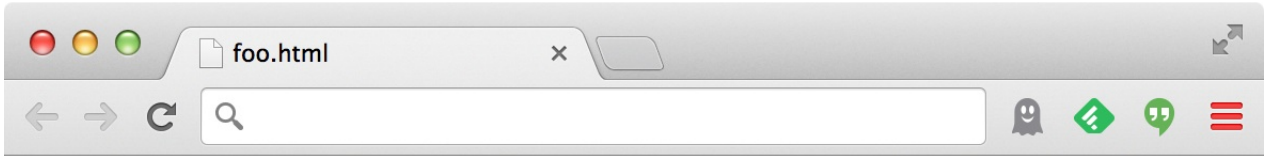
Web 2.0

Dynamic web pages

- Rather than static or dynamic HTML, web pages can be expressed as a program written in Javascript:

```
<html><body>
  Hello, <b>
  <script>
    var a = 1;
    var b = 2;
    document.write("world: ", a+b, "</b>");
  </script>
</body></html>
```



Hello, **world: 3**

Javascript (no relation to Java)

- Powerful web page **programming language**
  - Enabling factor for so-called **Web 2.0**
- Scripts are embedded in web pages returned by the web server
- Scripts are **executed by the browser**. They can:
  - **Alter page contents** (DOM objects)
  - **Track events** (mouse clicks, motion, keystrokes)
  - **Issue web requests** & read replies
  - **Maintain persistent connections** (AJAX)
  - ***Read and set cookies***

What could go wrong?

- Browsers need to **confine Javascript's power**
- A script on `attacker.com` should not be able to:
  - Alter the layout of a `bank.com` web page
  - Read keystrokes typed by the user while on a `bank.com` web page
  - Read cookies belonging to `bank.com`

Same Origin Policy

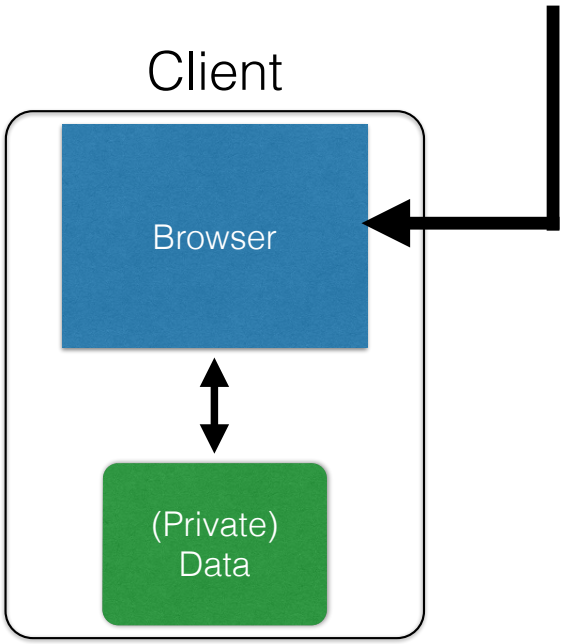
- Browsers provide isolation for javascript scripts via the **Same Origin Policy (SOP)**
- Browser associates **web page elements**…
  - Layout, cookies, events
- …with a given **origin**
  - The hostname (`bank.com`) that provided the elements in the first place

SOP =

only ***scripts*** *received* ***from*** *a* ***web page's origin*** ***have access*** *to the page's elements*

Cookies and SOP

Set-Cookie: edition=us; expires=Wed, 18-Feb-2015 08:20:34 GMT; path=/; domain=.zdnet.com



Semantics

- Store “en” under the key “edition”
- This value is no good as of Wed Feb 18…
- This value should only be readable by any domain ending in `.zdnet.com`
- This should be available to any resource within a subdirectory of `/`
- Send the cookie with any future requests to `<domain>/<path>`