

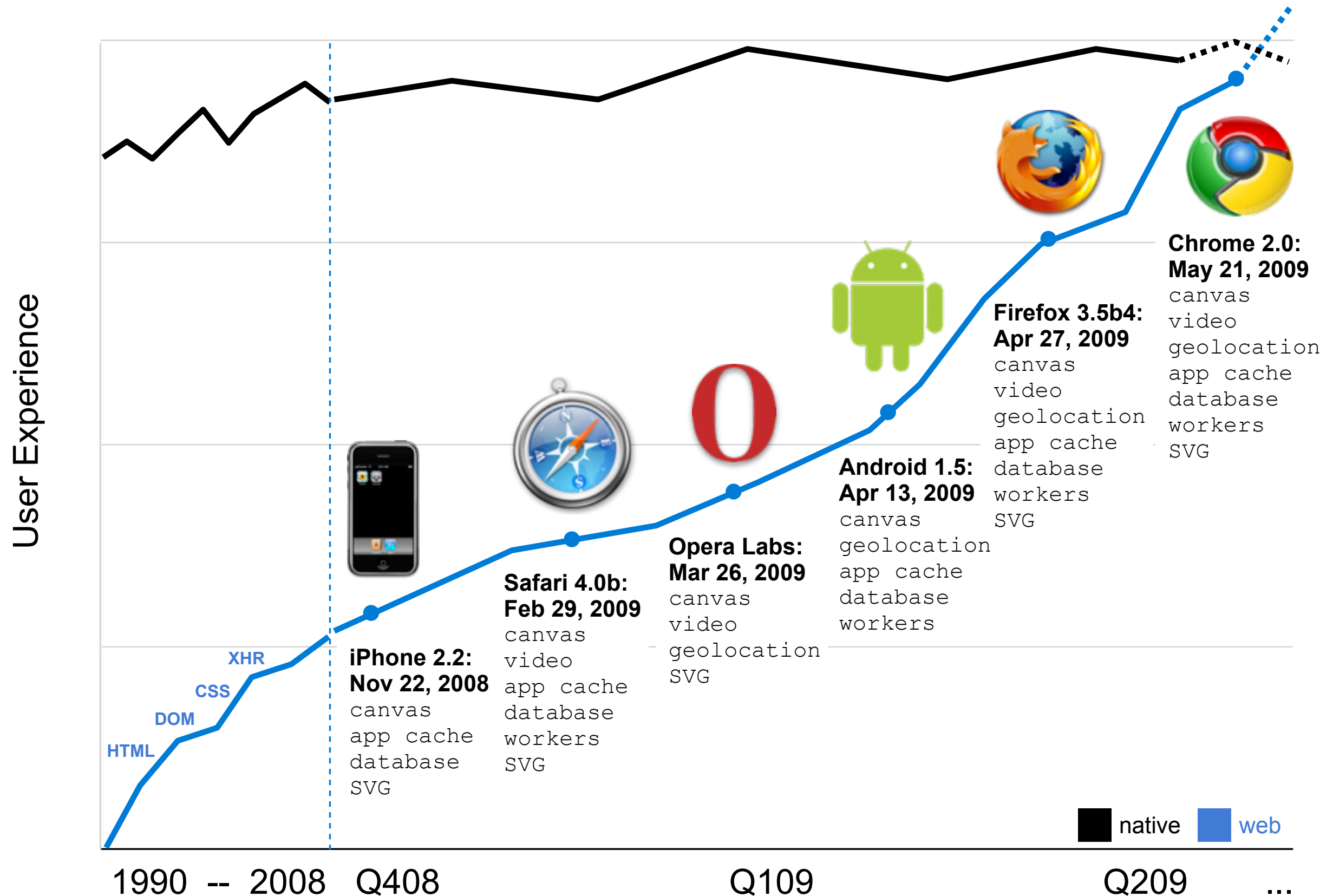
HTML 5 Training

Brad Neuberg
Developer Programs, Google

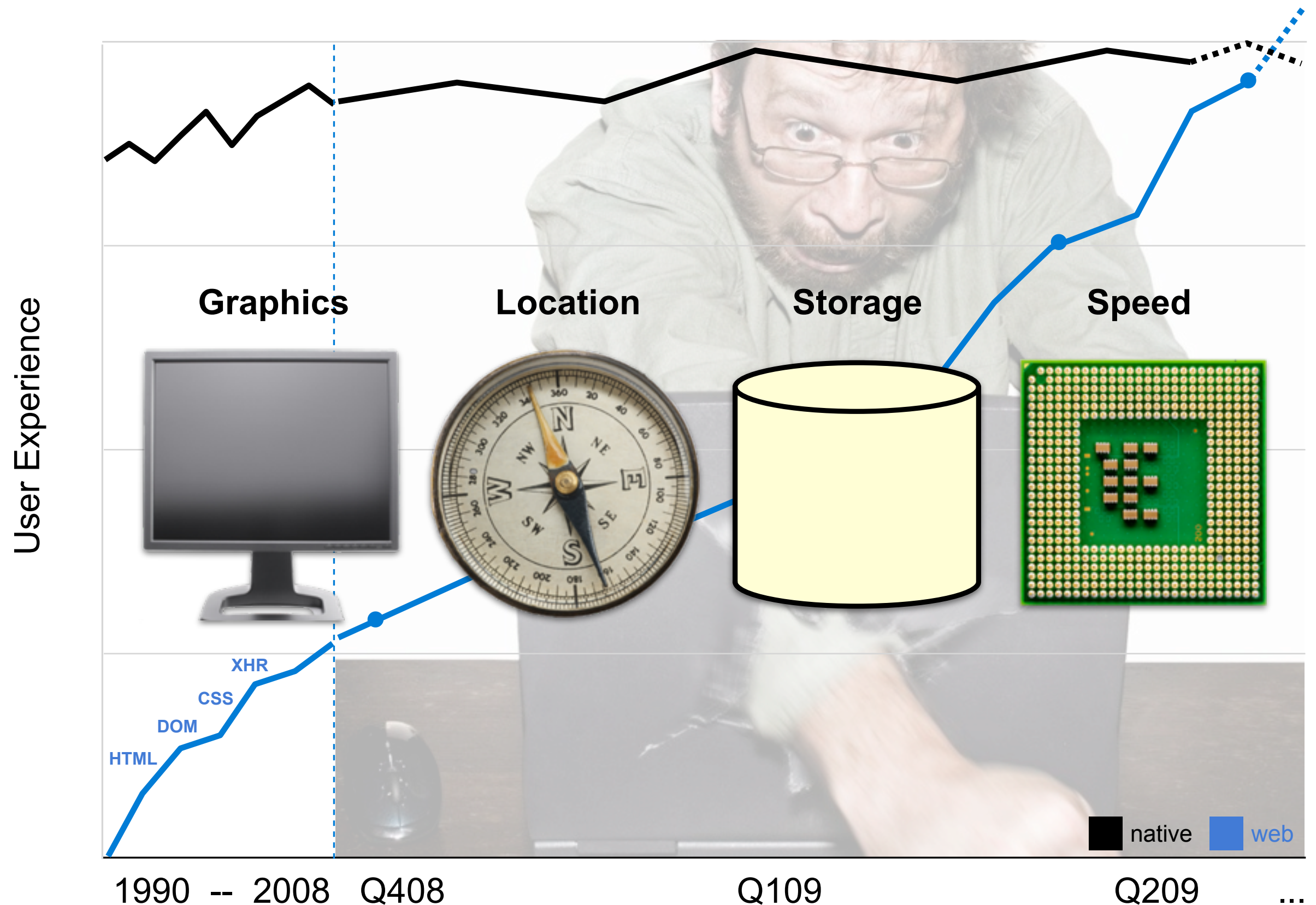
August 31st, 2009



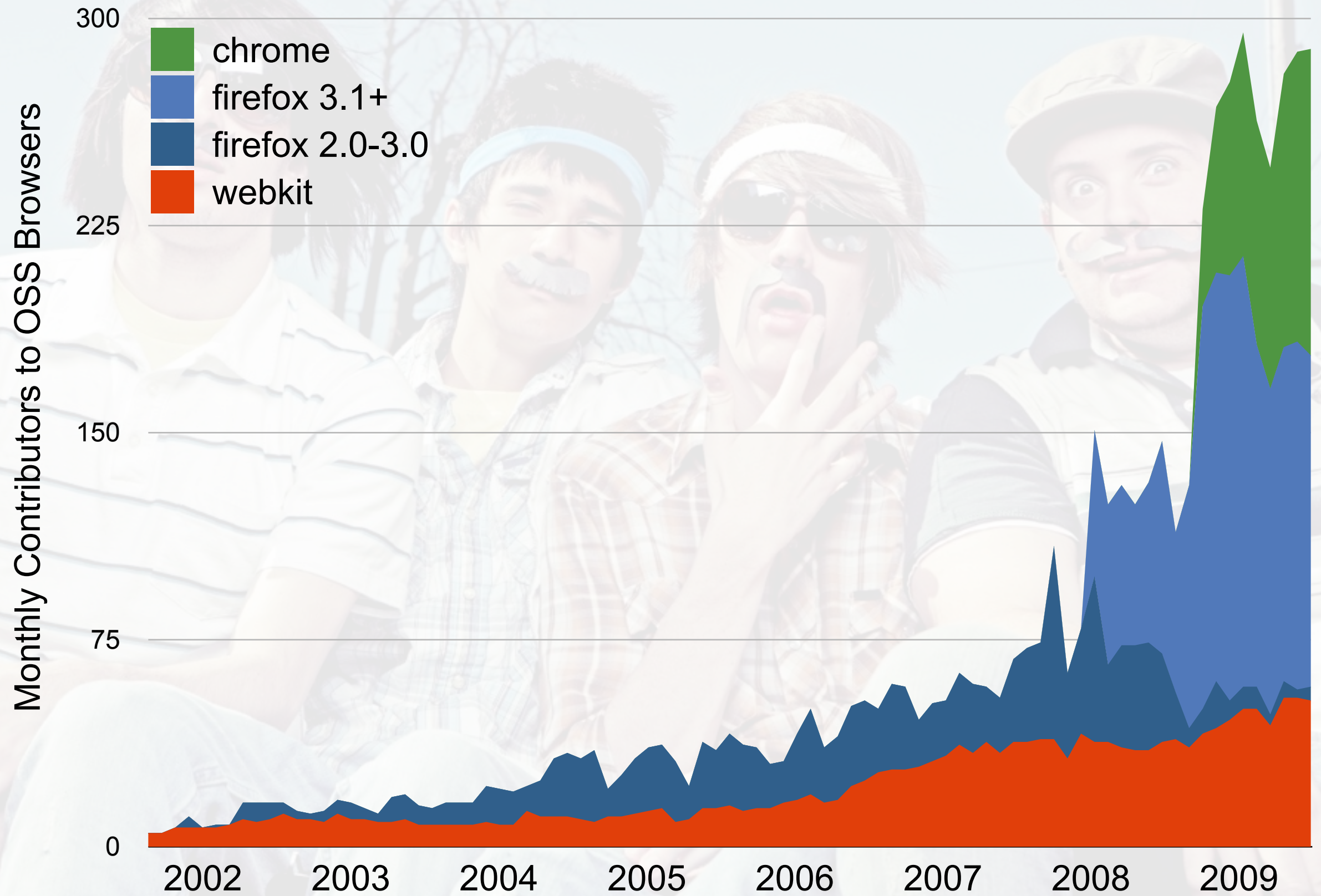
The Web Platform is Accelerating



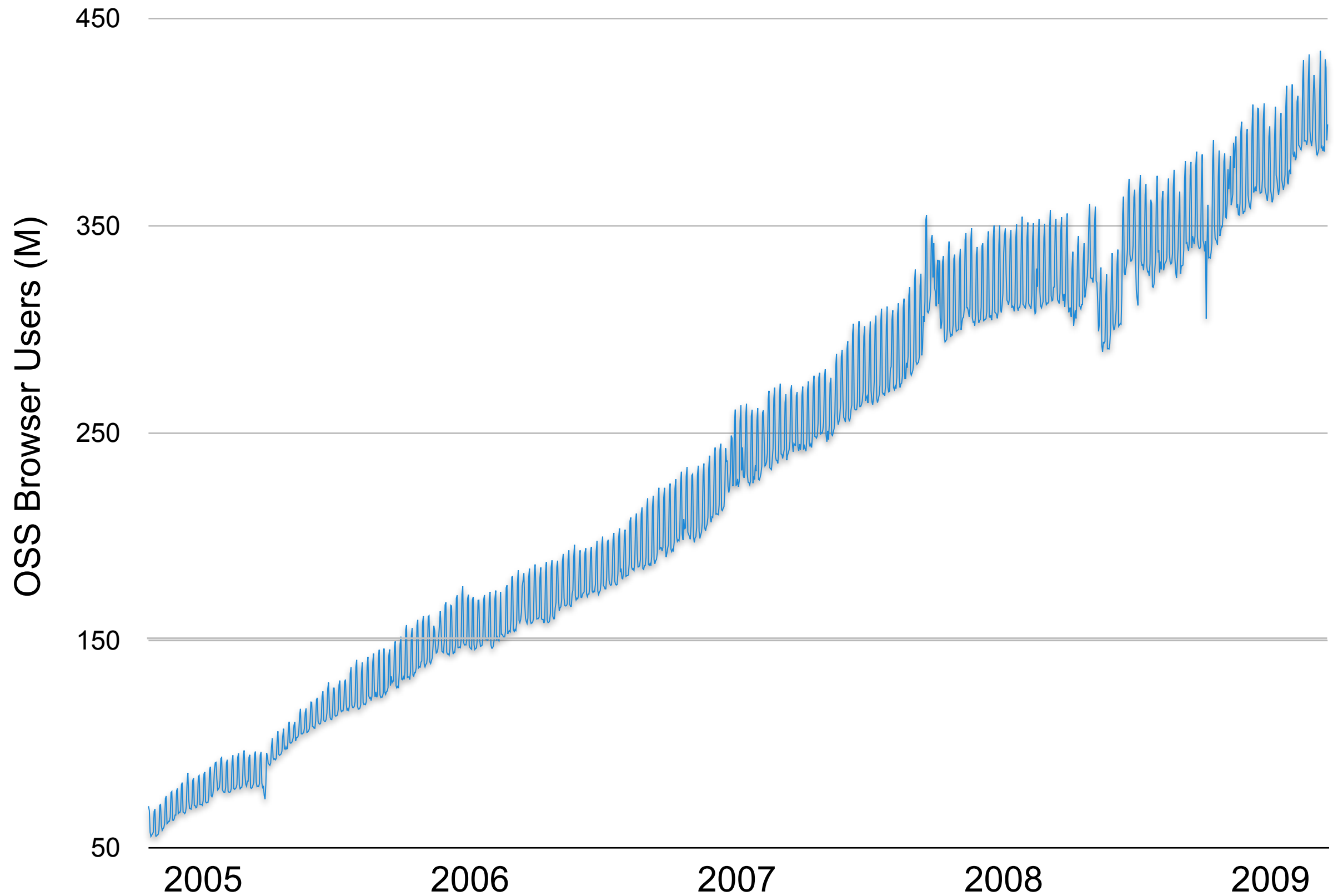
And It's Solving Key Developer Challenges



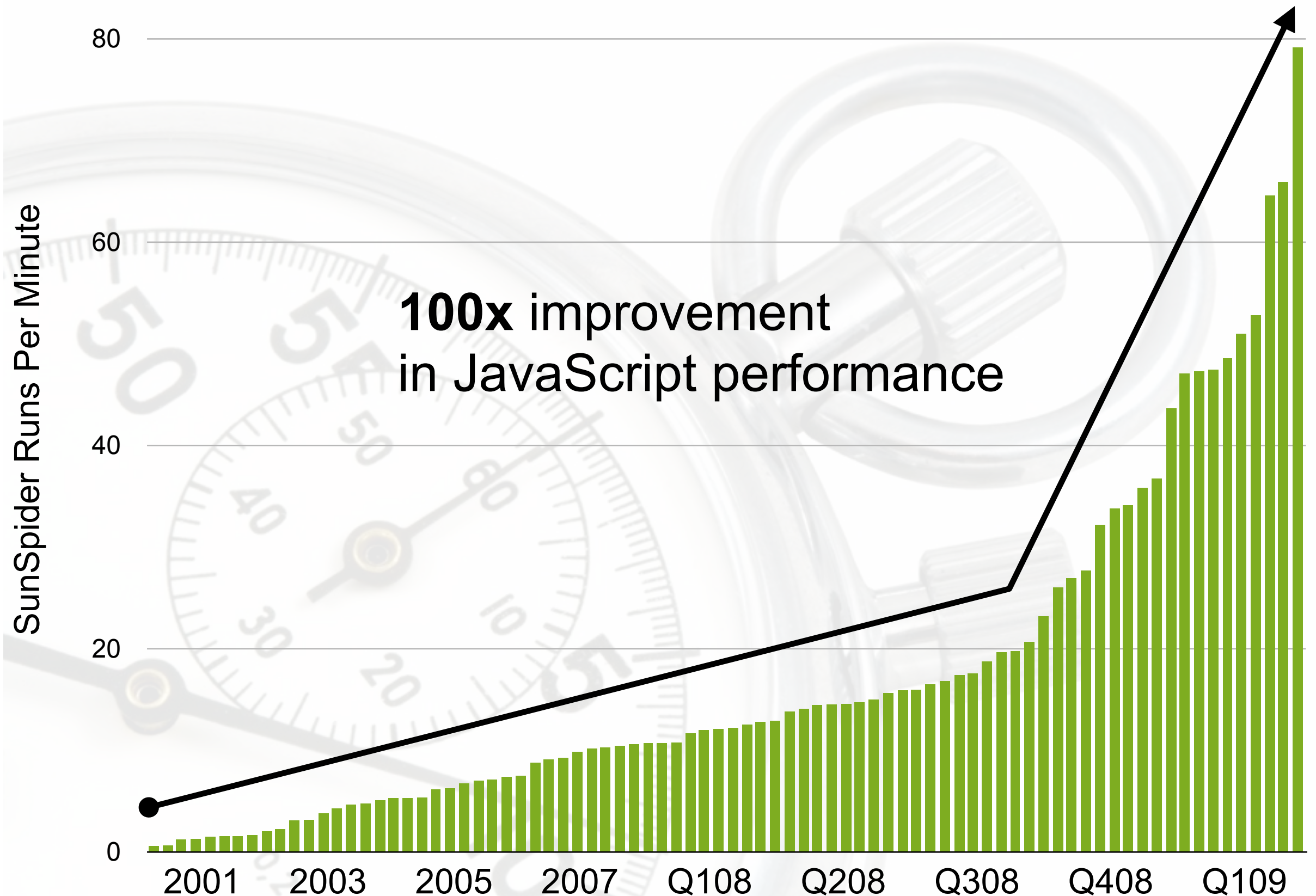
More Developers



More Users



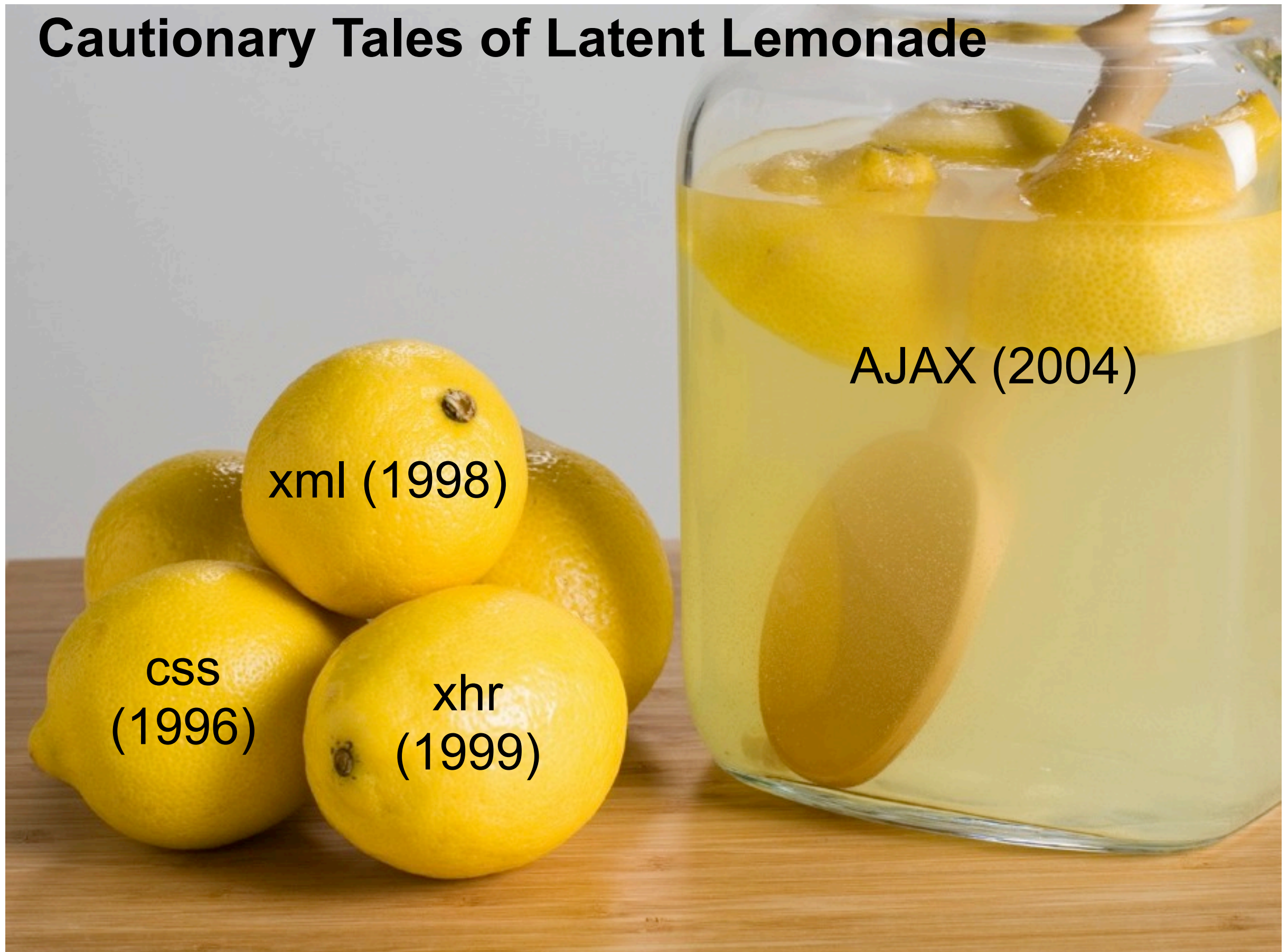
More Speed



A More Powerful Web

5 > 4

Cautionary Tales of Latent Lemonade



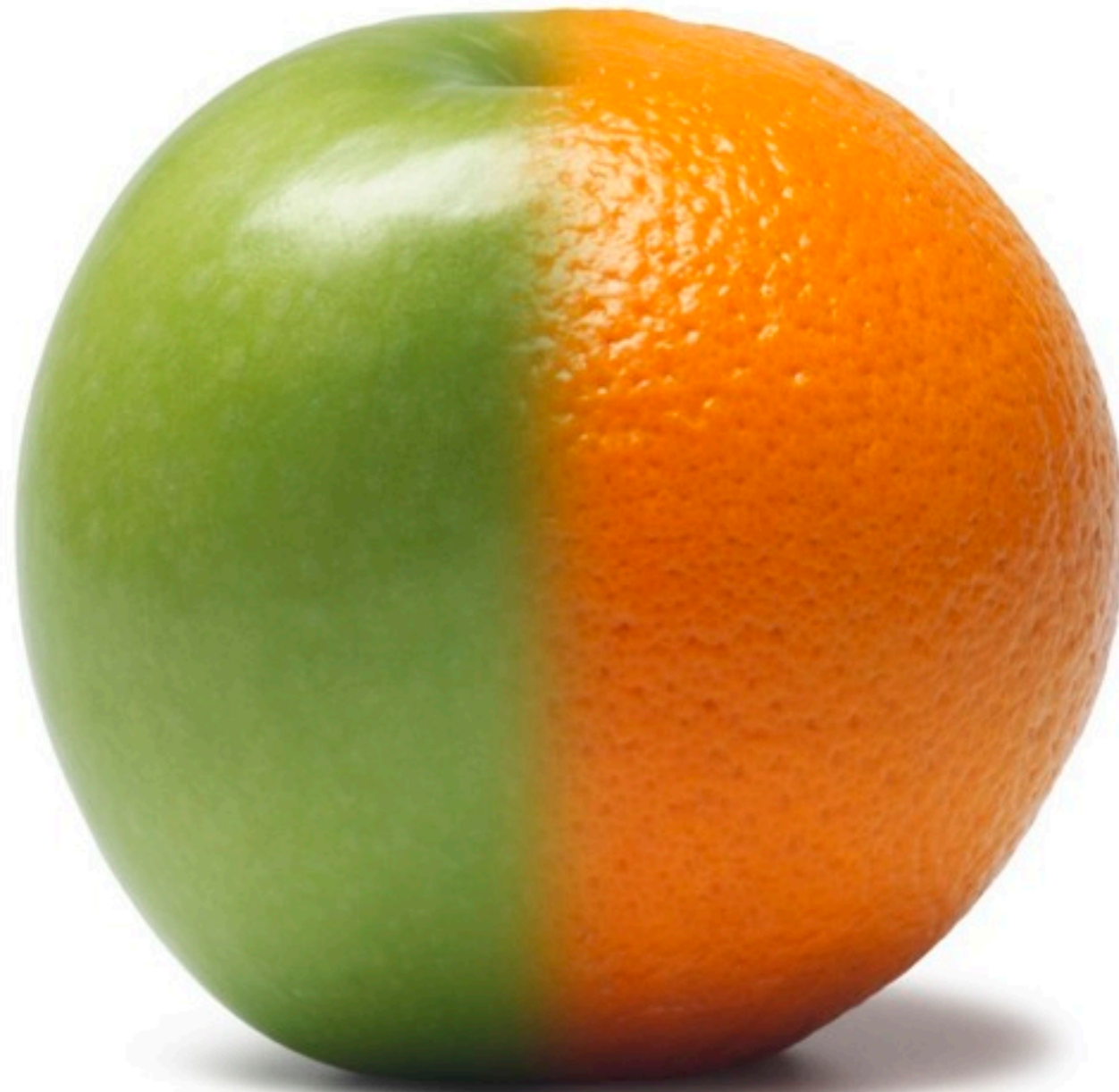
css
(1996)

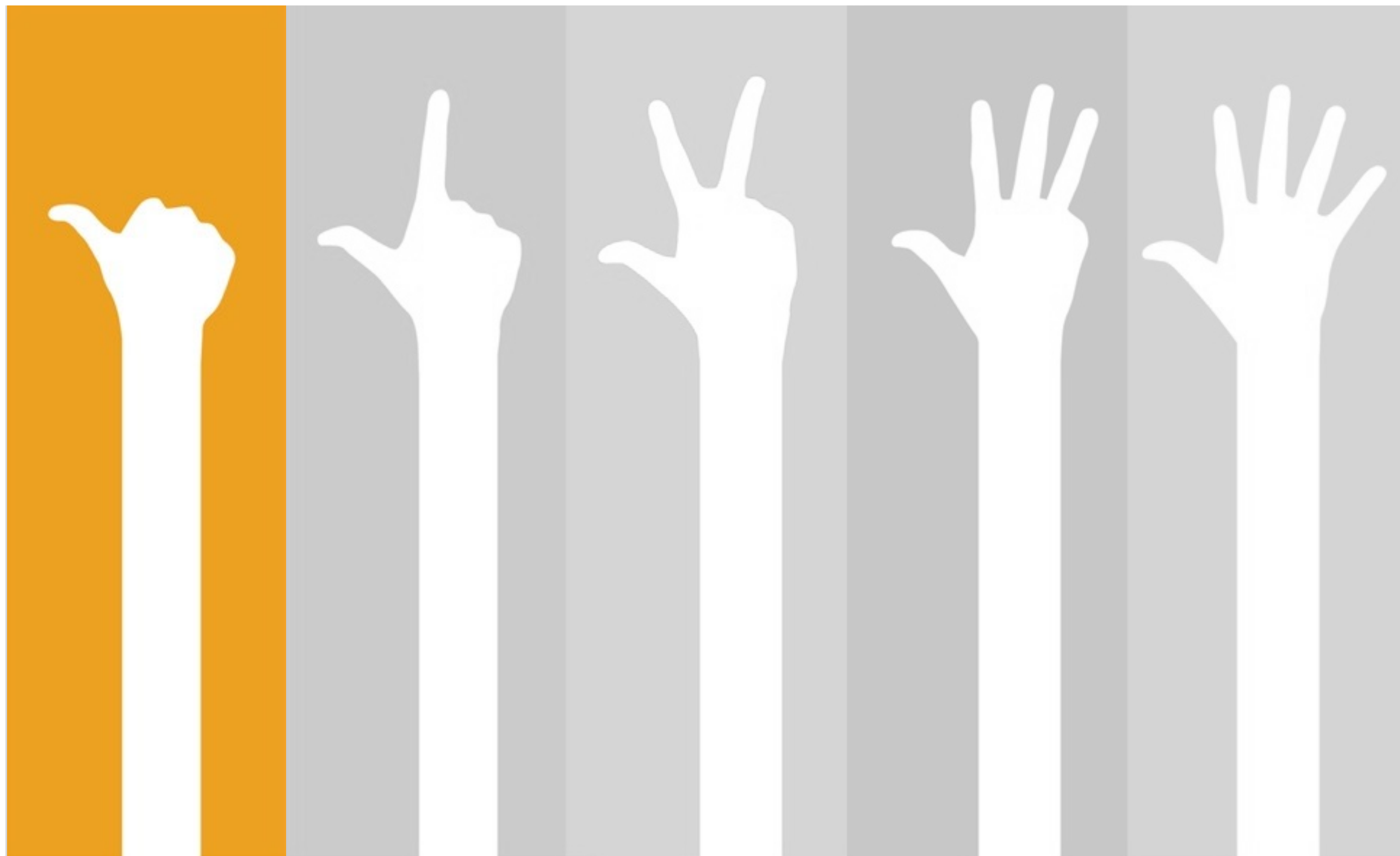
xml (1998)

xhr
(1999)

AJAX (2004)

HTML 5: A Chance to Do Things Differently





canvas/SVG

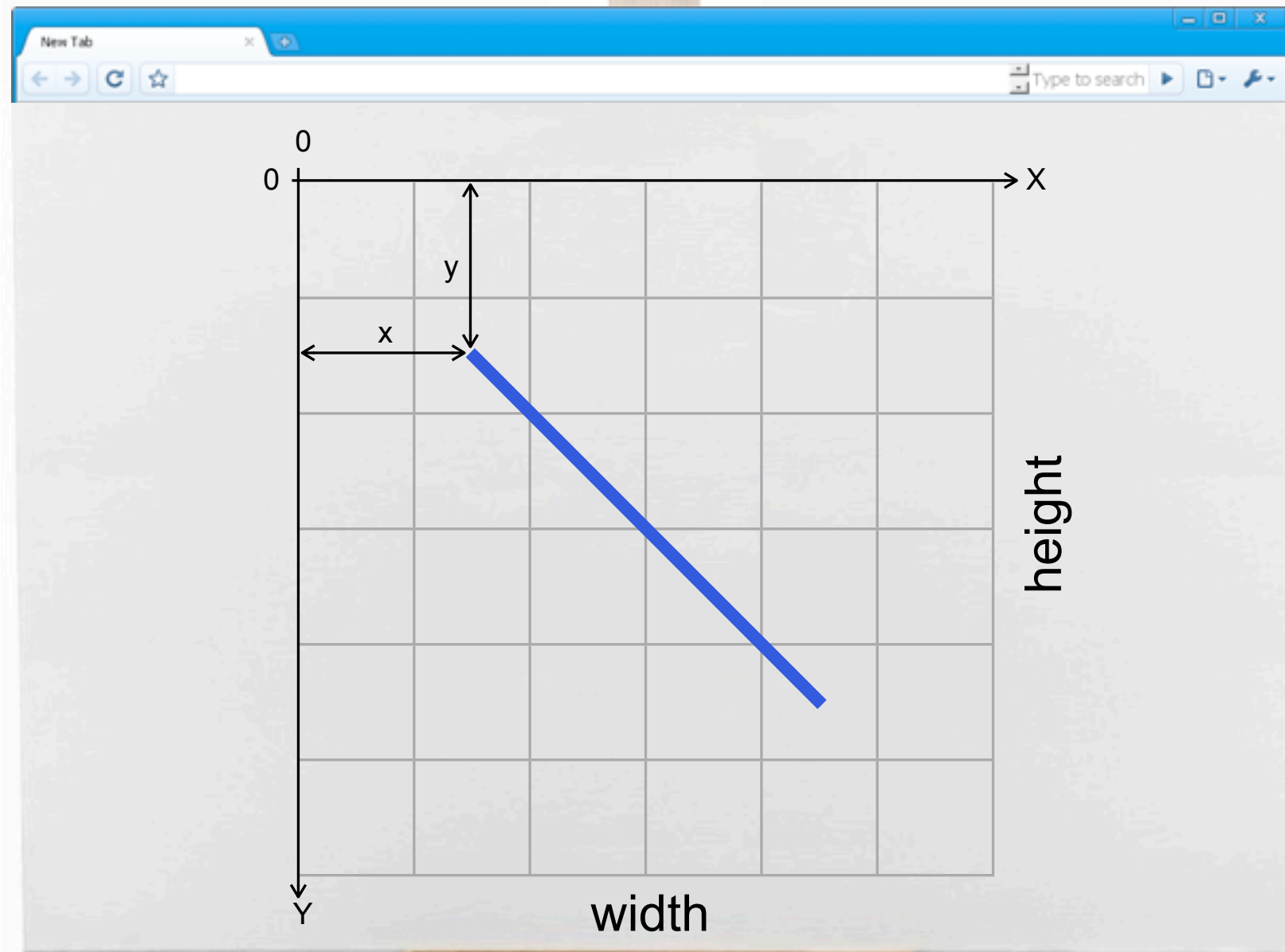
video

geolocation

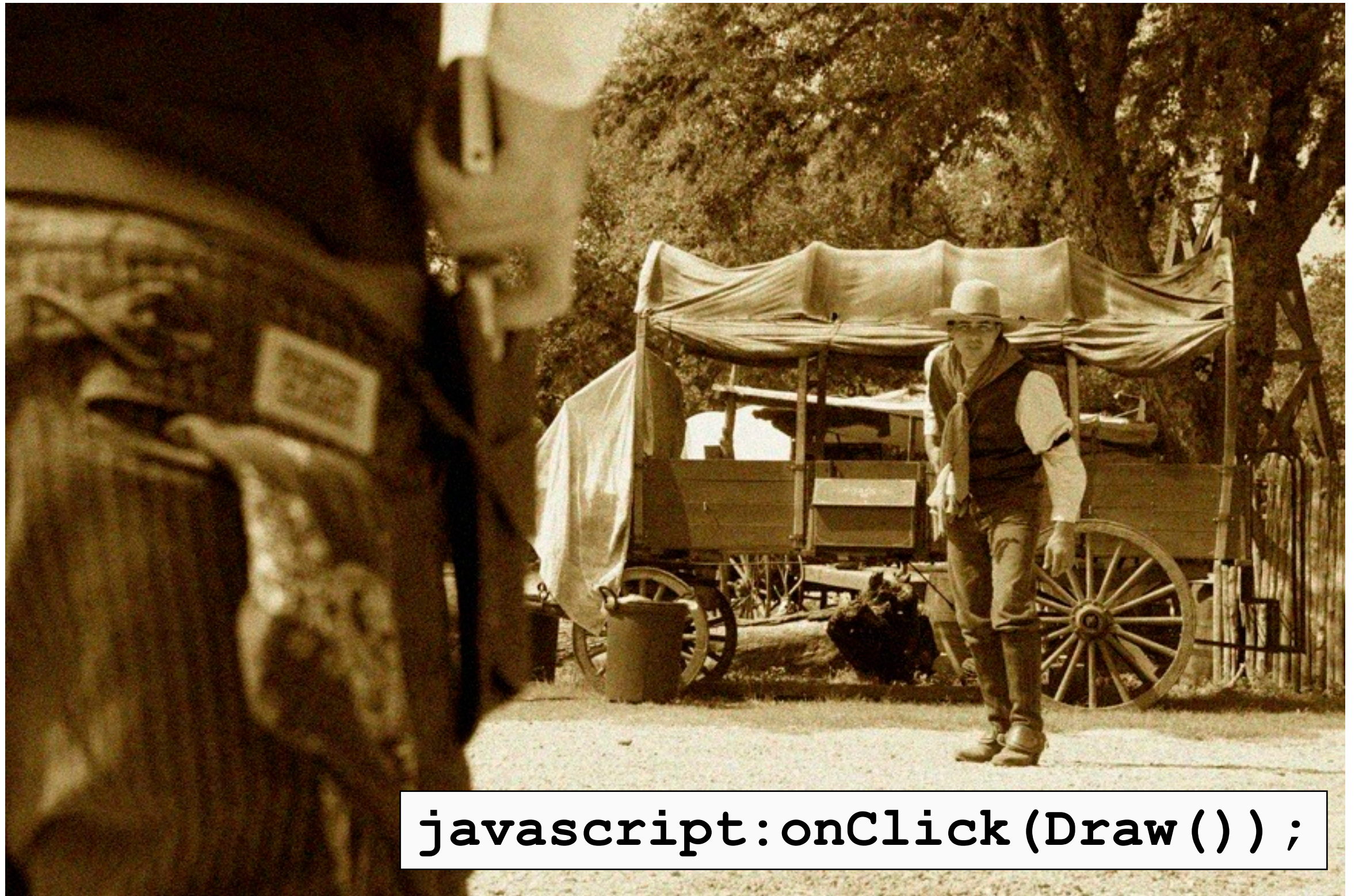
app cache &
database

web workers

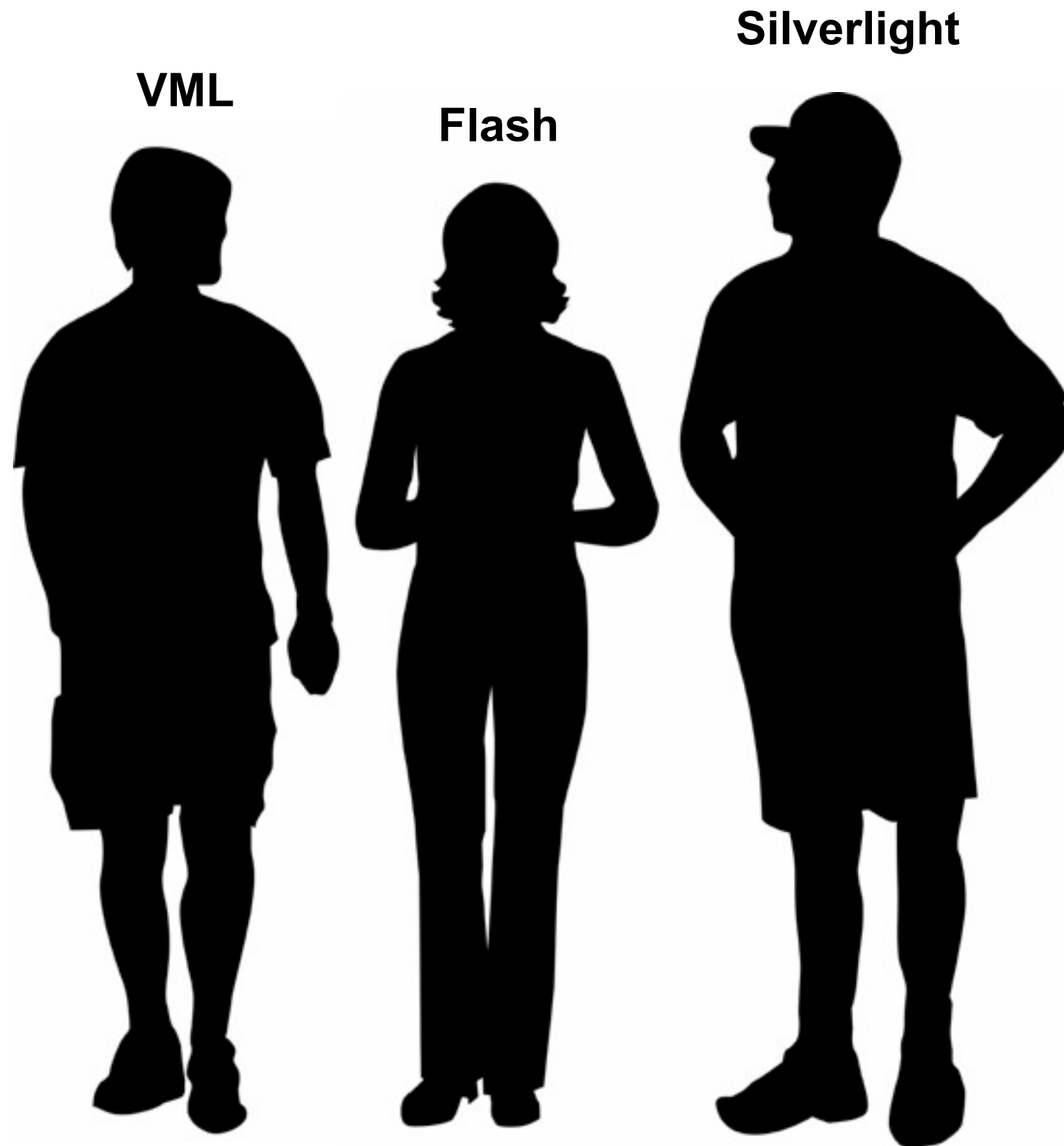
Until Recently, You Couldn't Draw on the Web



And Graphics Weren't Very Interactive



The Usual Options Do This...



... But canvas and SVG Are Intrinsic to the Web

Transparent Stack



Document Object Model (DOM) Specification

Original: <http://www.w3.org/TR/REC-DOM-Level-1/>

Latest: <http://www.w3.org/TR/DOM-Level-3-Core/>

Contributors: Netscape, Sun, Microsoft, W3C, IBM, Novell, JavaSoft, SoftQuad Inc., Inso EPS, Texcel Research, Arbortext

Hypertext Markup Language (HTML)

Original: <http://tools.ietf.org/html/rfc1866>

Latest: <http://www.w3.org/TR/html5/>

Contributors: T. Berners-Lee, D. Connolly, L. Masinter, MIT, W3C, AT&T, IBM, Microsoft, Netscape, Novell, SoftQuad, Spyglass, Adobe, Lotus, CWI, Reuters, JavaSoft, HP, GRIF, Sun, Opera, Mozilla, Google, Apple

Hypertext Transfer Protocol (HTTP)

Original: <http://tools.ietf.org/html/rfc1945>

Latest: <http://tools.ietf.org/html/rfc2616>

Contributors: UC Irvine, Compaq, MIT, Xerox, Microsoft, W3C, T. Berners-Lee, R. Fielding, J. Gettys, J. Mogul, H. Frystyk, L. Masinter, P. Leach

Scalable Vector Graphics (SVG)

- HTML-like tags for drawing



Scalable Vector Graphics (SVG)

- HTML-like tags for drawing



`<rect`

Scalable Vector Graphics (SVG)

- HTML-like tags for drawing



```
<rect  
  x="0" y="0"
```

Scalable Vector Graphics (SVG)

- HTML-like tags for drawing



```
<rect  
  x="0" y="0"  
  width="100" height="100"
```


Scalable Vector Graphics (SVG)

- HTML-like tags for drawing



```
<rect  
  x="0" y="0"  
  width="100" height="100"  
  fill="blue" stroke="red"
```

Scalable Vector Graphics (SVG)

- HTML-like tags for drawing



```
<rect  
  x="0" y="0"  
  width="100" height="100"  
  fill="blue" stroke="red"  
  stroke-width="5px"
```

Scalable Vector Graphics (SVG)

- HTML-like tags for drawing



```
<rect  
  x="0" y="0"  
  width="100" height="100"  
  fill="blue" stroke="red"  
  stroke-width="5px"  
  rx="8" ry="8"
```

Scalable Vector Graphics (SVG)

- HTML-like tags for drawing



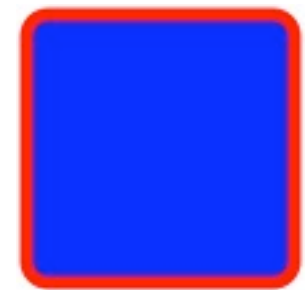
```
<rect  
  x="0" y="0"  
  width="100" height="100"  
  fill="blue" stroke="red"  
  stroke-width="5px"  
  rx="8" ry="8"  
  id="myRect" class="chart" />
```


Scalable Vector Graphics (SVG)

- HTML-like tags for drawing



```
<rect  
  x="0" y="0"  
  width="100" height="100"  
  fill="blue" stroke="red"  
  stroke-width="5px"  
  rx="8" ry="8"  
  id="myRect" class="chart" />
```

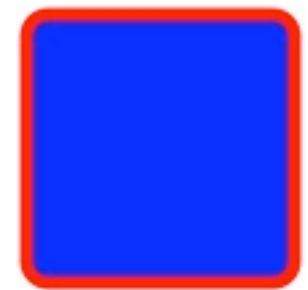


Scalable Vector Graphics (SVG)



- HTML-like tags for drawing

```
<!DOCTYPE html>
<html>
<body>
<svg width="200" height="200">
  <rect
    x="0" y="0"
    width="100" height="100"
    fill="blue" stroke="red"
    stroke-width="5px"
    rx="8" ry="8"
    id="myRect" class="chart" />
</svg>
</body>
</html>
```



Scalable Vector Graphics (SVG)



Scalable Vector Graphics (SVG)



```
var rect = document.getElementById('myRect');
```

Scalable Vector Graphics (SVG)



```
var rect = document.getElementById('myRect');  
rect.style.fill = 'green';
```


Scalable Vector Graphics (SVG)



```
var rect = document.getElementById('myRect');  
rect.style.fill = 'green';  
rect.onclick = function() { alert('hello'); }
```

Scalable Vector Graphics



Canvas API

- JavaScript API ("Scriptable Image Tag")

Canvas API

- JavaScript API ("Scriptable Image Tag")

```
<canvas id="myCanvas" width="150" height="150">  
</canvas>
```

Canvas API

- JavaScript API ("Scriptable Image Tag")

```
<canvas id="myCanvas" width="150" height="150">  
</canvas>
```

```
var canvas = document.getElementById('myCanvas');
```


Canvas API

- JavaScript API ("Scriptable Image Tag")

```
<canvas id="myCanvas" width="150" height="150">  
</canvas>
```

```
var canvas = document.getElementById('myCanvas');  
var ctx = canvas.getContext('2d');
```

Canvas API

- JavaScript API ("Scriptable Image Tag")

```
<canvas id="myCanvas" width="150" height="150">  
</canvas>
```

```
var canvas = document.getElementById('myCanvas');  
var ctx = canvas.getContext('2d');
```

```
ctx.fillStyle = "rgb(200,0,0)";
```

Canvas API

- JavaScript API ("Scriptable Image Tag")

```
<canvas id="myCanvas" width="150" height="150">  
</canvas>
```

```
var canvas = document.getElementById('myCanvas');  
var ctx = canvas.getContext('2d');
```

```
ctx.fillStyle = "rgb(200,0,0)";  
ctx.fillRect (10, 10, 55, 50);
```

Canvas API

- JavaScript API ("Scriptable Image Tag")

```
<canvas id="myCanvas" width="150" height="150">  
</canvas>
```

```
var canvas = document.getElementById('myCanvas');  
var ctx = canvas.getContext('2d');
```

```
ctx.fillStyle = "rgb(200,0,0)";  
ctx.fillRect (10, 10, 55, 50);
```

```
ctx.fillStyle = "rgba(0, 0, 200, 0.5)";
```

Canvas API

- JavaScript API ("Scriptable Image Tag")

```
<canvas id="myCanvas" width="150" height="150">  
</canvas>
```

```
var canvas = document.getElementById('myCanvas');  
var ctx = canvas.getContext('2d');
```

```
ctx.fillStyle = "rgb(200,0,0)";  
ctx.fillRect (10, 10, 55, 50);
```

```
ctx.fillStyle = "rgba(0, 0, 200, 0.5)";  
ctx.fillRect (30, 30, 55, 50);
```

Canvas API

- JavaScript API ("Scriptable Image Tag")

```
<canvas id="myCanvas" width="150" height="150">  
</canvas>
```

```
var canvas = document.getElementById('myCanvas');  
var ctx = canvas.getContext('2d');
```

```
ctx.fillStyle = "rgb(200,0,0)";  
ctx.fillRect (10, 10, 55, 50);
```



```
ctx.fillStyle = "rgba(0, 0, 200, 0.5)";  
ctx.fillRect (30, 30, 55, 50);
```


- Mozilla Download Center ([FF](#))
- First Person Gifter ([FF](#))
- Population Demo ([FF](#))
- Bepin ([Safari](#))
- German Election Atlas ([Safari](#))



canvas and SVG demos



When Canvas or SVG?

When Canvas or SVG?

SVG -> High level

- Import/Export
- Easy UIs
- Interactive
- Medium Animation
- Tree of objects

When Canvas or SVG?

SVG -> High level

- Import/Export
- Easy UIs
- Interactive
- Medium Animation
- Tree of objects

Canvas -> Low level

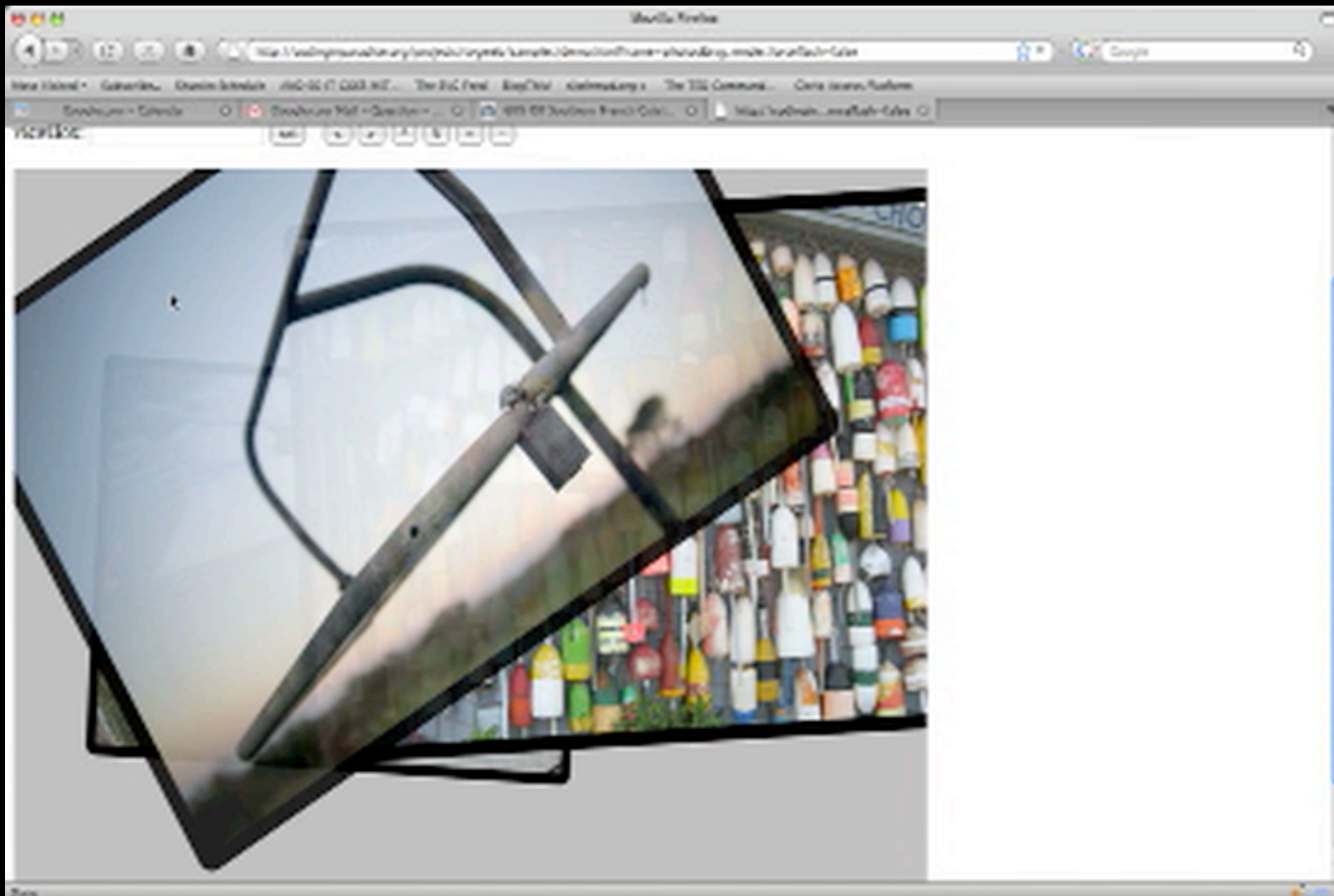
- No mouse interaction
- High Animation
- JS Centric
- More Bookkeeping
- Pixels

HTML 5 Support

	Chrome	Firefox	Safari	Opera
canvas/SVG				
video				
geolocation				
app cache				
database				
workers				

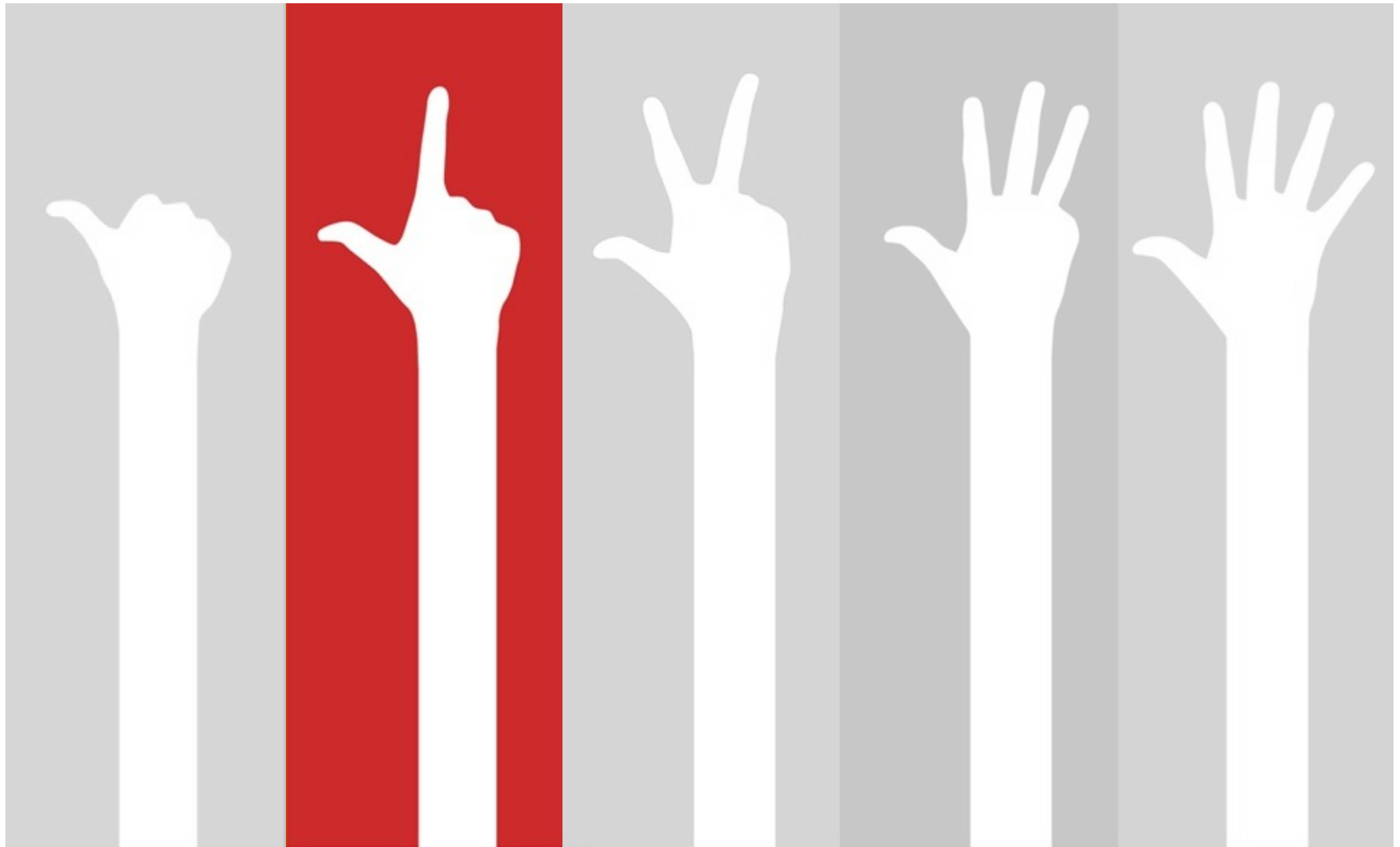
<http://tinyurl.com/mbw73x>





<http://tinyurl.com/mbw73x>





canvas/SVG

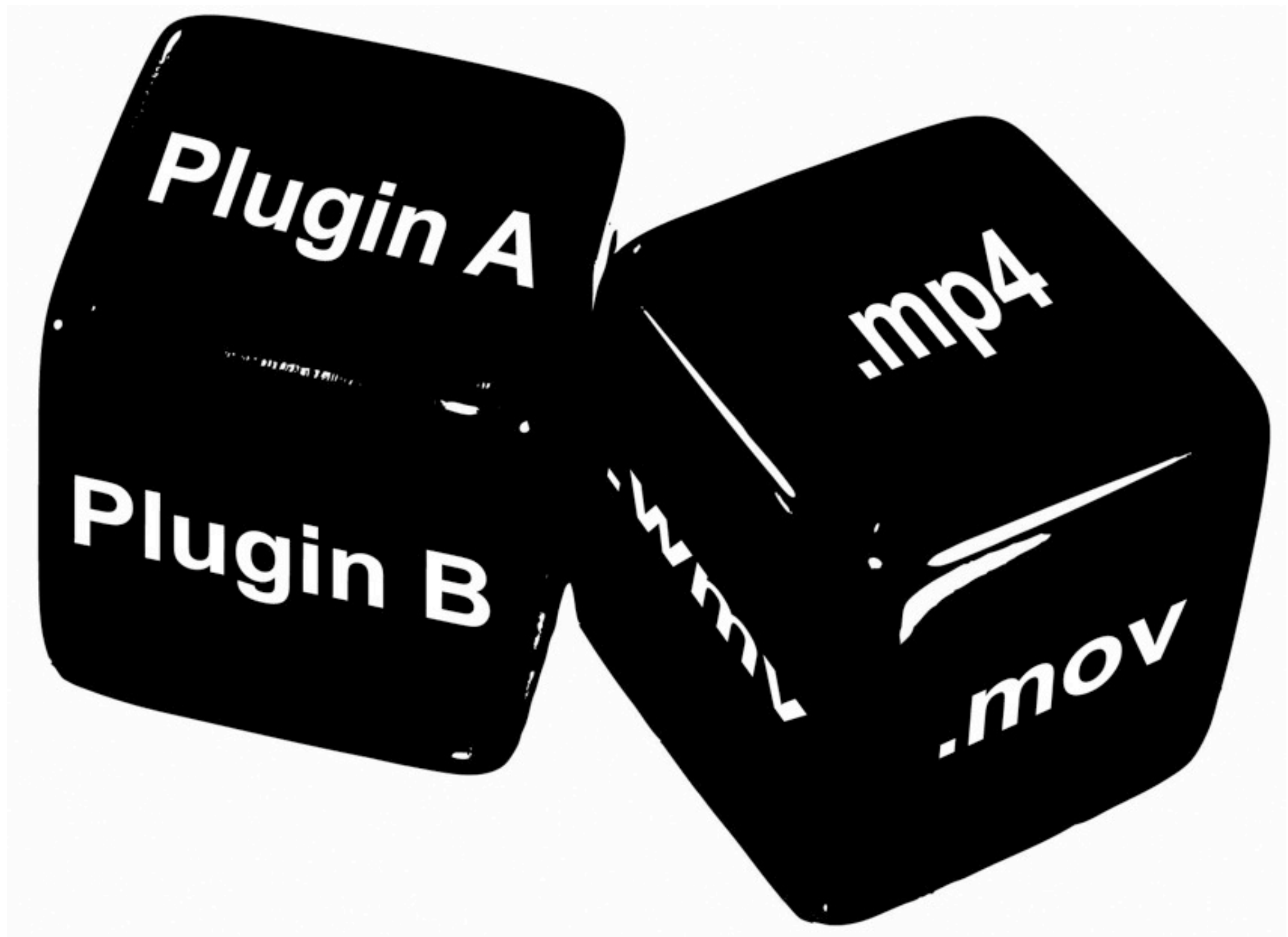
video

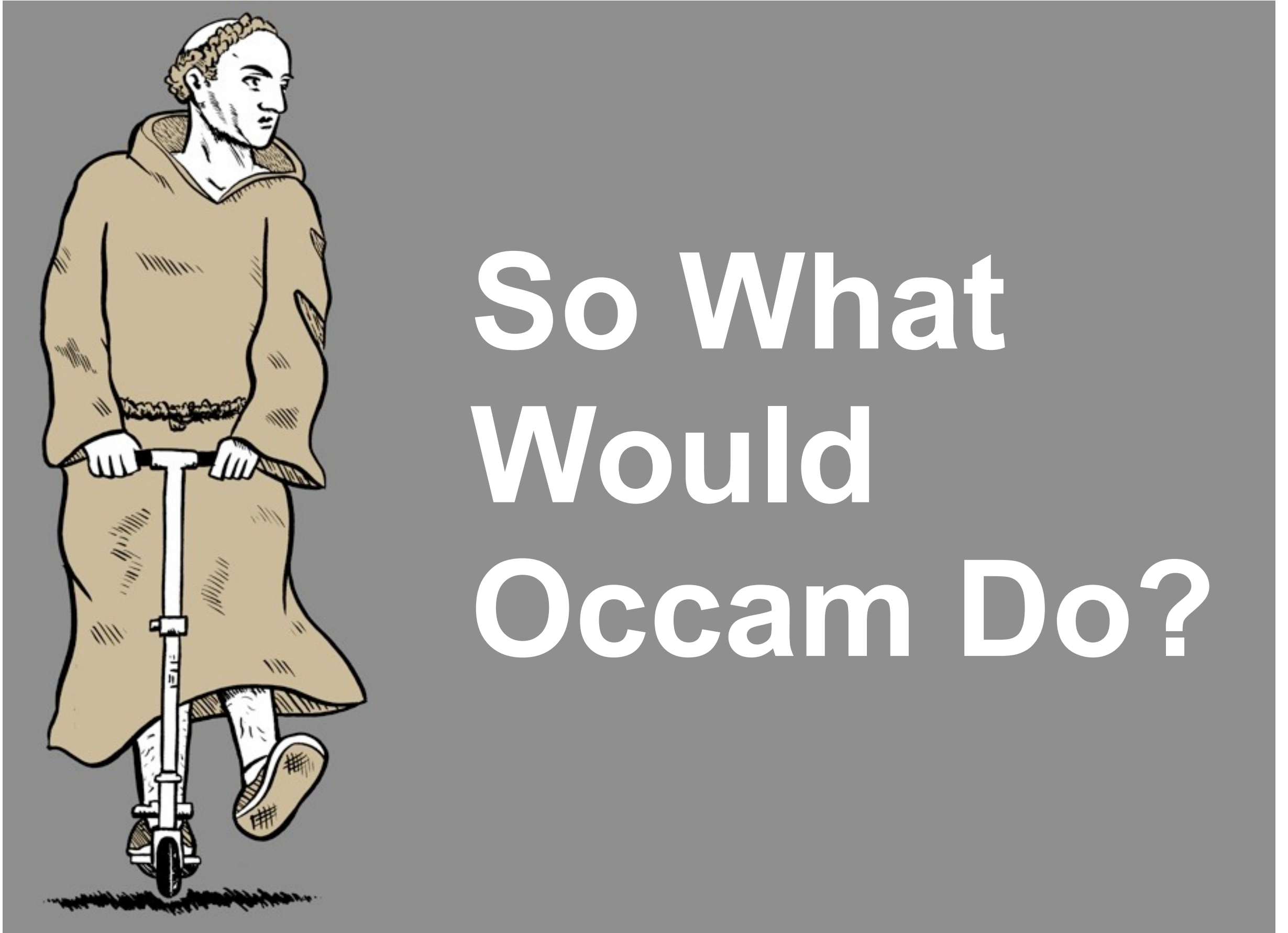
geolocation

app cache &
database

web workers

Video is Complicated, and Outside Your Control





So What
Would
Occam Do?

// HTML 5 makes
<video> as easy
as

Embedding Video

Embedding Video

```
<video src="http://example.com/myMovie.ogg" controls>
```


Embedding Video

```
<video src="http://example.com/myMovie.ogg" controls>  
Your browser does not support the video element.
```


Embedding Video

```
<video src="http://example.com/myMovie.ogg" controls>  
  Your browser does not support the video element.  
</video>
```

Multiple Files & Scripting

```
<video controls>
```

```
  <source src="foo.ogg" type="video/ogg">
```

```
  <source src="foo.mp4">
```

```
  Your browser does not support the video element.
```

```
</video>
```

Multiple Files & Scripting

```
<video controls>
```

```
  <source src="foo.ogg" type="video/ogg">
```

```
  <source src="foo.mp4">
```

```
  Your browser does not support the video element.
```

```
</video>
```

```
var v = document.getElementsByTagName("video")[0];  
v.play();
```

- Basic Player ([FF 3.5](#))
- YouTube ([Safari 4](#)) - View Source

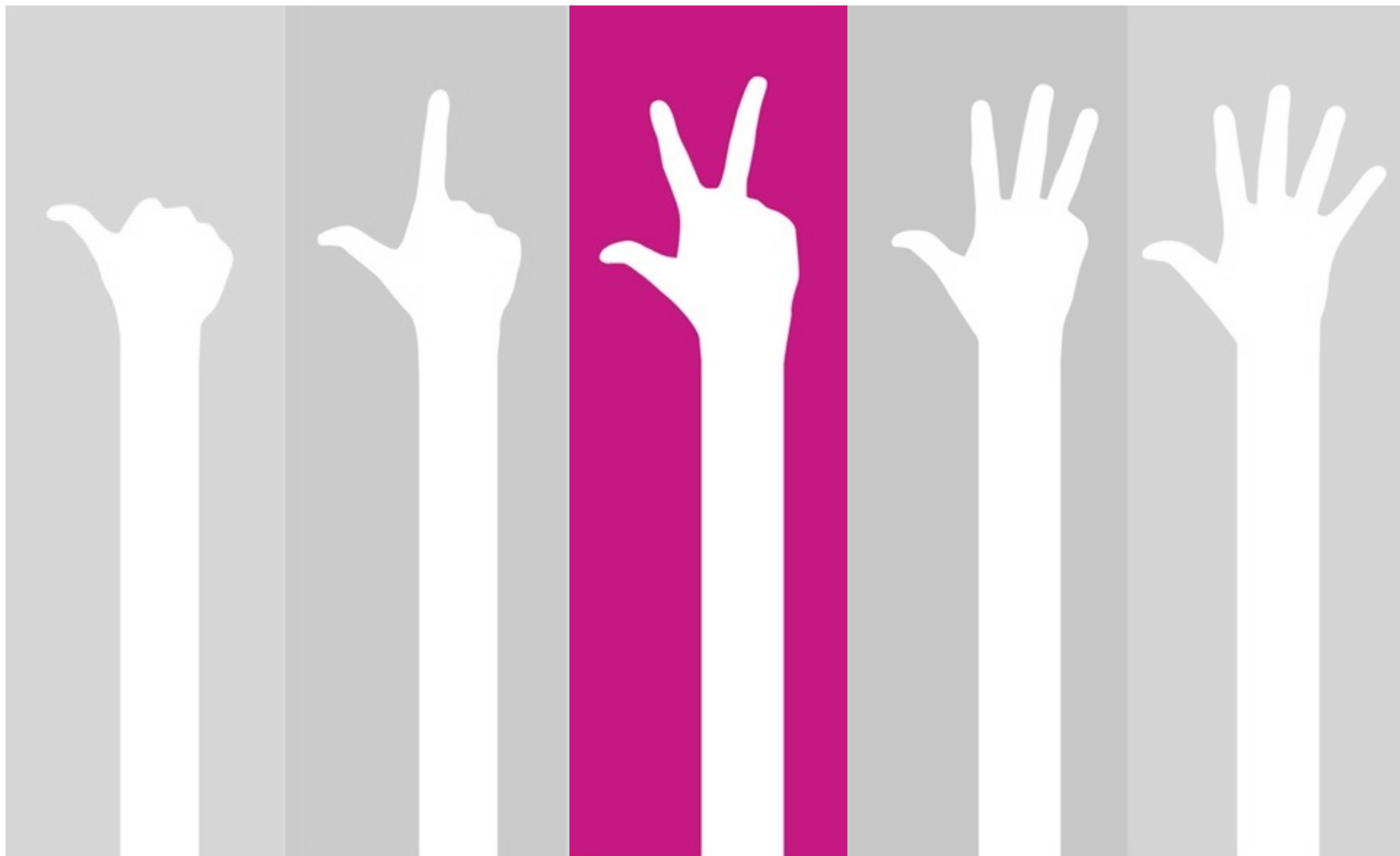


<video> demos



HTML 5 Support

	Chrome	Firefox	Safari	Opera
canvas/SVG	✓	✓	✓	✓
video	✓	✓	✓	✓
geolocation				
app cache				
database				
workers				



canvas/SVG

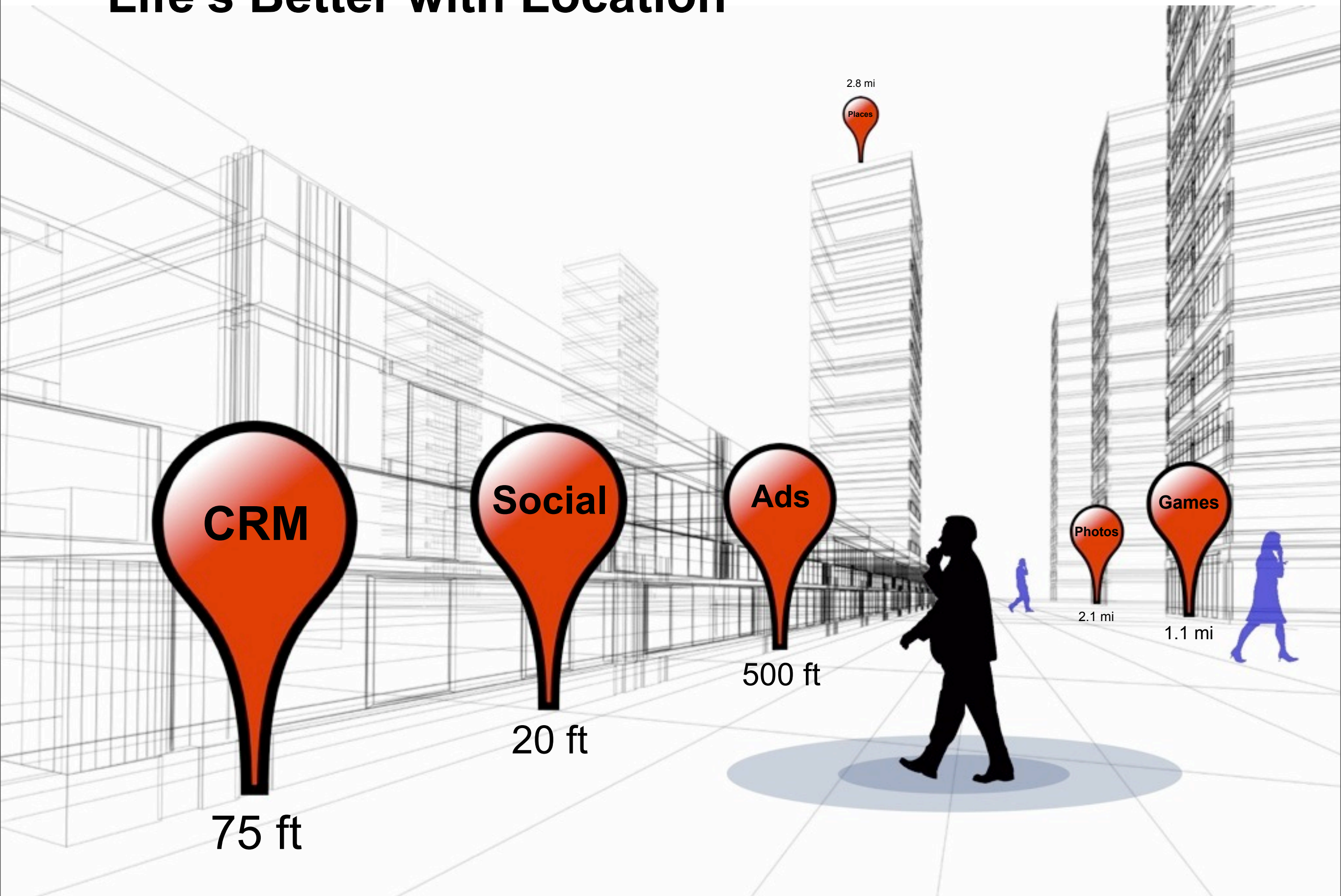
video

geolocation

app cache &
database

web workers

Life's Better with Location

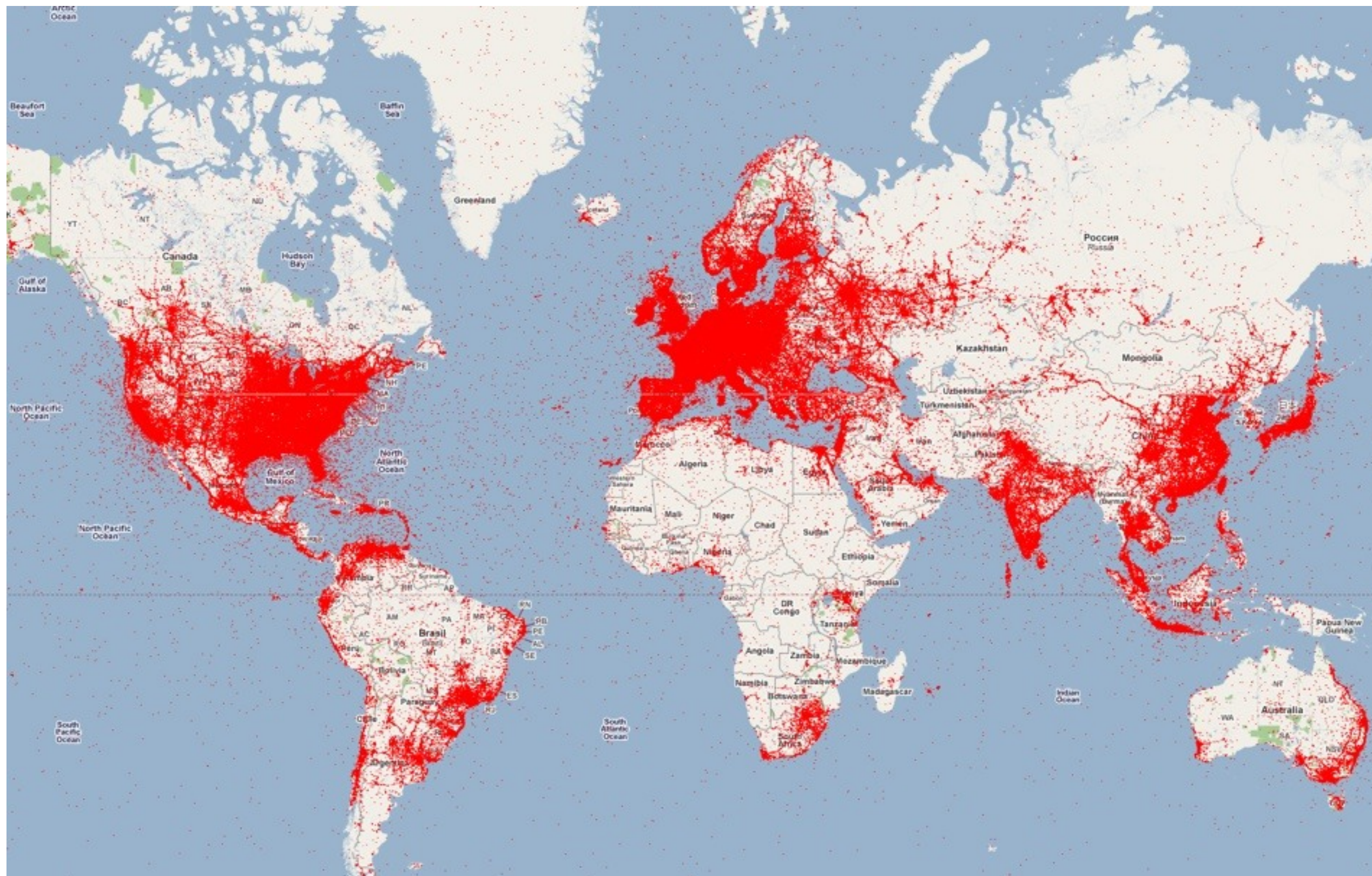


But GPS and IP Aren't Good Enough

1. too slow
2. too constrained
3. too fuzzy

1) Cell ID and WiFi Solve The Data Problem...





2) ...And Browsers Are Now Location-Enabled



// the
geolocation api
brings browser-
based location
to your apps

Geolocation Sample



Geolocation Sample



```
navigator.geolocation.getCurrentPosition(
```

Geolocation Sample



```
navigator.geolocation.getCurrentPosition(  
    function(position) {
```

Geolocation Sample



```
navigator.geolocation.getCurrentPosition(  
    function(position) {  
        var lat = position.coords.latitude;
```


Geolocation Sample



```
navigator.geolocation.getCurrentPosition(  
    function(position) {  
        var lat = position.coords.latitude;  
        var lon = position.coords.longitude;
```

Geolocation Sample



```
navigator.geolocation.getCurrentPosition(  
    function(position) {  
        var lat = position.coords.latitude;  
        var lon = position.coords.longitude;  
        showLocation(lat, lon);  
    }
```

Geolocation Sample



```
navigator.geolocation.getCurrentPosition(  
    function(position) {  
        var lat = position.coords.latitude;  
        var lon = position.coords.longitude;  
        showLocation(lat, lon);  
    }  
);
```

Geolocation Sample



```
navigator.geolocation.getCurrentPosition(  
    function(position) {  
        var lat = position.coords.latitude;  
        var lon = position.coords.longitude;  
        showLocation(lat, lon);  
    }  
);
```

- Google Maps ([FF 3.5](#))

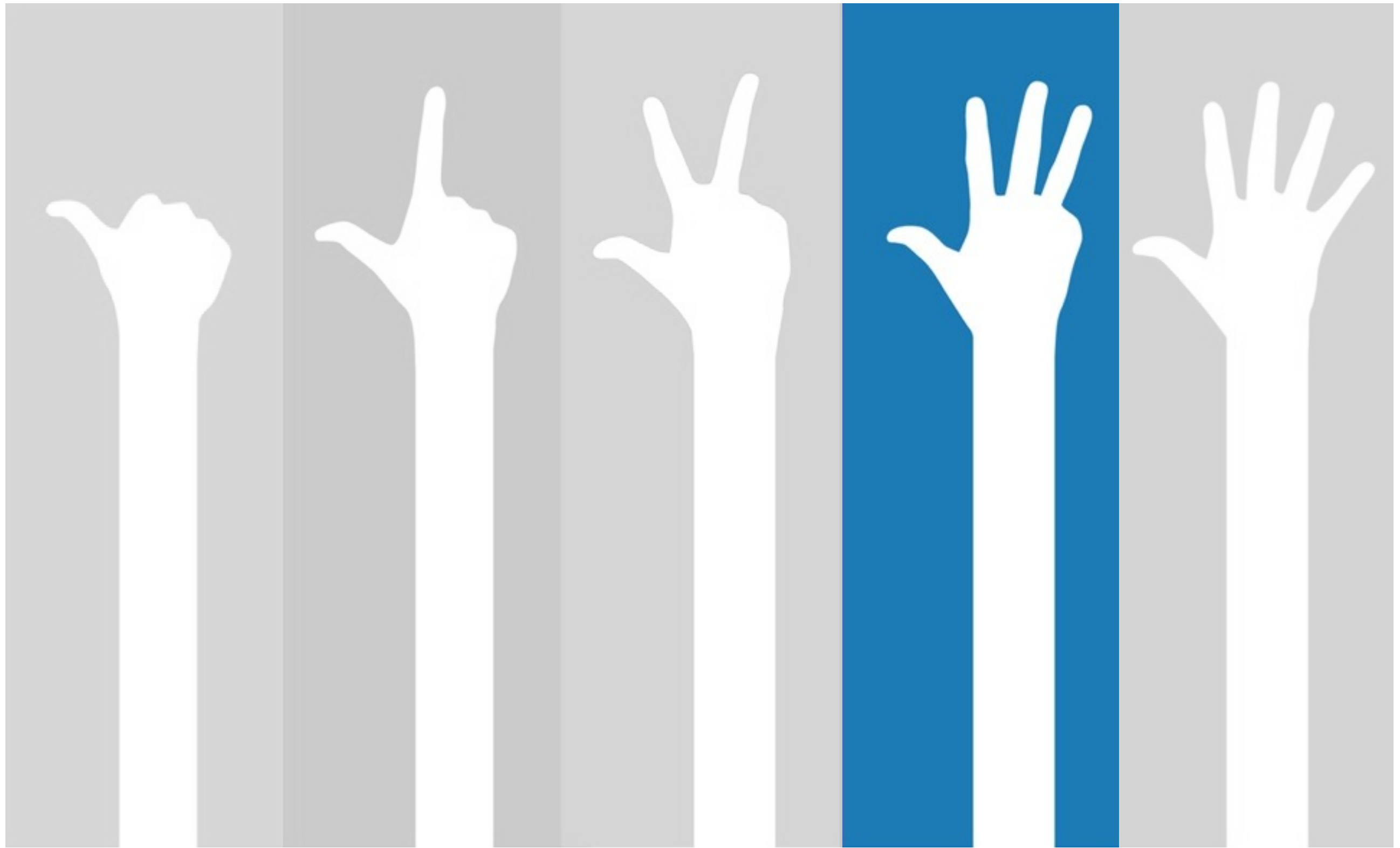


geolocation demos



HTML 5 Support

	Chrome	Firefox	Safari	Opera
canvas/SVG	✓	✓	✓	✓
video	✓	✓	✓	✓
geolocation	✓	✓	✓ (iPhone)	✓
app cache				
database				
workers				



canvas/SVG

video

geolocation

app cache &
database

web workers

Web Apps Need to Work Everywhere



// database and
app cache store
user data and
app resources
locally

- Sticky Notes Demo (Safari 4)



app cache & database demos



App Cache



- List resources that you want to take offline

CACHE MANIFEST

/static/stickies.html

/media/deleteButton.png

/media/deleteButtonPressed.png

/css/stickies.css

/js/stickies.js



App Cache

- List resources that you want to take offline

CACHE MANIFEST

/static/stickies.html

/media/deleteButton.png

/media/deleteButtonPressed.png

/css/stickies.css

/js/stickies.js

<body manifest="./cache.manifest">

</body>



Database

Database



Database



```
var db = window.openDatabase("NoteTest", "1.0",
```

Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",
```

Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",  
                             200000);
```

Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",  
                             200000);
```

```
function saveMe(id, text, timestamp, left, top, zIndex) {
```

Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",  
                             200000);
```

```
function saveMe(id, text, timestamp, left, top, zIndex) {  
    db.transaction(  
        function (tx) {  
            tx.executeSql("INSERT INTO notes (id, text, timestamp, left, top, zIndex) VALUES (?, ?, ?, ?, ?, ?)",  
                [id, text, timestamp, left, top, zIndex]);  
        },  
        function (tx) {  
            // Error handling  
        },  
        function (error) {  
            // Error handling  
        });  
}
```

Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",  
                             200000);
```

```
function saveMe(id, text, timestamp, left, top, zIndex) {  
    db.transaction(  
        function (tx) {
```

Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",  
                             200000);  
  
function saveMe(id, text, timestamp, left, top, zIndex) {  
    db.transaction(  
        function (tx) {  
            tx.executeSql(  
                "CREATE TABLE IF NOT EXISTS notes (  
                    id INTEGER PRIMARY KEY,  
                    text TEXT,  
                    timestamp TEXT,  
                    left TEXT,  
                    top TEXT,  
                    zIndex TEXT  
                );"  
            );  
        },  
        null,  
        function (error) {  
            console.log("Error: " + error.message);  
        }  
    );  
}
```


Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",  
                             200000);  
  
function saveMe(id, text, timestamp, left, top, zIndex) {  
    db.transaction(  
        function (tx) {  
            tx.executeSql(  
                "INSERT INTO WebKitStickyNotes "
```

Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",  
                             200000);
```

```
function saveMe(id, text, timestamp, left, top, zIndex) {  
    db.transaction(  
        function (tx) {  
            tx.executeSql(  
                "INSERT INTO WebKitStickyNotes "  
                + "(id, note, timestamp, left, top, zIndex) "            );  
        }  
    );  
}
```

Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",  
                             200000);  
  
function saveMe(id, text, timestamp, left, top, zIndex) {  
    db.transaction(  
        function (tx) {  
            tx.executeSql(  
                "INSERT INTO WebKitStickyNotes "  
                + "(id, note, timestamp, left, top, zIndex) "  
                + "VALUES (?, ?, ?, ?, ?, ?)",
```

Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",  
                             200000);  
  
function saveMe(id, text, timestamp, left, top, zIndex) {  
    db.transaction(  
        function (tx) {  
            tx.executeSql(  
                "INSERT INTO WebKitStickyNotes "  
                + "(id, note, timestamp, left, top, zIndex) "  
                + "VALUES (?, ?, ?, ?, ?, ?)",  
                [id, text, timestamp, left, top, zIndex]);  
        }  
    );  
}
```

Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",  
                             200000);  
  
function saveMe(id, text, timestamp, left, top, zIndex) {  
    db.transaction(  
        function (tx) {  
            tx.executeSql(  
                "INSERT INTO WebKitStickyNotes "  
                + "(id, note, timestamp, left, top, zIndex) "  
                + "VALUES (?, ?, ?, ?, ?, ?)",  
                [id, text, timestamp, left, top, zIndex]);  
        }  
    );  
}
```

Database



```
var db = window.openDatabase("NoteTest", "1.0",  
                             "Example DB",  
                             200000);  
  
function saveMe(id, text, timestamp, left, top, zIndex) {  
    db.transaction(  
        function (tx) {  
            tx.executeSql(  
                "INSERT INTO WebKitStickyNotes "  
                + "(id, note, timestamp, left, top, zIndex) "  
                + "VALUES (?, ?, ?, ?, ?, ?)",  
                [id, text, timestamp, left, top, zIndex]);  
        }  
    );  
}
```

Database

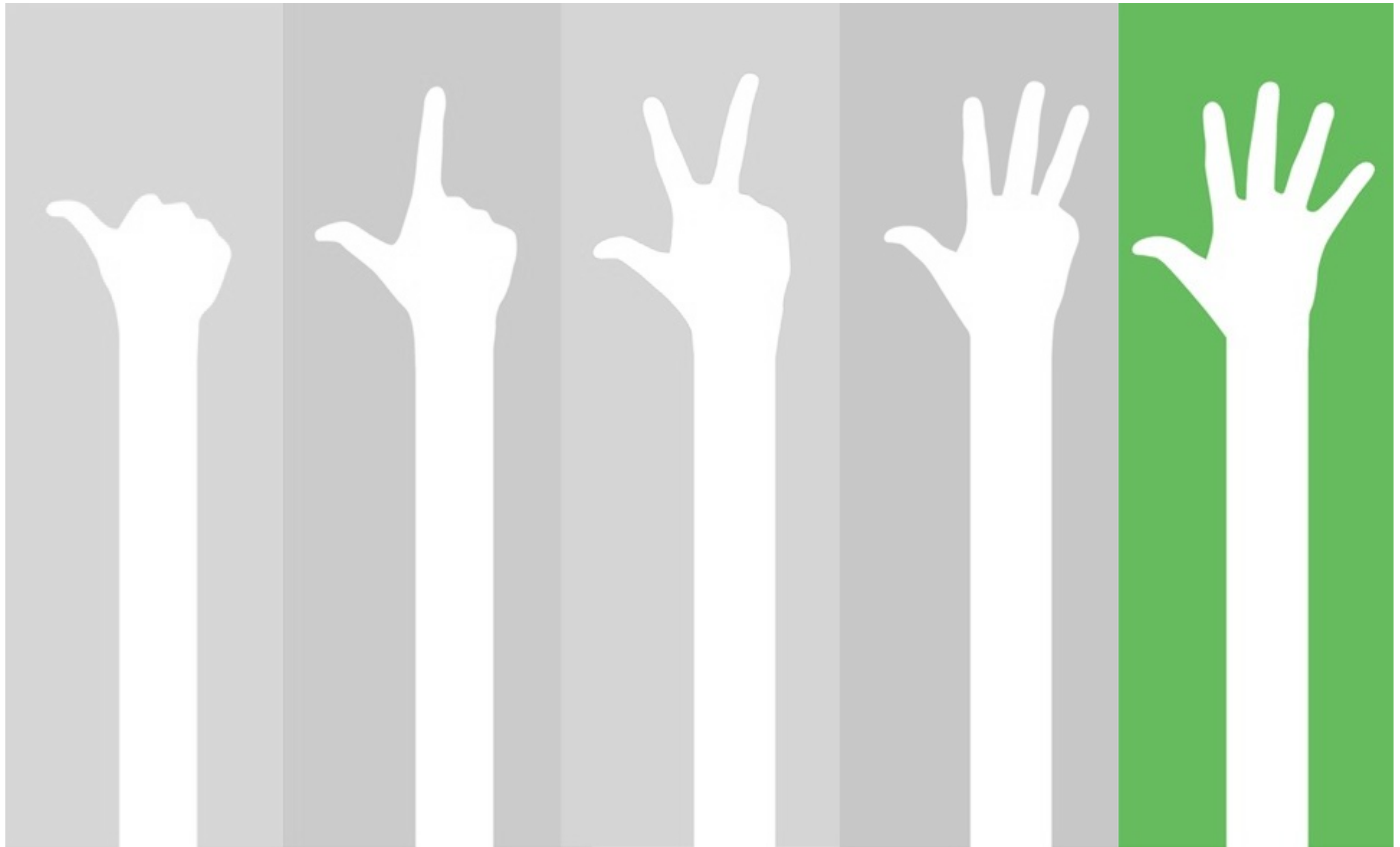


```
var db = window.openDatabase("NoteTest", "1.0",
                             "Example DB",
                             200000);

function saveMe(id, text, timestamp, left, top, zIndex) {
    db.transaction(
        function (tx) {
            tx.executeSql(
                "INSERT INTO WebKitStickyNotes "
                + "(id, note, timestamp, left, top, zIndex) "
                + "VALUES (?, ?, ?, ?, ?, ?)",
                [id, text, timestamp, left, top, zIndex]);
        }
    );
}
```


HTML 5 Support

	Chrome	Firefox	Safari	Opera
canvas/SVG	✓	✓	✓	✓
video	✓	✓	✓	✓
geolocation	✓	✓	✓ (iPhone)	✓
app cache	✓	✓	✓	✓ (mobile)
database	✓	✓	✓	✓ (mobile)
workers				



canvas/SVG

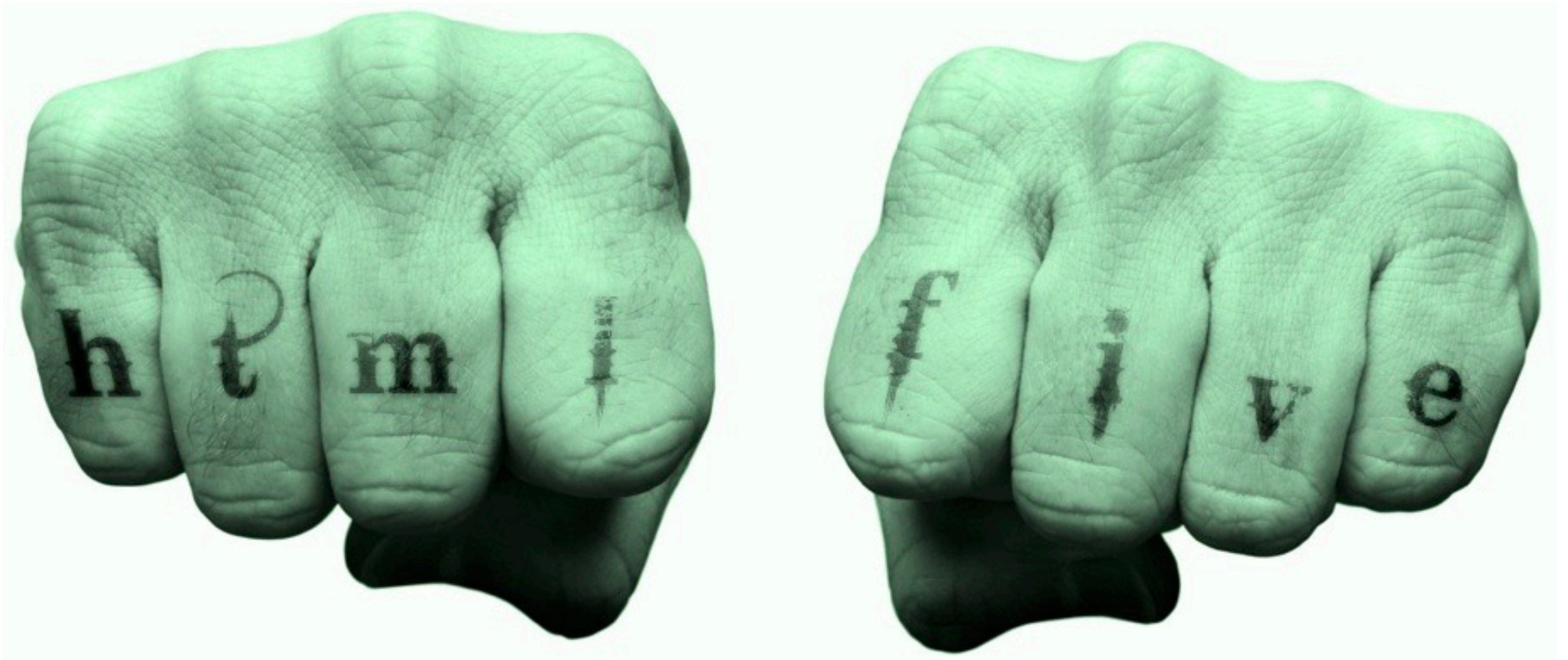
video

geolocation

app cache &
database

web workers

A More Powerful Web == More Powerful Apps



But More Power == More Responsibility

I will not hose the browser with JavaScript

I will not hose the browser with JavaScript

I will not hose the browser with JavaScript

I will not hose the browser with JavaScript

I will not hose the browser with JavaScript

I will not hose the browser with JavaScript

// web workers
defines an API
for running
background
scripts

- Bad Primes (FF 3.5)
- Good Primes (FF 3.5)
- Motion Tracker (FF)



web workers demos





Worker Pool

Web Workers



Web Workers



`<script>`

Web Workers



```
<script>  
  var worker = new Worker('worker.js');
```

Web Workers



```
<script>  
  var worker = new Worker('worker.js');  
  worker.onmessage = function (event) {
```

Web Workers



```
<script>
  var worker = new Worker('worker.js');
  worker.onmessage = function (event) {
    console.log('Results: ' + event.data);
  }
</script>
```

Web Workers



```
<script>
  var worker = new Worker('worker.js');
  worker.onmessage = function (event) {
    console.log('Results: ' + event.data);
  };

```

Web Workers



```
<script>
  var worker = new Worker('worker.js');
  worker.onmessage = function (event) {
    console.log('Results: ' + event.data);
  };
</script>
```


worker.js



```
function findPrimes() {  
    // ... prime algorithm here  
    postMessage(nextPrime);  
}  
  
findPrimes();
```

HTML5 Support

	Chrome	Firefox	Safari	Opera
canvas/SVG	✓	✓	✓	✓
video	✓	✓	✓	✓
geolocation	✓	✓	✓ (iPhone)	✓
app cache	✓	✓	✓	✓ (mobile)
database	✓	✓	✓	✓ (mobile)
workers	✓	✓	✓	✓ (mobile)



HTML 5 Training

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