avoids these problems

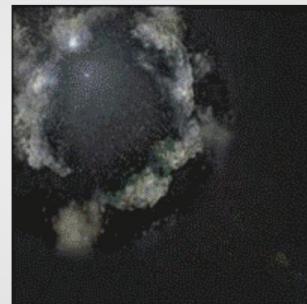
- render fully-functional HTML from the server
- progressively enhance it with JS/CSS
- state belongs safely on the server, not on an uncontrolled client
- updates easily applied *after* round trip to server

But client updates were never fun in Lift...

Excellent support for both ajax and async pushes...
...but you're on your own to manipulate the DOM

That's why we built lift-ng to make Angular a breeze with Lift

While speaking with Bryan Powell creator of Pakyow, I had an idea...





Most Lift DOM manipulation is to reflect state changes on the server
Why not do this automagically?

Like React.js, just write code to convert application state into desired view

To update the view when the application state changes, simply call one side-affecting function.

Then Lift does the work...

- calls your code to re-render the page
- diffs the tree against the previous render
- pushes a small json representation of the patches to apply
- updates the DOM in place with a few small javascript functions

Remember progressive enhancement?

It's a POST if the JS never shows up, or is disabled

The `form` element is converted into an ajax call if JS available

It's the usual story of Lift's happy path leading the developer to the best solution

BUT!!!

It's not ready yet...

Britany Meadows (@letbritcode) and I believe we can have it done for Lift 3.1

What we have thus far is solid...

- HtmlUnit for testing the JavaScript
- Generative property tests for generating the cases
- Can't yet handle multiple mutations reliably

So why a talk right now when it's not ready?

I WANT YOU



CHARLES M. SCHWAB

TO CONTRIBUTE

Ways to help:

Discuss the idea

Play with the code

Play with the sample application

Then Lift does the work...

- calls your code to re-render the page
- diffs the tree against the previous render
- pushes a small json representation of the patches to apply
- updates the DOM in place with a few small javascript functions

Credits

Apocalypse painting: <http://pierremassine.deviantart.com/art/Apocalypse-2-145369654>

Firefox browser: <https://5t3ph.files.wordpress.com/2009/03/vectorfirefoxbrowser.jpg>

Cloud server: <http://www.pngall.com/wp-content/uploads/2016/04/Cloud-Server-Free-PNG-Image.png>

Google fiber: Google Images found it in <https://www.youtube.com/watch?v=elIJjFcV230>

MacBook Pro: <http://www.cultofmac.com/268822/apple-finally-discontinue-non-retina-macbook-pro-year-rumor/>

Crazy wiring: Google Images found it in https://www.reddit.com/r/news/comments/47udy/after_man_built_dozens_of_tiny_houses_for_the/

Flight wifi: <http://arstechnica.com/business/2011/06/in-flight-internet-the-view-from-35000-feet-and-three-years/>

Blackberry: <http://us.blackberry.com/software.html>

Client-side complexity was tweeted by @ssstephenson

Runar: Google Images found it in <https://www.youtube.com/watch?v=GqmsQeSzMdw>

Keep 'em entertained with a spinner!
(Don't mention we had to fetch it too)

Michael Scott NO!: <https://memegenerator.net/instance/37308948>

Earth on fire: <http://1888.org/images/2012/09/21/9028/fire-on-earth.jpg>

Scala.js: <https://jaxenter.com/interview-compiling-scala-to-javascript-with-scala-js-107247.html>

Flash: Google Images found it in <http://wccftech.com/adobe-fix-flash-hacking-team/>

Java Applet: <http://www.enviromath.com/AppletInformation.htm>

Walmart Fight: <https://lh6.googleusercontent.com/-vwwqFdqePBM/UpibcMla1lI/AAAAAAAAn1I/Uo0N3DqCzPI/w434-h368-no/Untitled.gif>

Amazon shopping: I did those screen shots

Mind-blown: http://www.reactiongifs.com/wp-content/uploads/2011/09/mind_blown.gif

Sponge-bob: I created it at <https://imgflip.com/i/1d8vti>

Uncle Sam: I created it at <https://imgflip.com/i/1d8xbn>

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