



HTML5

Friend or Foe?



The Open Web

Friend or Foe?

A row of several fish, likely salmon, laid out on a surface. The fish are arranged in a line, facing right. They have a silvery, iridescent sheen. The background is a light-colored, possibly metallic, surface with vertical lines.

**Remy Sharp.
Non-Flash-er.**

<http://remysharp.com/html5-spell-death-to-flash/>

HTML5 spell death to Flash?

http://remysharp.com/2009/05/28/html5-spell-death-to-flash/

Check out my latest project: [Full Frontal JavaScript Conference](#)

remy sharp's b:log
About [code] and all that jazz
"I wonder if the iPad's Safari supports position:fixed. Shame if it didn't..." [about 5 hours ago](#)

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Full Frontal JavaScript Conference Twivatar, a Twitter avatar API

28 MAY **HTML5 spell death to Flash?** (edit)

The web community has gone loopy over Google announcing they're supporting [HTML5](#) in a big way, particularly and almost specifically because of the [YouTube](#) to demo using the `video` tag (I'll add: rightly so).

However, if you search Twitter for [#html5](#) and you'll see a that half of the comments see the HTML5 demo as a big wave goodbye to Flash.

I don't think this is the end of Flash in the slightest.

Witch hunt mentality?

I know I'm going to upset a few people by first off saying that it feels like a witch hunt for Flash.

You see, I'm a snowboarder, and when I'm on the mountain and I see skiers, I don't think to myself: "I wish they'd leave, because it would be much more fun without them", I think: "that's cool, we all love riding the mountain in our own ways". Live and let live, and all that hippie crap. But I believe in it.

Flash has it's place on the web.

Equally, I haven't seen so many (read: *any*) Flash developers posting that this is the end of their Flash days and it's time to move over to pure HTML RIA.

Flash isn't *the* web either

Those developers who understand Flash's place on the web, do an awesome job. Adobe's site running entirely in Flash is a fail. We all know this right?

Post Meta

Posted: 28-May 2009
Category: [Web](#)
Tags: [flash](#), [html5](#)
[Post to delicious](#)

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"Flash is dead!"

Is Flash is dead?

**Should Flash
be worried?**



BEST COPY AVAILABLE BY 31 MAR 06

A vintage television set with a wooden frame and a shattered screen. The screen is cracked and distorted, showing a dark, indistinct shape. The television is placed on a textured, brown floor. The background consists of a wall with blue floral wallpaper on the left and plywood on the right. A small white label with the text 'long life' is visible on the top left of the television's frame. The text 'Video killed the radio Flash star?' is overlaid on the image in a large, bold, black font, with a diagonal line striking through the word 'radio'.

Video killed the
~~radio~~ **Flash** star?



<http://youtube.com/watch?v=uofWfXOzX-g>

Flash based

- Capture video
- Encode to FLV
- Upload/create SWF to play FLV
- Copy & paste <object> code

Flash based

- Capture video
- Encode to FLV
- Upload, **create** SWF to play FLV
- Copy & paste <object> code

Open web based

- Capture video
- Encode to mp4
- Add
`<video src="foo.mp4" />`



```
<video src="dizzy.mp4" />
```

```
<video src="dizzy.mp4" controls/>
```

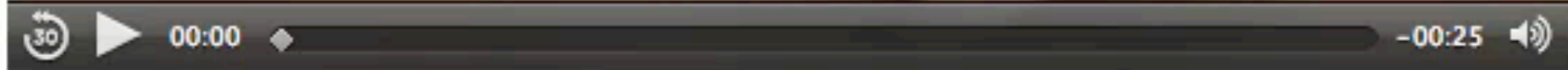
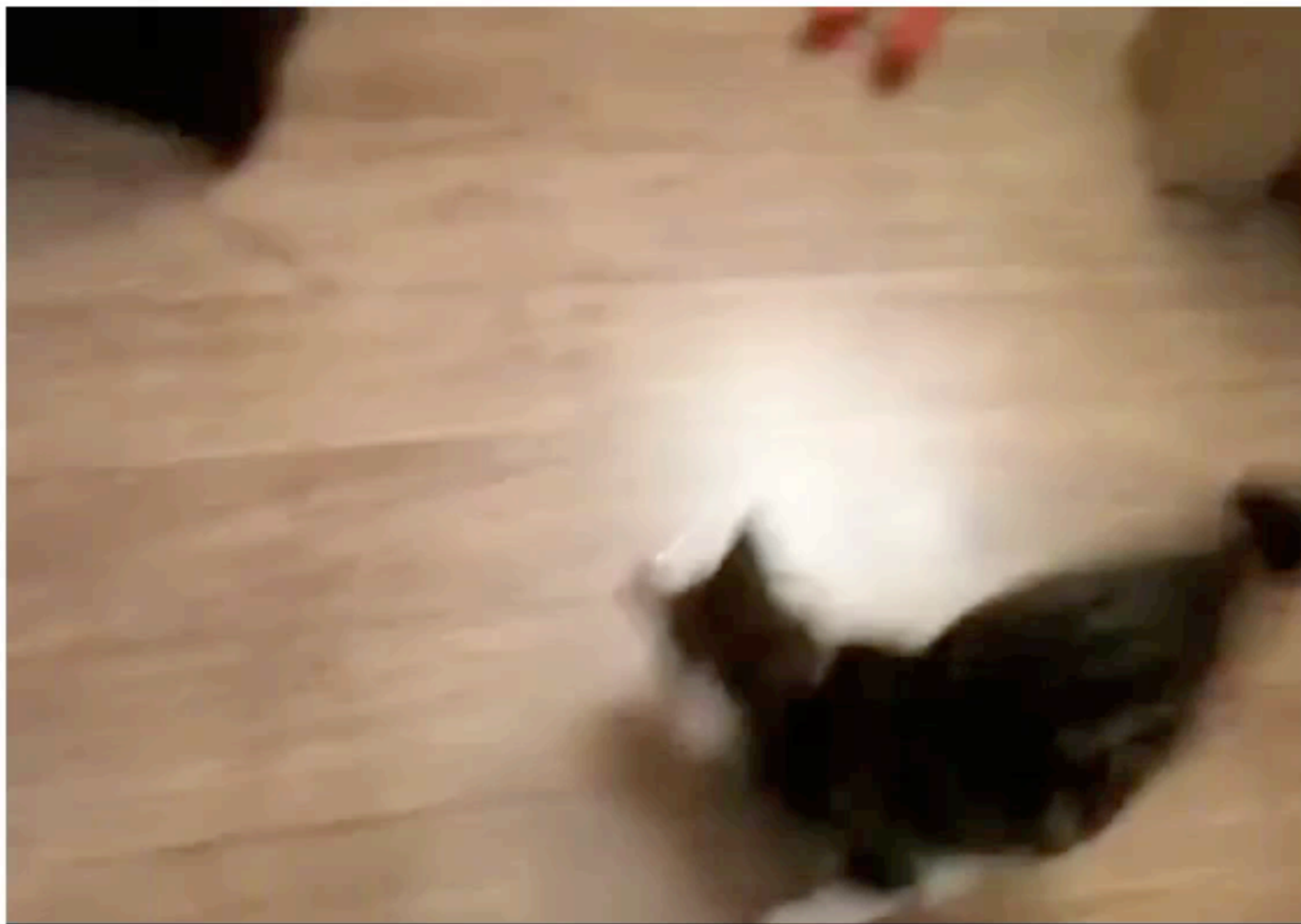
```
<!DOCTYPE html>  
<html lang="en">  
<head>  
  <meta charset=utf-8 />  
  <title>Video Example</title>  
</head>  
<body>  
<video src="dizzy.mp4" controls/>  
</body>  
</html>
```


Video Example



file:///Users/remy/Dropbox/Talks/HTML%205/HTML5%20and%20Flash

Google



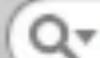
Scripting



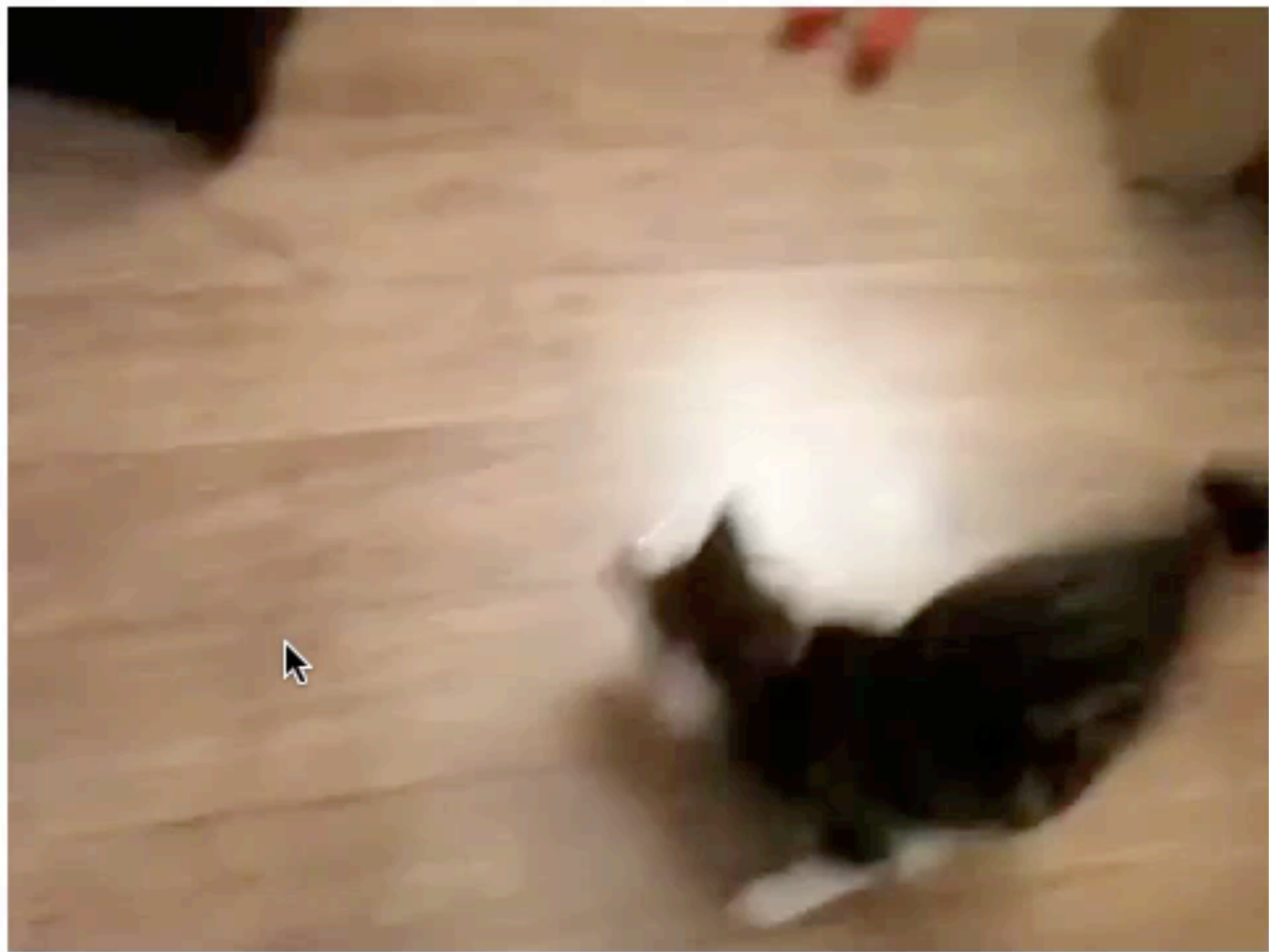
Dizzy



file:///Users/remy/Desktop/html5js



Google



play

00:00 / 00:25

```
var video = document.getElementsByTagName('video')[0];  
if (video.paused) {  
    video.play();  
}
```

```
var video = document.getElementsByTagName('video')[0];
if (video.paused) {
    video.play();
}
```

```
// position & asTime defined elsewhere
video.addEventListener('timeupdate', function () {
    position.innerHTML = asTime(this.currentTime);
}, false);
```

API

- `play()`, `pause()`, `canPlayType(t)`

API

- `play()`, `pause()`, `canPlayType(t)`
- `currentTime`, `paused`, `duration`,
`loop`, `autoplay`, `muted`, `volume`, `etc`

API

- `play()`, `pause()`, `canPlayType(t)`
- `currentTime`, `paused`, `duration`,
`loop`, `autoplay`, `muted`, `volume`, `etc`
- `progress`, `stalled`, `play`, `pause`,
`waiting`, `canplay`, `seeking`,
`timeupdate`

Fullscreen?

⚠ Warning! User agents should not provide a public API to cause videos to be shown full-screen. A script, combined with a carefully crafted video file, could trick the user into thinking a system-modal dialog had been shown, and prompt the user for a password. There is also the danger of "mere" annoyance, with pages launching full-screen videos when links are clicked or pages navigated. Instead, user-agent specific interface features may be provided to easily allow the user to obtain a full-screen playback mode.

⚠ Warning! User agents *should not provide a public API to cause videos to be shown full-screen.* A script, combined with a carefully crafted video file, could trick the user into thinking a system-modal dialog had been shown, and prompt the user for a password. There is also the danger of "mere" annoyance, with pages launching full-screen videos when links are clicked or pages navigated. Instead, user-agent specific interface features may be provided to easily allow the user to obtain a full-screen playback mode.

Video

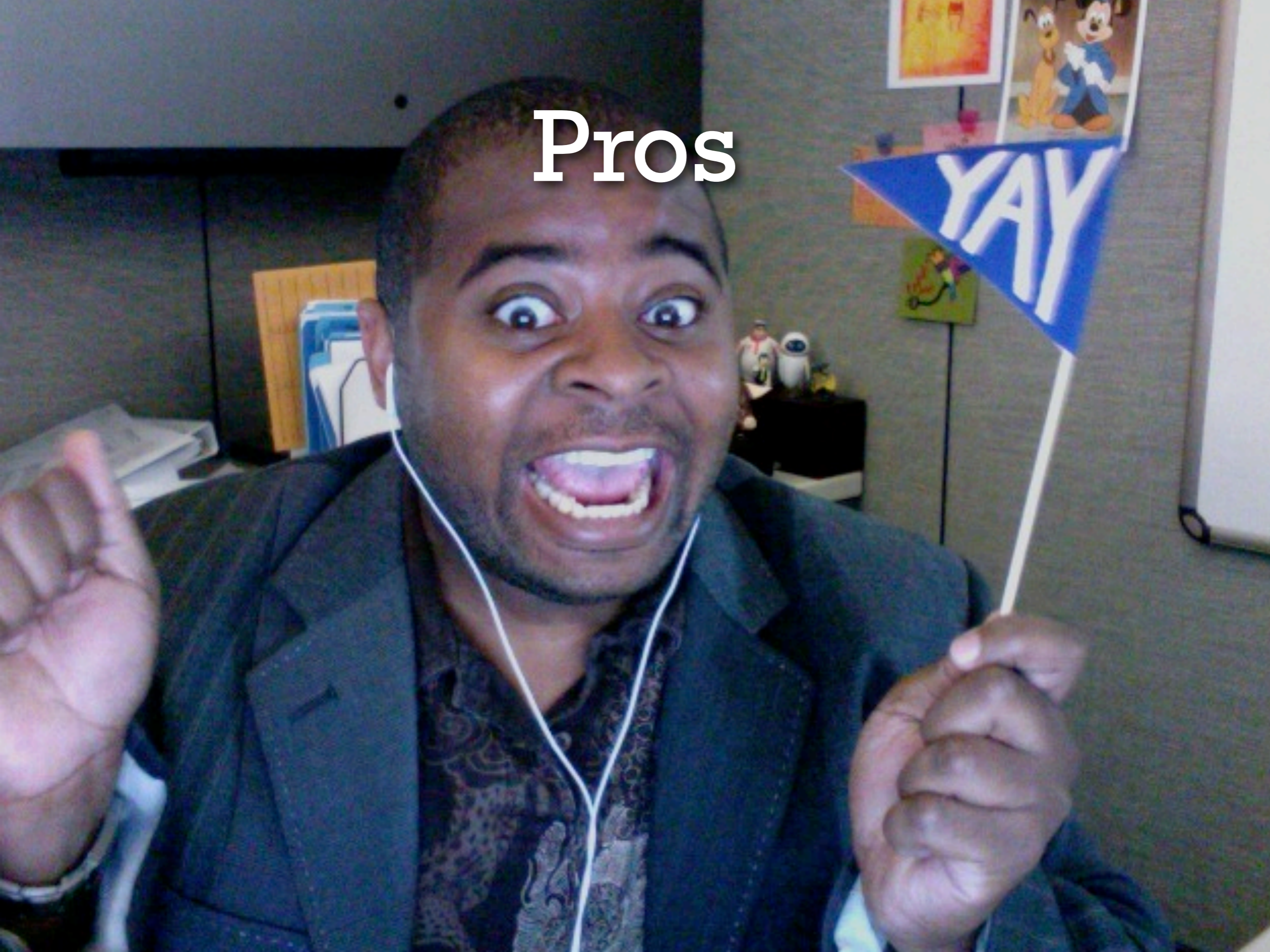


fullscreen pause 00:07 / 00:25

Note that (at time of writing) [Webkit nightly](#) supports full screen mode, which will add a button above.

[HTML5 demo](#)

Pros



Pros

- No plugins required

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- Simple API: `play()`, `pause()` etc

Pros

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- Simple API: `play()`, `pause()` etc
- Video & Audio API the same

Pros

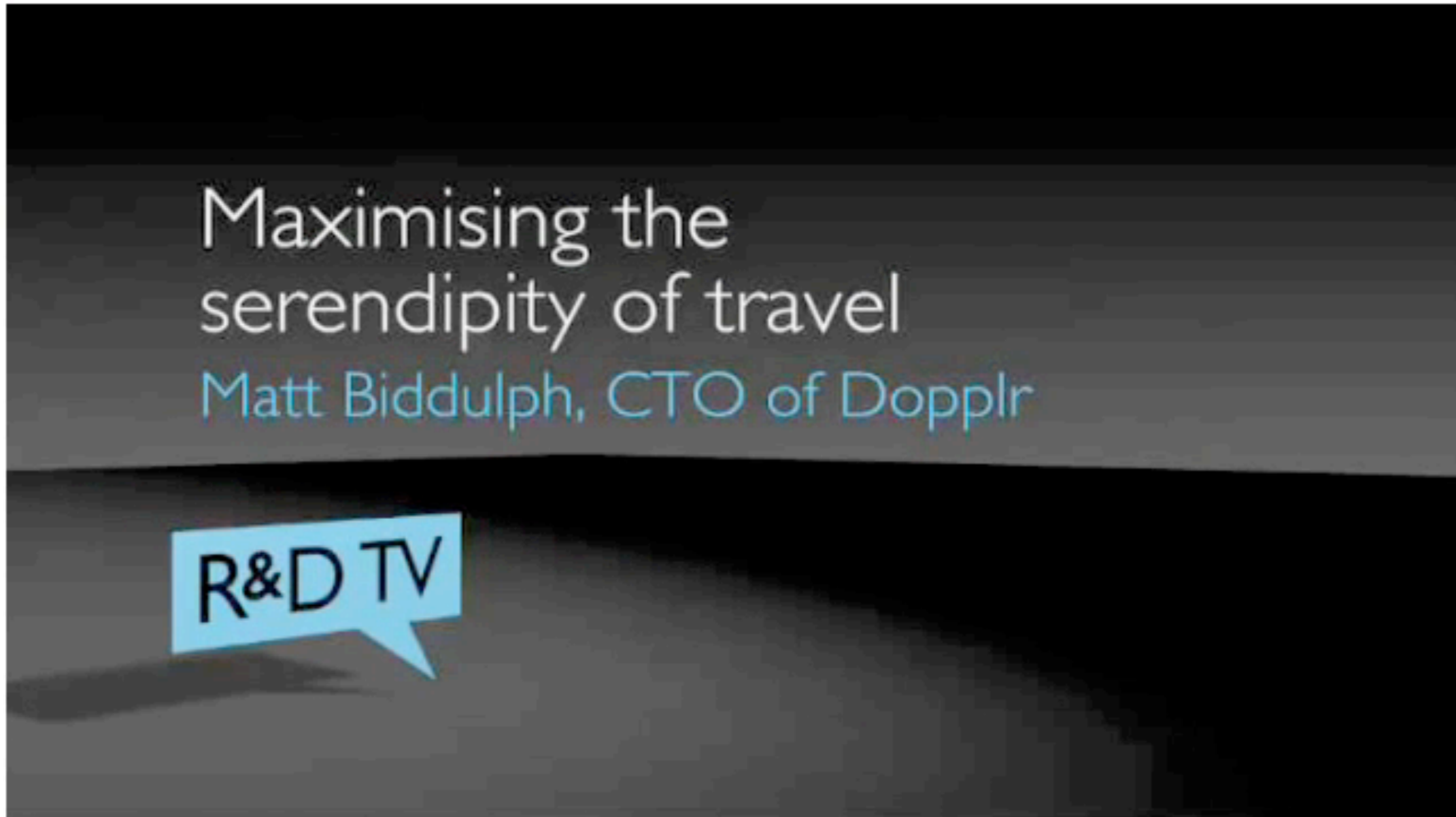
- No plugins required
- Simple API: `play()`, `pause()` etc
- Video & Audio API the same
- Player chrome is HTML & CSS

Cons



Cons

- **Accessibility?**



▼ Programme chapters

This is a proof of concept demonstration of HTML pluginless Video and Audio playback, showing AV content synchronised to chapters, allowing direct access to specific sections

Cons

- Accessibility?

Cons

- Accessibility?
- Codecs

Cons

- Accessibility?
- Codecs
- IE

WATCH WHATEVER WHENEVER.



With Sony's Betamax SL-8600 video recorder, you can see any TV show you want to see anytime you want to see it.

Because Betamax, which plugs into any TV set and is easy to operate, can videotape a show up to three hours long (with the L-750 videocassette) while you're doing something else—even while you're out of the house, by setting the electronic timer.

It can also videotape something off one channel while you're watching another channel.

And remember, Sony has more experience in videorecorders than anyone (over 20 years!). In fact, we've sold more videorecorders to broadcasters and industry than any other consumer manufacturer. We even make our own tape.

For years you've watched TV shows at the times you've had to. Now you can watch them at the times you want to.

SONY BETAMAX
THE LEADER IN VIDEO RECORDING

© 1978 Sony Corp. of America. SONY and Betamax are registered trademarks of Sony Corp.

```
<video src="dizzy.mp4" controls/>
```

```
<video controls>  
  <source src="dizzy.ogv" />  
  <source src="dizzy.mp4" />  
</video>
```

Video for Everybody

```
<video width="640" height="360" poster="dizzy.jpg" controls>
  <source src="dizzy.ogv" type="video/ogg" />
  <source src="dizzy.mp4" type="video/mp4" /><!--[if gt IE 6]
  <object width="640" height="375" classid="clsid:02BF25D5-8C17-4B23-BC80-D3488ABDDC6B"><![endif]--><!--[if !IE]><!-->
  <object width="640" height="375" type="video/quicktime" data="dizzy.mp4">
  <!--<![endif]-->
  <param name="src" value="dizzy.mp4" />
  <param name="showlogo" value="false" />
  <object width="640" height="380" type="application/x-shockwave-flash"
    data="player.swf?image=dizzy.jpg&file=dizzy.mp4">
    <param name="movie" value="player.swf?image=dizzy.jpg&file=dizzy.mp4" />
    
  </object><!--[if gt IE 6]><!--></object><!--<![endif]-->
</video>
<p>Download Video: <a href="dizzy.mp4">High Quality "MP4"</a> | <a href="dizzy.ogv">Low
Quality "OGG"</a></p>
```

[http://camendesign.com/code/video for everybody](http://camendesign.com/code/video%20for%20everybody)

**Flash will be
needed for video
for a while yet.**

fonts

sIFR & Cufon

The easiest way to use REAL FONTS ON YOUR WEBSITE

FF Dax Compact Web Pro by [FontFont](#)

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Feature Tour Try it for Free

FF Dax Compact Web Pro by [FontFont](#)

Doesn't work in Firefox 3 - 7%

A snap to set up fonts on your website

We've worked hard to make Typekit easy to use. Add and use fonts the way you want to.

Try it for free

Your fonts will be served from a robust network built with hundreds of servers worldwide.

[How it works](#)

We're working with foundries to bring the best possible fonts for your website.

[Browse fonts](#)

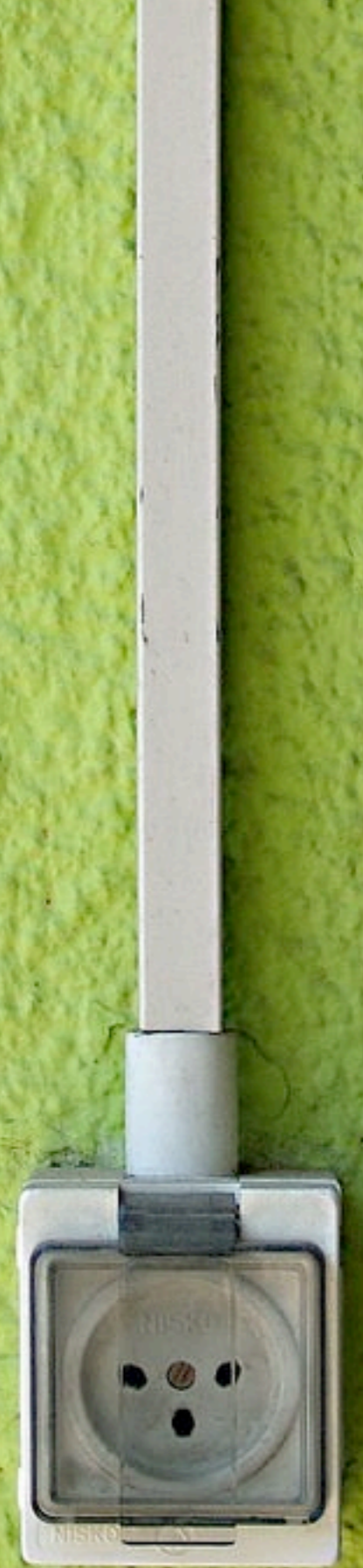
© Copyright 2010 [Small Batch, Inc.](#) | [Support](#) | [Terms & Conditions](#) | [Privacy Policy](#) | [Contact Us](#) | [Typekit on Twitter](#)

- Native font rendering

- IE works via EOT

- Doesn't work in Firefox 3 - 7%

Streaming Sockets





[Load earlier messages](#)



Elliott Kember 3 months ago
design was by @dizzyup, good friend of mine



Elliott Kember 3 months ago
very clever



Remy Sharp 16 seconds ago
Just here for a screen shot for some lovely Flash folk

Create or join a room

KLN1IRGA



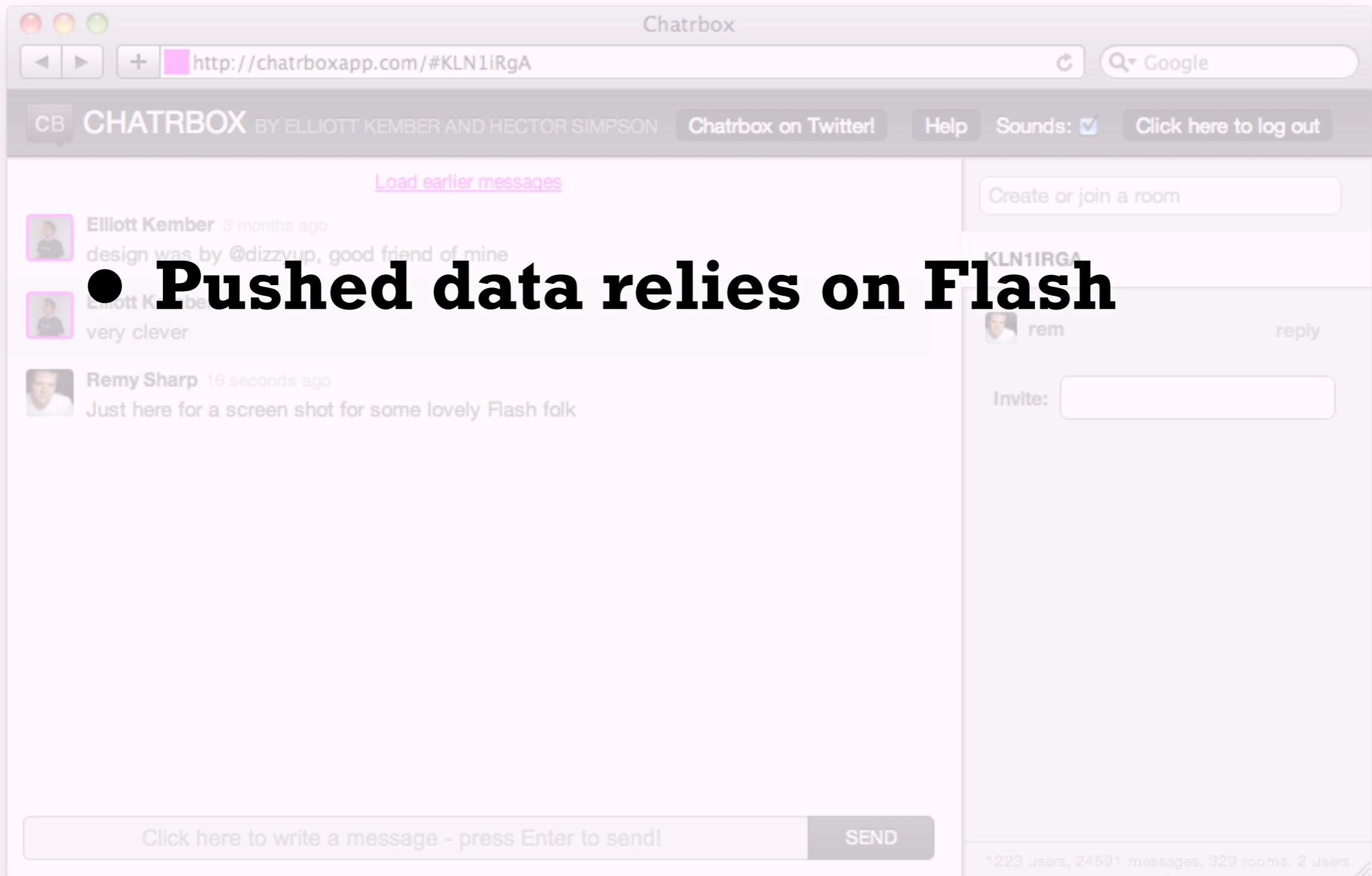
rem

reply

Invite:

Click here to write a message - press Enter to send!

SEND



● Pushed data relies on Flash

Chatrbox

http://chatrboxapp.com/#KLN1iRgA

Google

CB CHATRBOX BY ELLIOTT KEMBER AND HECTOR SIMPSON Chatrbox on Twitter! Help Sounds: [checked] Click here to log out

[Load earlier messages](#)

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Invite:

Click here to write a message - press Enter to send! SEND

1223 users, 24591 messages, 329 rooms. 2 users

- **Pushed data relies on Flash**
- **If no Flash, switches to polling**

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http://chatrboxapp.com/#KLN1iRgA

Google

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- **Pushed data relies on Flash**
- **If no Flash, switches to polling**
- **Polling bad for high concurrency**

- **Had to work in corporate environment**
- **Corp env were blocking odd traffic & Flash**
- **Needed to be pure JS solution**
- **It's possible, but complicated**

WebSocket


```
var ws = new WebSocket("ws://hostname:80/");
```

```
ws.onmessage = function (event) {  
    // message in, let's convert it to JSON  
    var data = JSON.parse(event.data);  
};
```

```
ws.onclose = function () {};
```

```
ws.onopen = function () {};
```

```
var ws = new WebSocket("ws://localhost:8080/");
ws.onmessage = function(event) {
    var data = JSON.parse(event.data);
    var p = $(twitterlib.render(data));
    if( $('#tweets > li').length > 15) {
        $('#tweets > li:last').slideDown(100, function() {
            $(this).remove();
        });
    }

    $('#tweets').prepend(p);
    p.slideDown(140);
};
ws.onclose = function() {
    alert("socket closed");
};
ws.onopen = function() {
    //alert("connected...");
};
```

```
78 margin: 5px 0 15px 0;
79 }
80
81 </style>
82 <script src='http://ajax.googleapis.com/ajax/libs/jquery/1.3.2/jquery.min.js'></script>
83 <script src='/twitterlib.js'></script>
84 <script>
85 $(document).ready(function(){
86     if(!("WebSocket" in window)) {
87         alert("Sorry, the build of your browser does not support WebSockets. Please use
latest Chrome or Webkit nightly");
88         return;
89     }
90
91     ws = new WebSocket("ws://localhost:8080/");
92     ws.onmessage = function(evt) {
93         var data = JSON.parse(evt.data);
94         var p = $(twitterlib.render(data));
95         if( $('#tweets > li').length > 15) {
96             $('#tweets > li:last').slideDown(100, function() {
97                 $(this).remove();
98             });
99         }
100
101         $('#tweets').prepend(p);
102         p.slideDown(140);
103     };
104     ws.onclose = function() {
105         alert("socket closed");
106     };
107     ws.onopen = function() {
108         //alert("connected...");
109     };
110 });
111 </script>
112 </head>
113 <body>
```

Graphics

spring green

silver

cadet blue

salmon

yellow green

turquoise blue

green

wild strawberry

sky blue

yellow orange

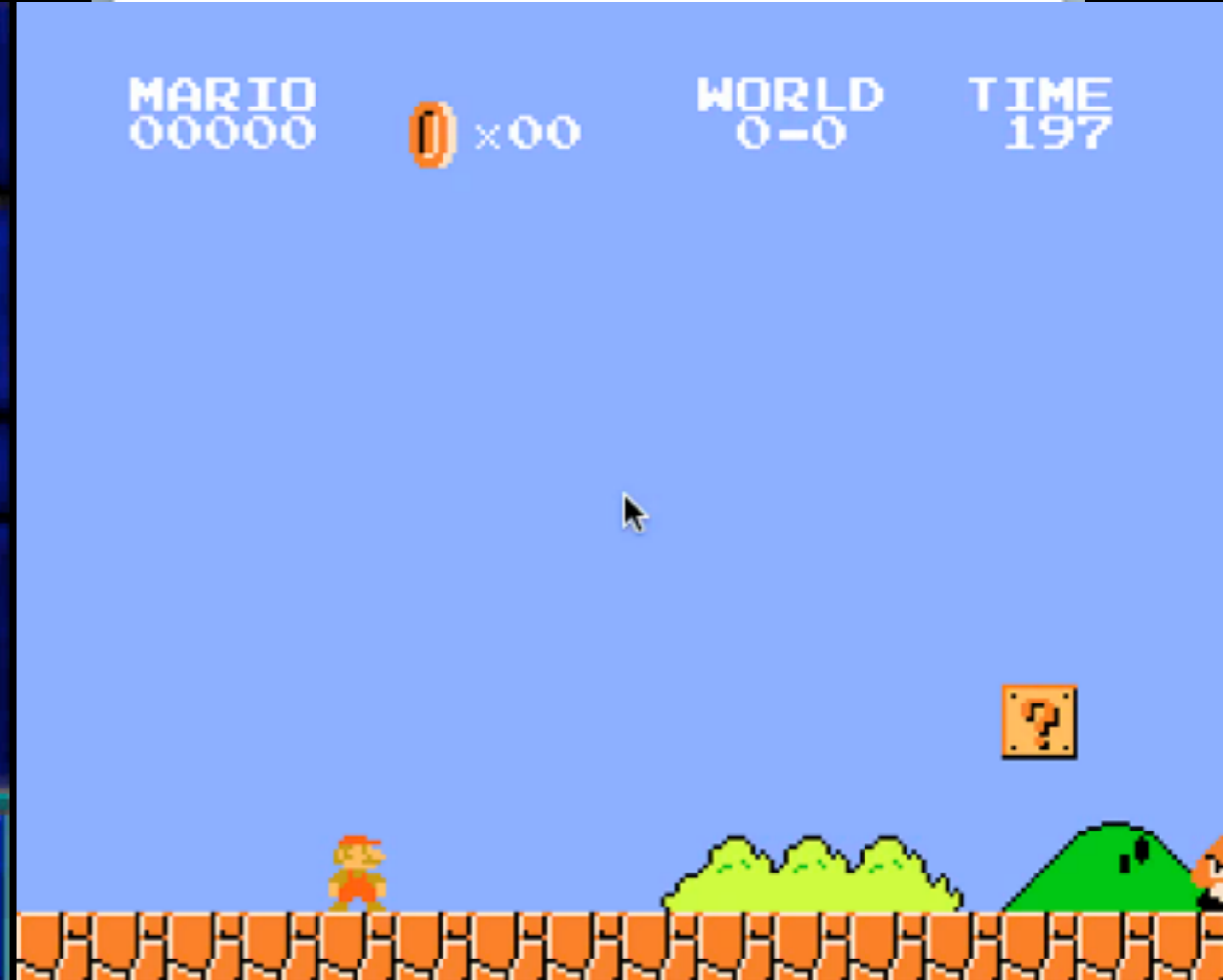
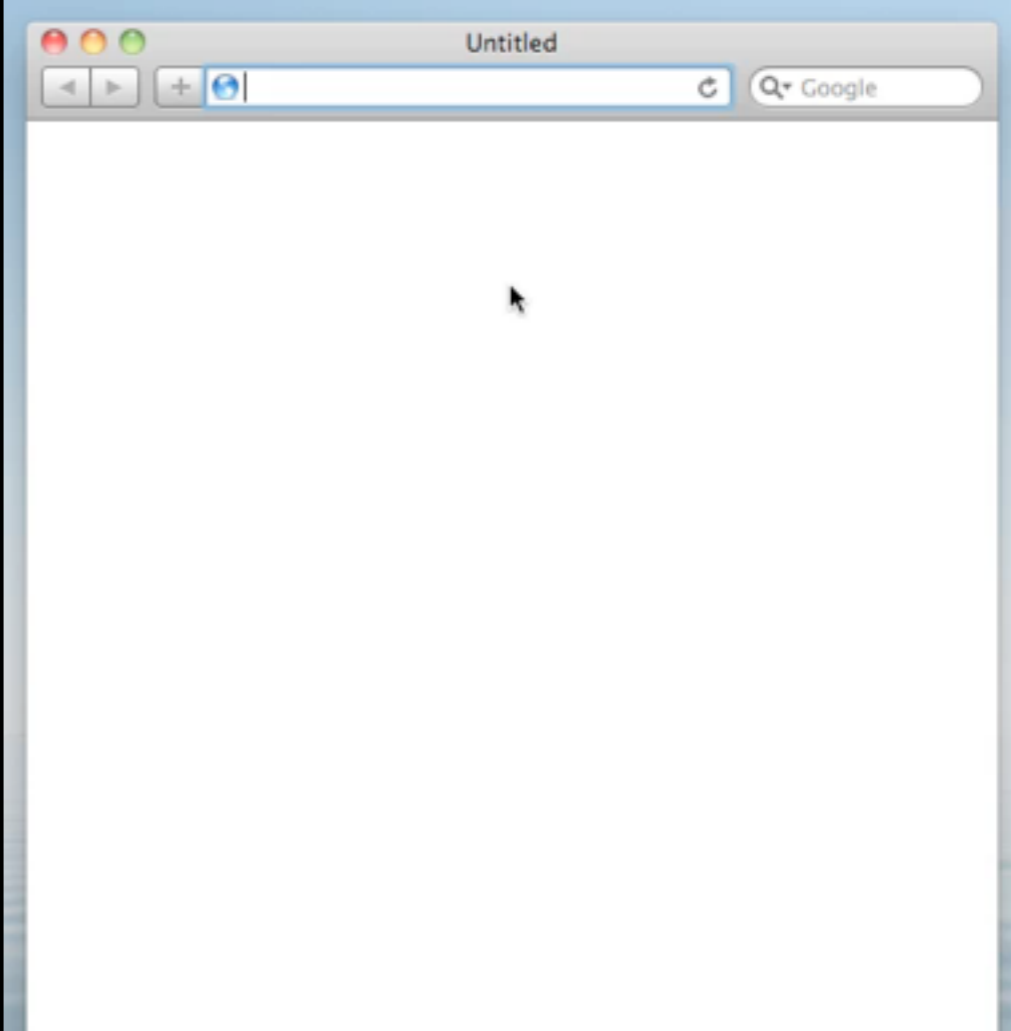
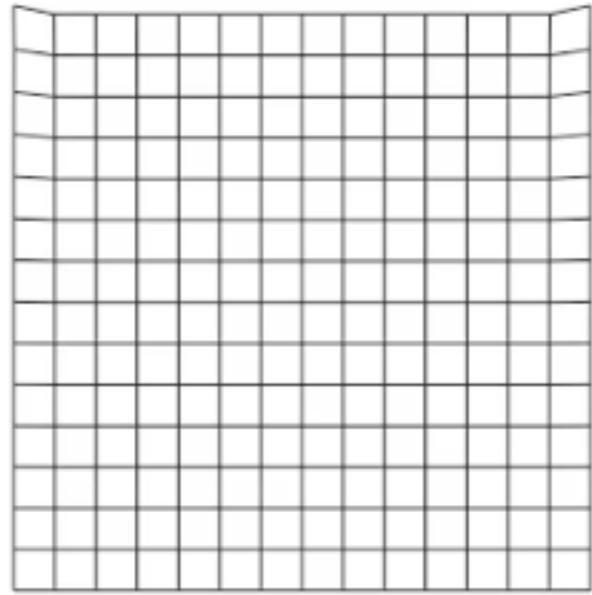
purple mountain's majesty

gold



2D Graphics

Canvas

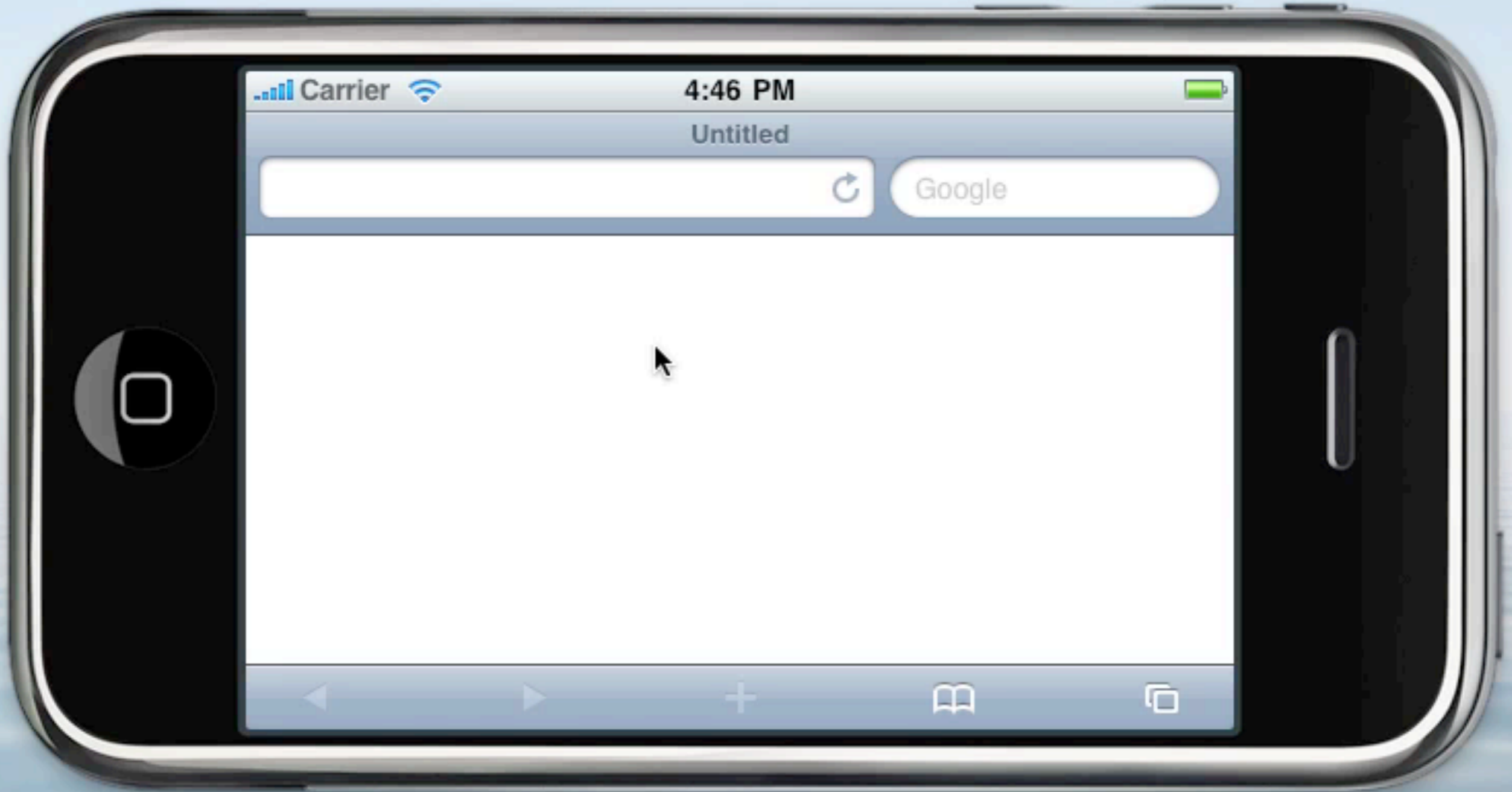


Google Analytics - Flash charts

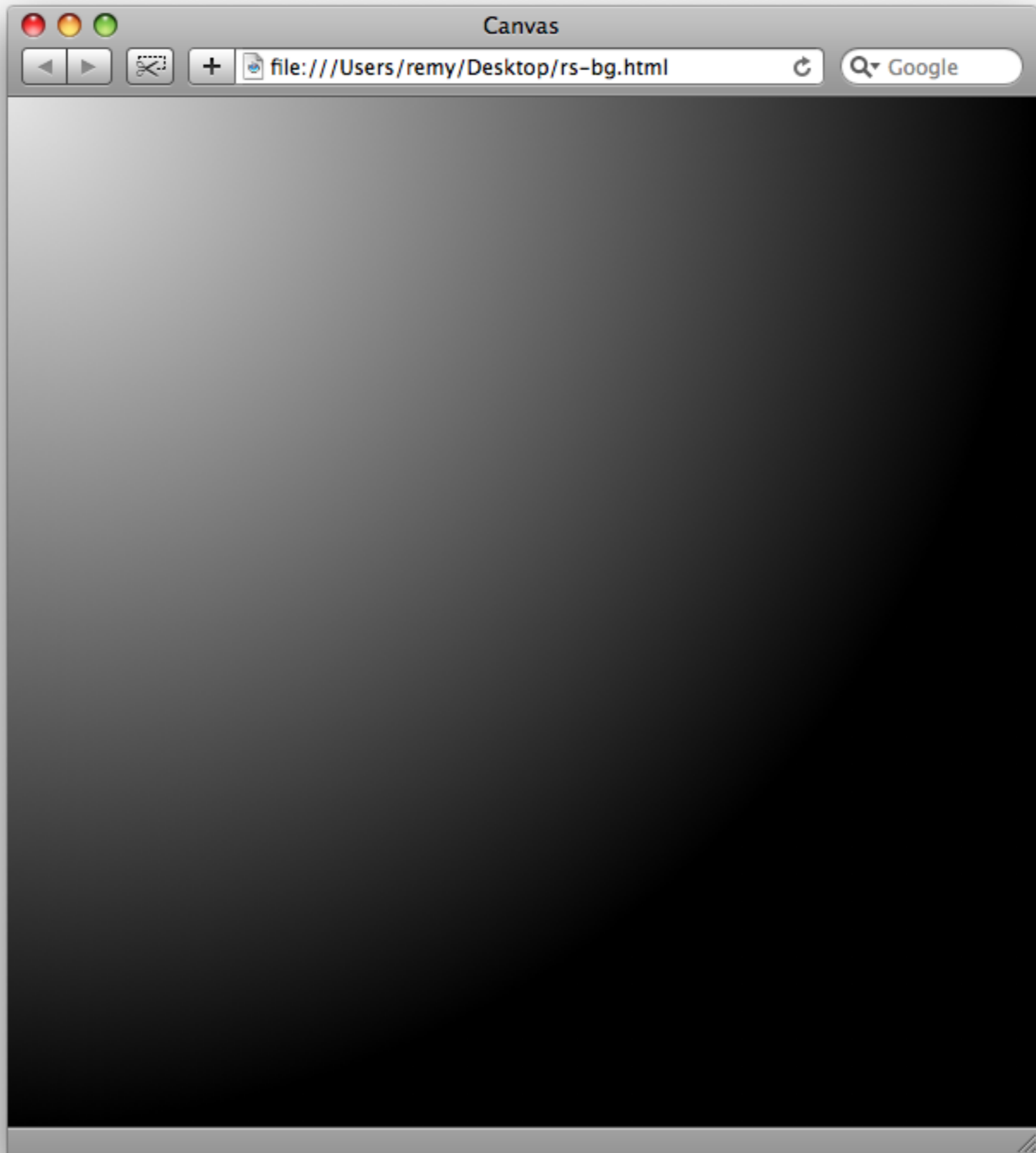


Interactive Demo - Canvas charts





Let's get technical



```
<!DOCTYPE html>
<html>
<head>
  <title>Canvas</title>
</head>
<body>
  <canvas></canvas>
</body>
</html>
```

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

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

```
// Create radial gradient
```

```
var grad = ctx.createRadialGradient(0,0,0,0,0,600);
```

```
var ctx = canvas.getContext( '2d' );  
  
// Create radial gradient  
var grad = ctx.createRadialGradient(0,0,0,0,0,600);  
grad.addColorStop(0, '#E4E4E4');  
grad.addColorStop(1, '#000');
```

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

// Create radial gradient
var grad = ctx.createRadialGradient(0,0,0,0,0,600);
grad.addColorStop(0, '#E4E4E4');
grad.addColorStop(1, '#000');

// assign gradients to fill
ctx.fillStyle = grad;
```

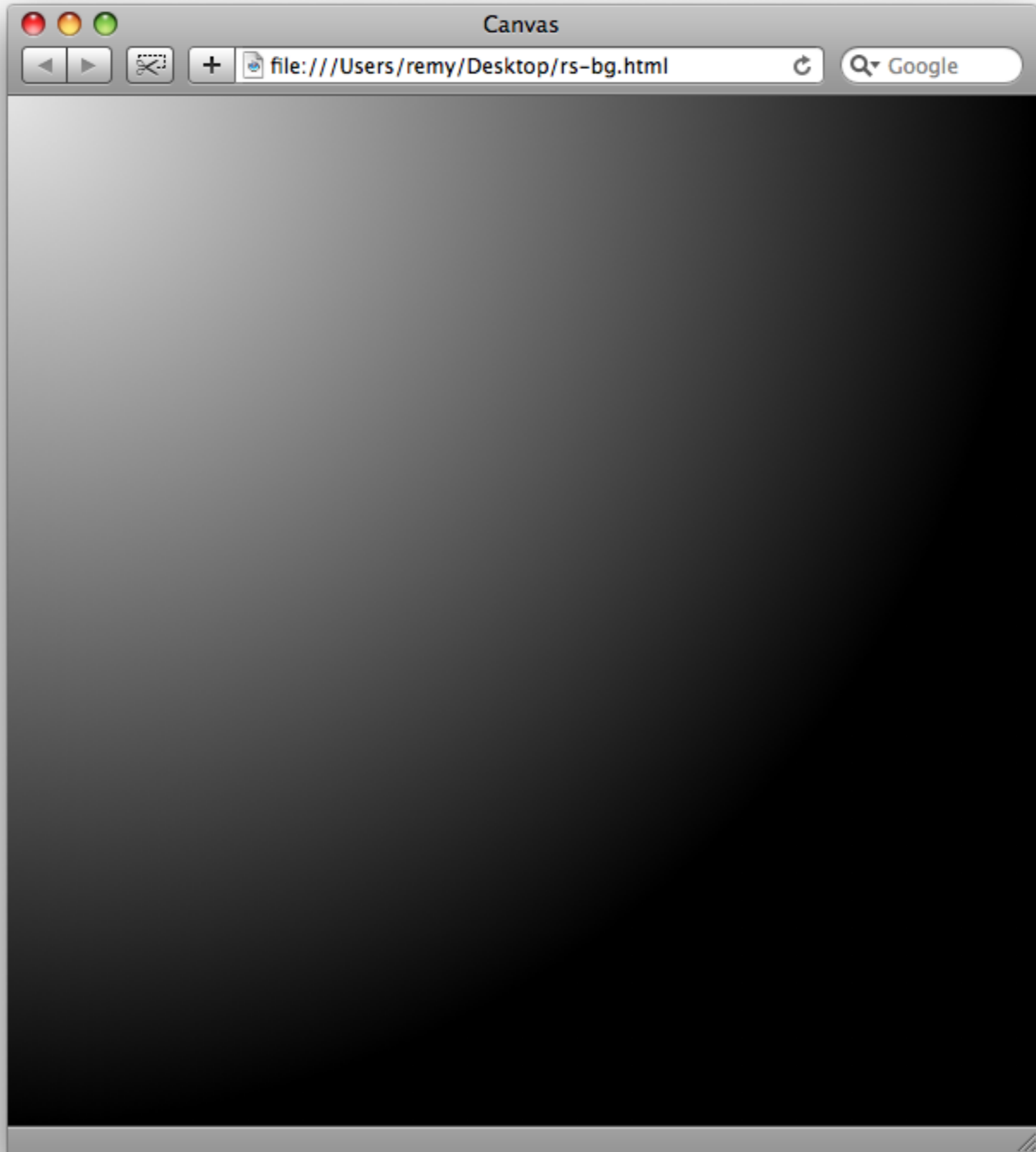


```
var ctx = canvas.getContext( '2d' );

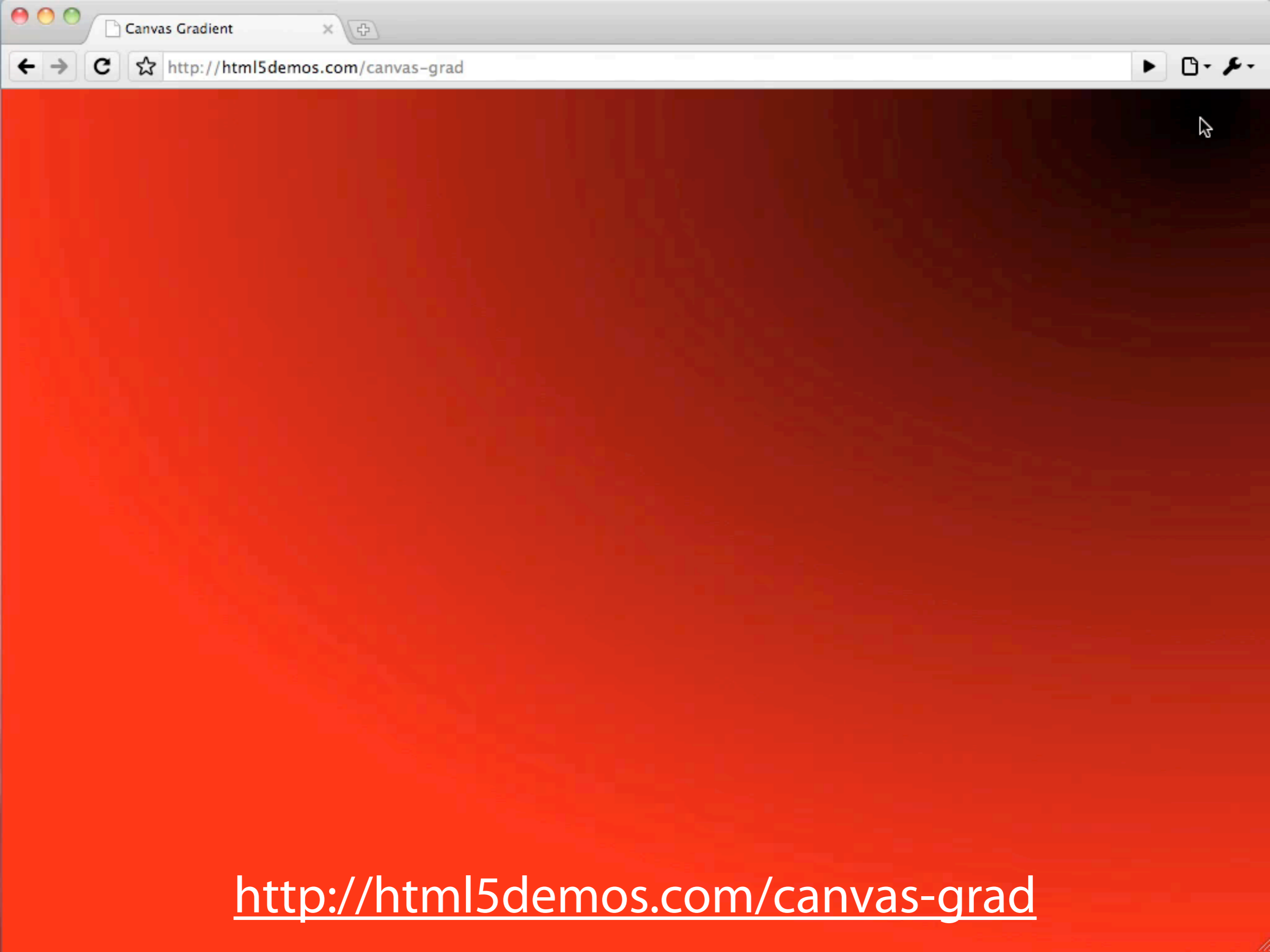
// Create radial gradient
var grad = ctx.createRadialGradient(0,0,0,0,0,600);
grad.addColorStop(0, '#E4E4E4');
grad.addColorStop(1, '#000');

// assign gradients to fill
ctx.fillStyle = grad;

// draw 600x600 fill
ctx.fillRect(0,0,600,600);
```



Let's mix it up



<http://html5demos.com/canvas-grad>

```
body.onmousemove = function (event) {  
    var width = window.innerWidth,  
        height = window.innerHeight,  
        x = event.clientX,  
        y = event.clientY,  
        rx = 600 * x / width,  
        ry = 600 * y / width;  
  
    var xc = parseInt(256 * x / width);  
    var yc = parseInt(256 * y / height);  
  
    grad = ctx.createRadialGradient(rx, ry, 0, rx, ry, 600);  
    grad.addColorStop(0, '#000');  
    grad.addColorStop(1, 'rgb('+xc+', +(255-xc)', '+yc+')');  
  
    ctx.fillStyle = grad;  
    ctx.fillRect(0, 0, 600, 600);  
};
```

<http://html5demos.com/canvas-grad>

```
body.onmousemove = function (event) {  
    var width = window.innerWidth,  
        height = window.innerHeight,  
        x = event.clientX,  
        y = event.clientY,  
        rx = 600 * x / width,  
        ry = 600 * y / width;  
  
    var xc = parseInt(256 * x / width);  
    var yc = parseInt(256 * y / height);  
  
    grad = ctx.createRadialGradient(rx, ry, 0, rx, ry, 600);  
    grad.addColorStop(0, '#000');  
    grad.addColorStop(1, 'rgb('+xc+', +(255-yc)', '+yc+')');  
  
    ctx.fillStyle = grad;  
    ctx.fillRect(0, 0, 600, 600);  
};
```

Calculate from
the mouse the
radius and
colours

<http://html5demos.com/canvas-grad>

```
body.onmousemove = function (event) {  
    var width = window.innerWidth,  
        height = window.innerHeight,  
        x = event.clientX,  
        y = event.clientY,  
        rx = 600 * x / width,  
        ry = 600 * y / height;  
  
    var xc = rx * width;  
    var yc = ry * height;  
  
    grad = ctx.createRadialGradient(rx, ry, 0, rx, ry, 600);  
    grad.addColorStop(0, '#000');  
    grad.addColorStop(1, 'rgb('+xc+', +(255-xc)+', '+yc+')');  
  
    ctx.fillStyle = grad;  
    ctx.fillRect(0, 0, 600, 600);  
};
```

Re-render the
gradient

<http://html5demos.com/canvas-grad>

```
body.onmousemove = function (event) {  
    var width = window.innerWidth,  
        height = window.innerHeight,  
        x = event.clientX,  
        y = event.clientY,  
        rx = 600 * x / width,  
        ry = 600 * y / width;
```

```
    var xc = parseInt(256 * x / width);
```

```
    var yc = parseInt(256 * y / height);
```

```
    grad = ctx.createRadialGradient(xc, yc, 600);
```

```
    grad.addColorStop(0, '#000');
```

```
    grad.addColorStop(1, 'rgb('+xc+', '+yc+', '+yc+')');
```

```
    ctx.fillStyle = grad;
```

```
    ctx.fillRect(0, 0, 600, 600);
```

```
};
```

Set the new fill style and refill - the browser handles the hard work

<http://html5demos.com/canvas-grad>


```
body.onmousemove = function (event) {  
    var width = window.innerWidth,  
        height = window.innerHeight,  
        x = event.clientX,  
        y = event.clientY,  
        rx = 600 * x / width,  
        ry = 600 * y / width;  
  
    var xc = parseInt(256 * x / width);  
    var yc = parseInt(256 * y / height);  
  
    grad = ctx.createRadialGradient(rx, ry, 0, rx, ry, 600);  
    grad.addColorStop(0, '#000');  
    grad.addColorStop(1, 'rgb('+xc+', +(255-xc)', '+yc+')');  
  
    ctx.fillStyle = grad;  
    ctx.fillRect(0, 0, 600, 600);  
};
```

<http://html5demos.com/canvas-grad>

```
canvas.toDataURL("image/png");
```

canvas.toDataURL("image/png");

data:image/
png;base64,iVBORw0KGgoAAAANSUHEUgAAAMgAAADICAYAAACTWK6eAAAFxULEQVR4Ae3dQW5jORAEUXvQ97+yez
CzNQpNyPwdIp+XJkVlRTKgheGvz69/fz78IIDAtwT+
+fa3fokAAv8RIIiLgMBAgCADHEsIEMQdQGAgQJABjiUECOIOIDAQIMgAxxICBHEHEBgIEGSAYwkBgrgDCAwECDLAs
YQAQdwBBAYCBB...
fuQfHehf6/8Ik
+4aAYKs8bL7Mg
+zICBLmsc00uE
+4aAYKs8bL7Mg
+zICBLmsc00uESDIGi+7LyNAkMsKN+4aAYKs8bL7MgI//3R3T1m/
7AqdPa5PkLP7Nd2LBAjyIkAvP5sAQc7u13QvEiDIiwC9/
GwCBDm7X909SIAgLwL08rMJEOTsfk33IgGCvAjQy88mQJCz+zXdiwR+/i/pLwba/fLPj7/zPe5fH1+7R3P+BgI
+QTZAdeQ5BAhyTpcm2UCAIBug0vIcAgQ5p0uTbCBAkA1QHxkOAYKc06VJNhAgyAaojjyHAEH06dIkGwgQZANUR55D
gCDndGmSDQQIsgGqI88hQJBzujTJBgIE2QDVkecQIMg5XZpkAwGcbIDqyHMIEOScLk2ygQBBNkB15DkECHJOlybZQ
IAgG6A68hwCBDmnS5NsIECQDVAdeQ4BgpzTpUk2ECDIBqiOPicAQc7p0iQbCBBkA1RHnkOAIod0aZINBAiyAaojzy
FAkHO6NMkGAgTZANWR5xC47ununrJ+zuV9YhKfIE9Q9h5vS4Agblud4E8QIMgTlL3H2xIgyNtWJ/
gTBajyBGXv8bYECpk21Qn+BAGCPEHze7wtAYK8bXWCP0GAIE9Q9h5vS+C6v6TXm/r801/j/vHla9y/vRo
+Qb7F4pcI/E
+AIG4CAgMBggxwLCFAEHcAgYEAQQY4lhAgidUawECAIAMcSwgQxB1AYCBAkAG0JQQI4g4gMBAgyADHEgIEcQcQGAg
QZIBjCQGCuAMIDAQIMsCxhABB3AEEBgIEGeBYQoAg7gACAwGCDHASIUAQdwCBgQBBBjiWECCIO4DAQIAGaxxLCBDE
HUBgIECQAY4lBAjidiAwECDIAMcSAGRxBxAYCBBkgGMJAU93j90BT1lvFeITpNWHNDECBIkVIk6LAEFafUgTI0CQW
CHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBI
kVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0C
QWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDEC
BIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI
0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHND
ECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUg
TI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECvwHnaxGSkeUPVAAAAABJRu5ErkJggg==

data:image/png;base64,...

Canvas

+

drawImage

+

Video

=



NG
OPER

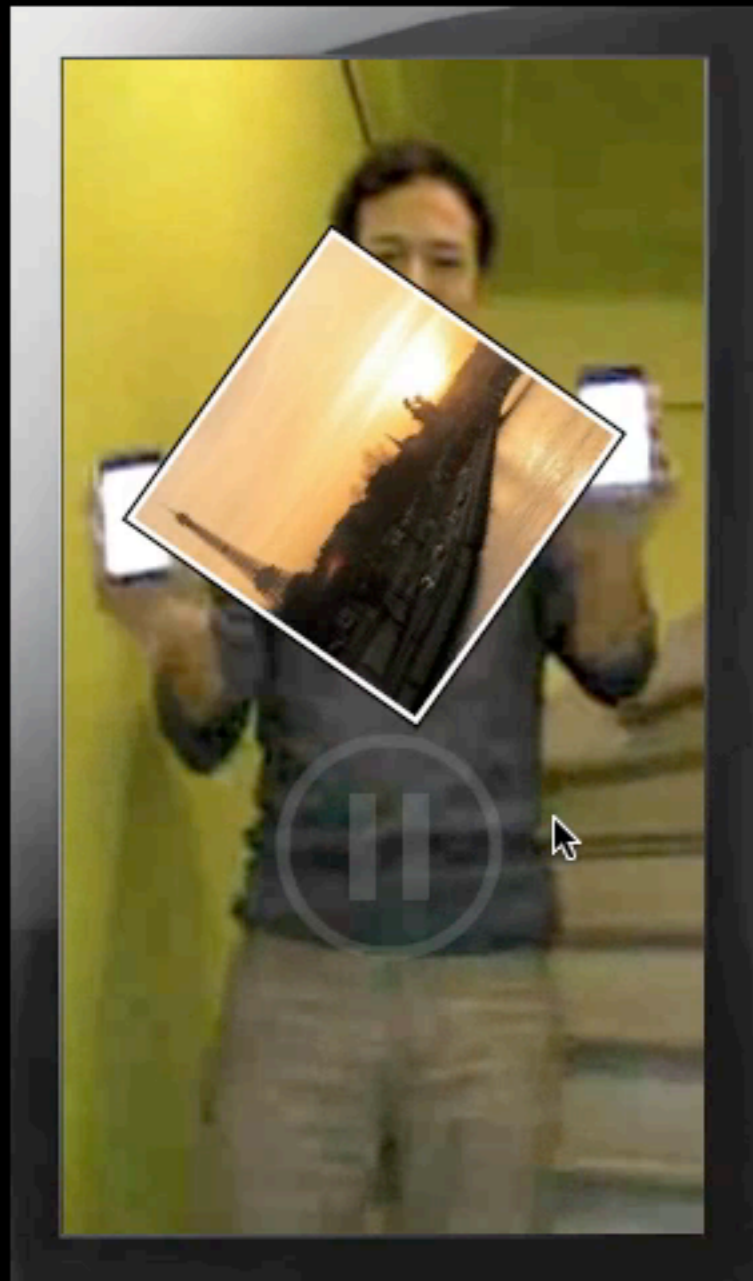
HOUSE OF
Frankenstein
THE FEAR STAR



ING
OPER

HOUSE OF
MONKI
THE FEAR STAR

Click to play:



Choose a pattern:

Video:



Image:

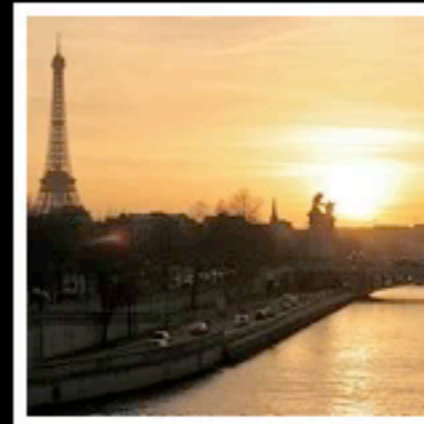
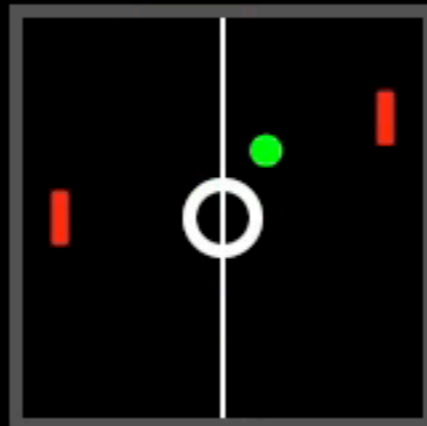


Image:



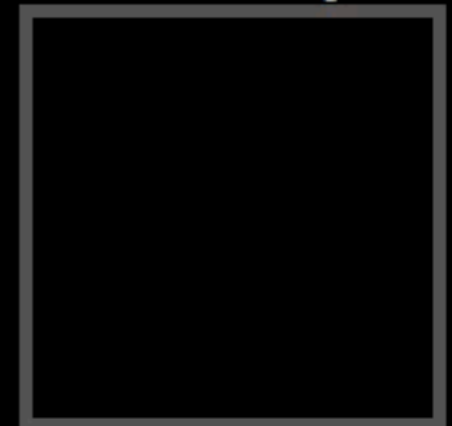
Canvas:



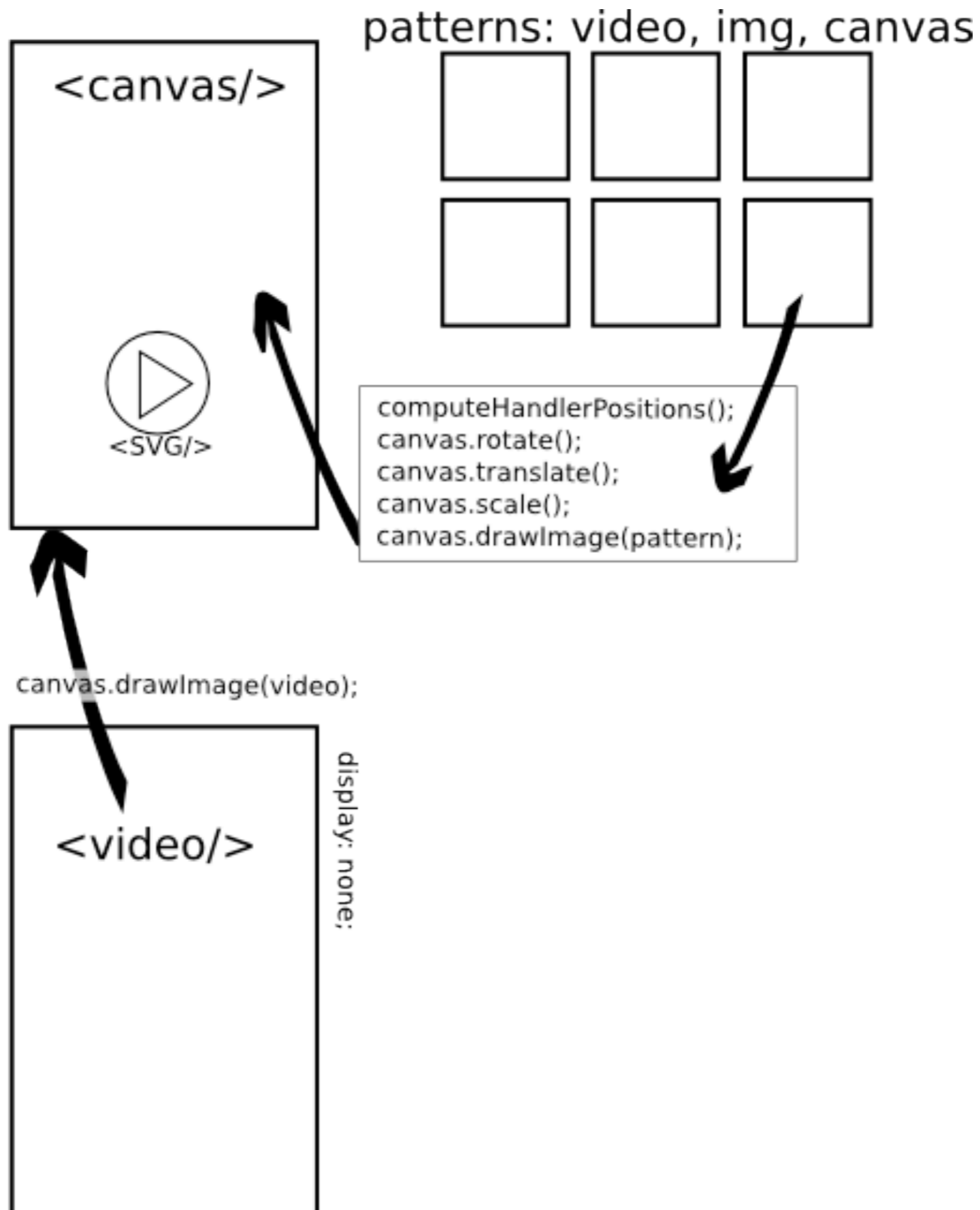
Your text:



Your drawing:



clear 3




```
ctx.translate(canvas.width/2, canvas.height/2);  
ctx.scale(-1, 1);  
ctx.translate(-canvas.width/2, -canvas.height/2);
```

```
ctx.drawImage(  
    video, 0, 0,  
    video.width,  
    video.height,  
    0, 0,  
    canvas.width,  
    canvas.height);
```

<http://html5demos.com/video-canvas>

```
ctx.translate(canvas.width/2, canvas.height/2);  
ctx.scale(-1, 1);  
ctx.translate(-canvas.width/2, -canvas.height/2);
```

```
ctx.drawImage(  
  video, 0, 0,  
  video.width,  
  video.height,  
  0, 0,  
  canvas.width,  
  canvas.height);
```



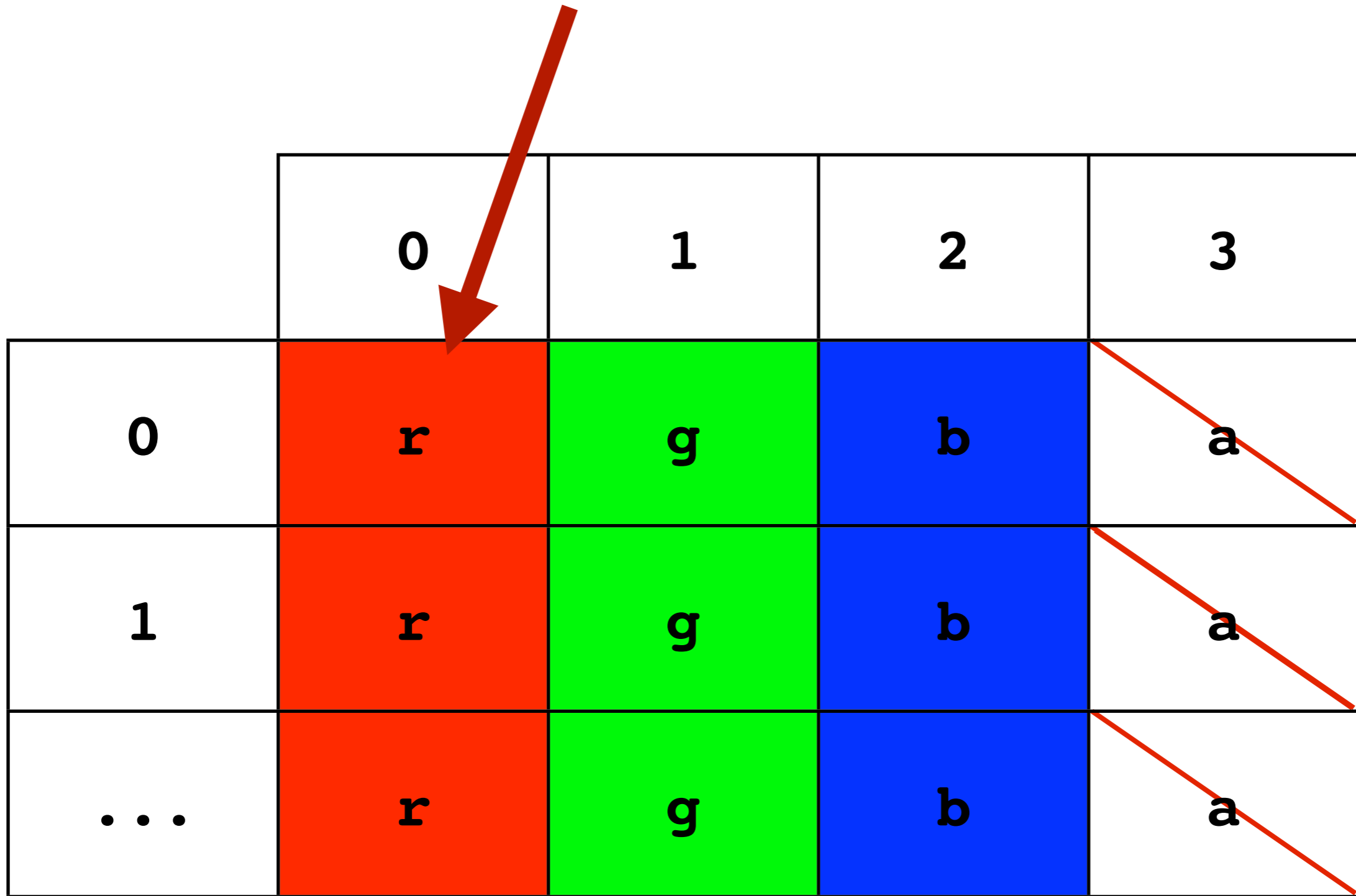
<http://html5demos.com/video-canvas>

```
ctx.getImageData(0, 0, w, h);
```

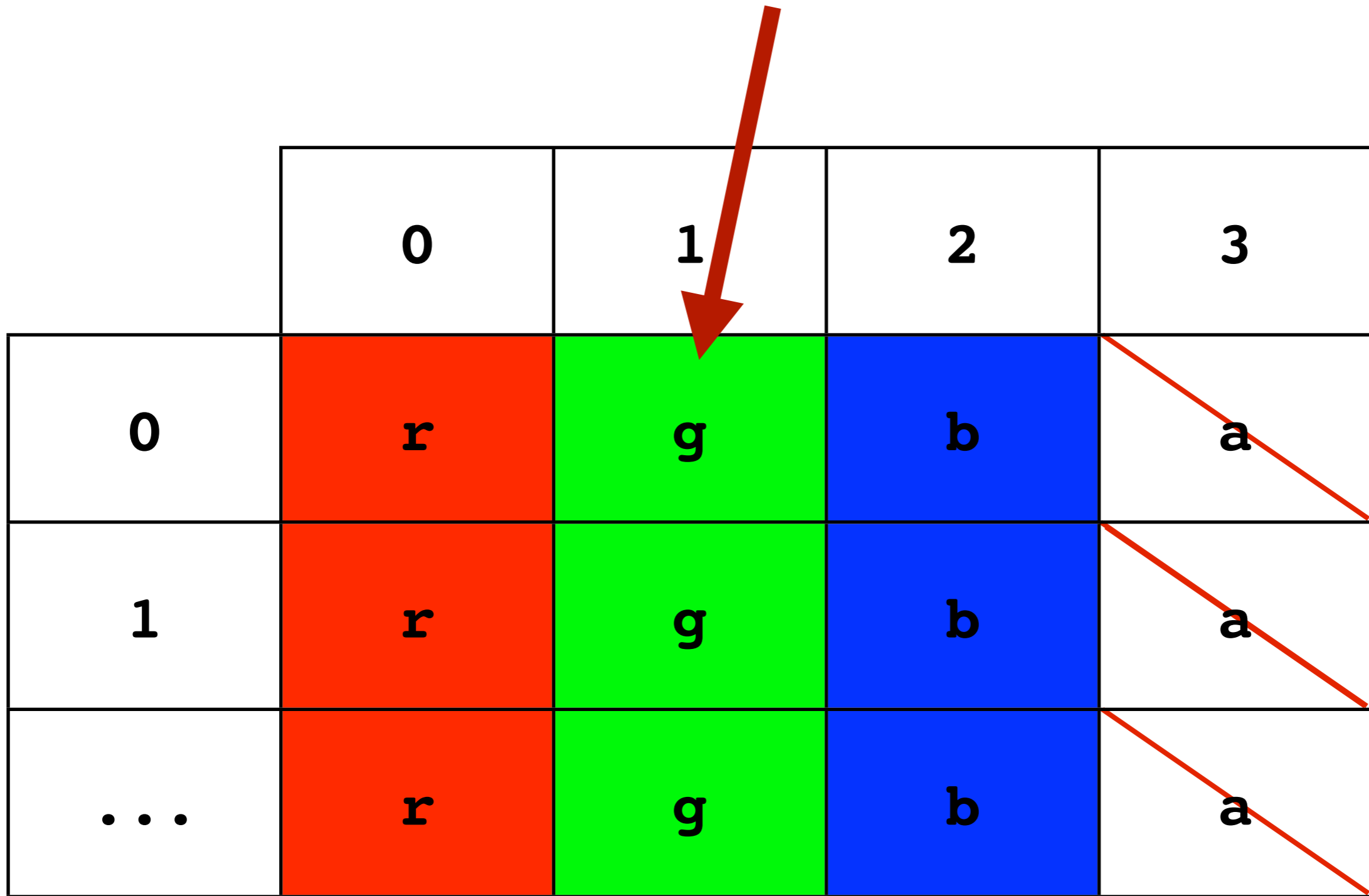
```
ctx.getImageData(0, 0, w, h);
```

	0	1	2	3
0	r	g	b	a
1	r	g	b	a
...	r	g	b	a

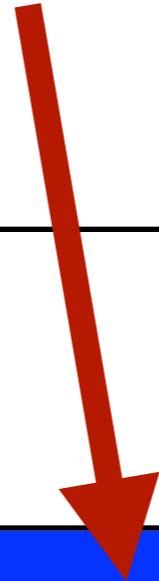
```
pixels.data[i * 4 + 0];
```



```
pixels.data[i * 4 + 1];
```

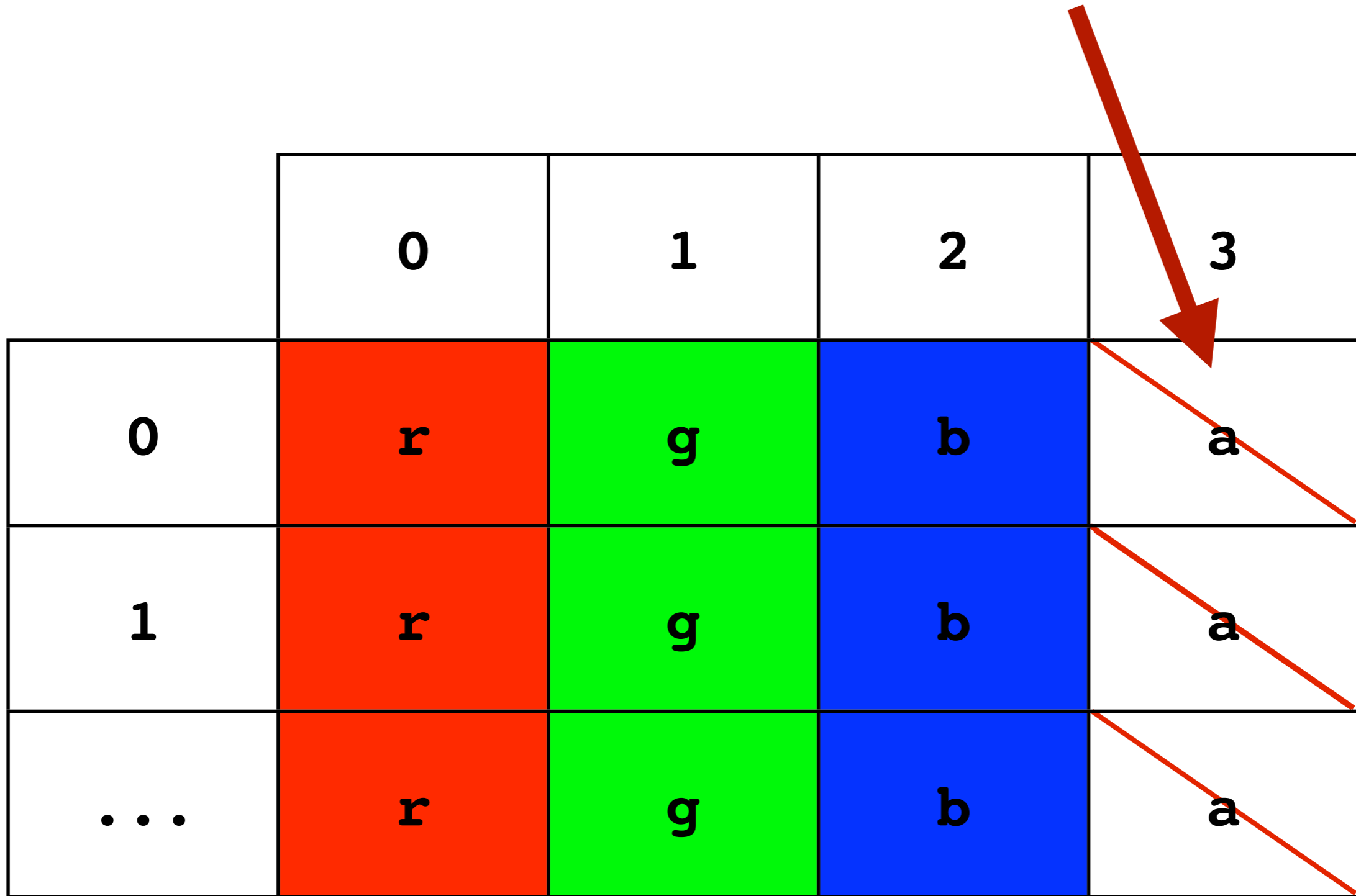


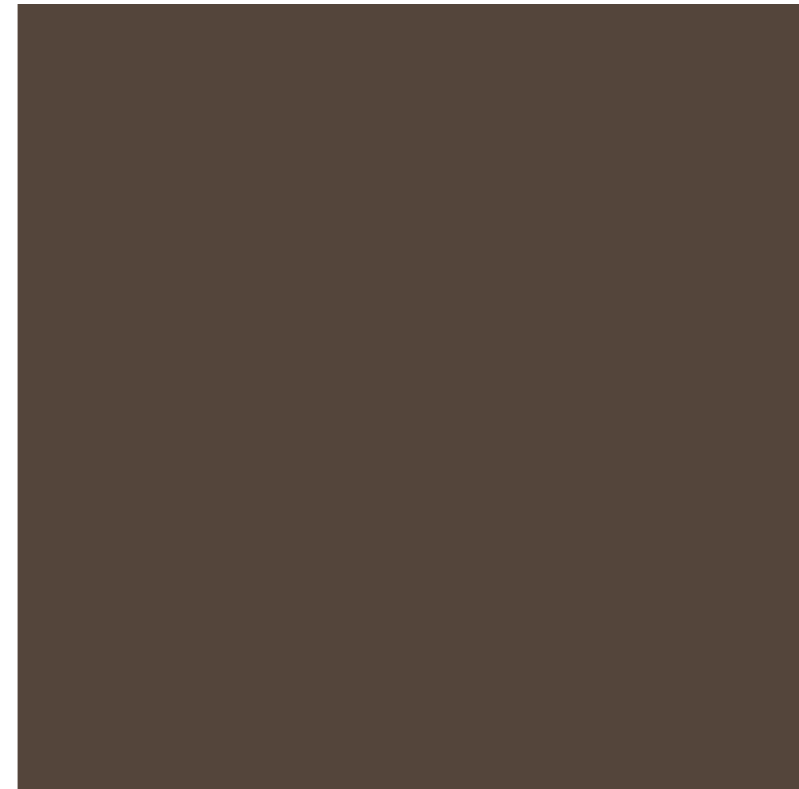
```
pixels.data[i * 4 + 2];
```



	0	1	2	3
0	r	g	b	a
1	r	g	b	a
...	r	g	b	a

```
pixels.data[i * 4 + 3];
```





```
for (i = 0; i < pixels.data.length / 4; i++) {  
    totals.r += pixels.data[i * 4 + 0]; // r  
    totals.g += pixels.data[i * 4 + 1]; // g  
    totals.b += pixels.data[i * 4 + 2]; // b  
}
```

```
var r = parseInt(totals.r / (w*h)),  
    g = parseInt(totals.g / (w*h)),  
    b = parseInt(totals.b / (w*h)),  
    rgb = [r, g, b].join(',');
```


SVG



Native SVG in Firefox...

...using Flash!

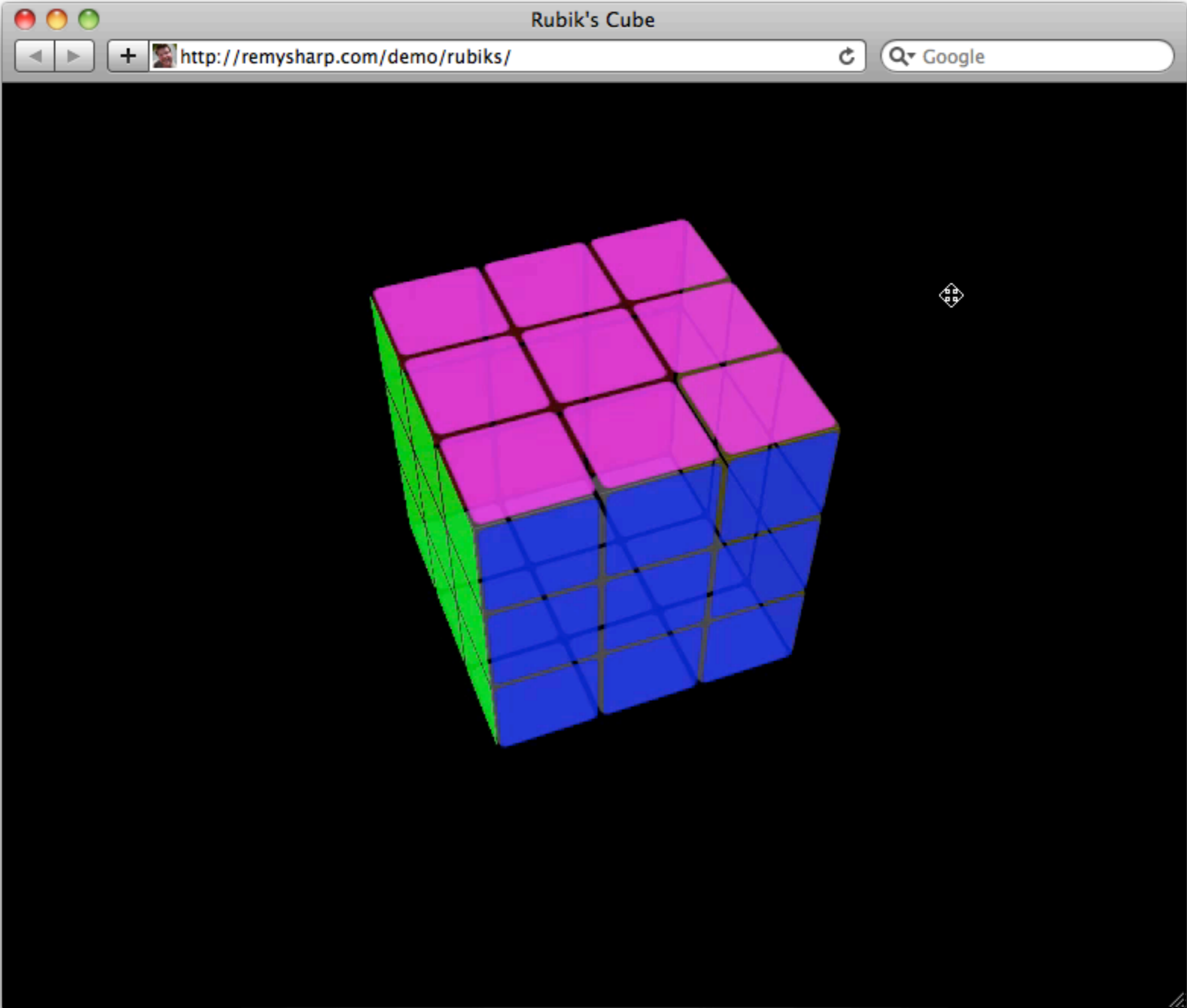
segue: just like
screaming monkey

3D



CSS

Yeah, 3D CSS.



```
#canvas {
  -webkit-perspective: 800;
  -webkit-perspective-origin: 50% 20em;
}

#rubiks {
  -webkit-transform-style: preserve-3d;
  -webkit-transform: rotateX(15deg) rotateY(15deg);
}

#rubiks .face1 {
  -webkit-transform: rotateX(90deg) translateZ
(10.8em);
}

#rubiks .face2 { /* front */
  -webkit-transform: translateZ(10.8em);
}

#rubiks .face3 {
  -webkit-transform: rotateY(90deg) translateZ
(10.8em);
```

WebGL



Thank you for testing WebKit!

Quick Links:

- [WebKit.org](#)
- [WebKit Blog](#)
- [Nightly Builds](#)
- [Contact Us](#)
- [Mailing List](#)

Individuals like yourself who download and test the latest nightly builds of WebKit help us to create the highest quality product. For that, we thank you.

How can I help?

The number one way you can help is to [report issues](#) you encounter while using WebKit.

Tester Center

Bug Reporting Tips

A guide to writing a good bugreport for the developers.

Bugs Needing Reduction

Bugs that need a reduced testcase made.

Unconfirmed Bugs

Bugs that need a clear list of steps for reproduction.

How to Reduce a Bug

A guide to making a good testcase that will help us.

Bug Life Cycle

Describes the life cycle of a bug in the WebKit project.

Developer Center

Bugs With Reductions

Bugs that have reduced testcases attached.

High Priority Bugs

The most important bugs to fix.

Forgotten Patches

These bugs are good starting points.

Patches awaiting Review

Patches that are awaiting review.

Approved Patches

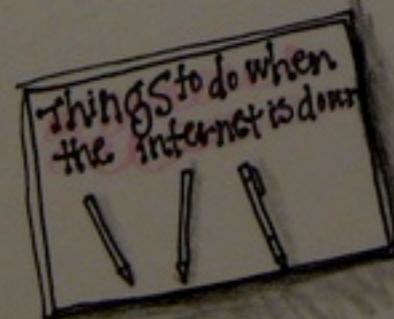
Patches with positive reviews that need to be landed.

Mobile?

*WebGL in Firefox
on Nokia N900*

Offline

Things to do when the internet is down:



Dear Barb

Offline Apps

- **Application cache / manifest**
- **Events: offline, online**
- **navigator.onLine property**

Offline Apps

- **Application cache / manifest**
- **Events: offline, online**

remysharp.com/demo/... 

Google



<http://icanhaz.com/rubiks>



11:24



Rubik's Cube

remysharp.com/demo/... 

Google



<http://icanhaz.com/rubiks>

Using a Manifest

```
<!DOCTYPE html>  
<html manifest="my.manifest">  
<body>  
<!-- my page -->  
</body>  
</html>
```

Using a Manifest

```
<!DOCTYPE html>  
<html manifest="my.manifest">  
<body>  
<!-- my page -->  
</body>  
</html>
```

my.manifest

CACHE MANIFEST

app.html

css/style.css

js/app.js

#version 13

The Manifest

1. Serve as text/manifest, by adding to `mime.types`:

`text/cache-manifest manifest`

The Manifest

2. First line must be:

CACHE MANIFEST

The Manifest

- 3. Including page is implicitly included in the cache.**

The Manifest

4. Two further namespaces:
NETWORK & FALLBACK

FALLBACK:

/ offline.html

The Manifest

5. Include some versioning to cache bust your manifest

```
# version 16
```

The process



Browser: request



Browser: request

```
GET / HTTP/1.1 200 4085 "-" Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9
] "GET / HTTP/1.1" 200 4084 "-" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /snapbird.css HTTP/1.1" 200 5809 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /images/header.jpg HTTP/1.1" 200 24716 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /images/header.jpg HTTP/1.1" 200 24716 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /twitter-search.js HTTP/1.1" 200 3040 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /images/background.jpg HTTP/1.1" 200 635 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /snapbird.js?2009-11-01 HTTP/1.1" 200 985 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /images/logo.png HTTP/1.1" 200 22512 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
```

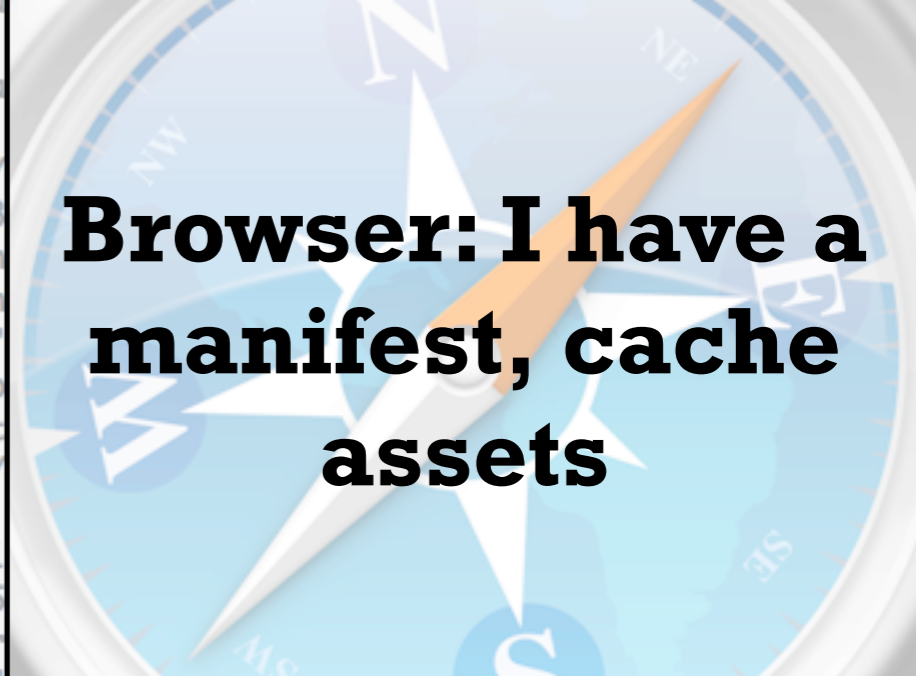
Server: serve all



Browser: request

```
GET / HTTP/1.1 200 4085 "-" Mozilla/5.0 (Macintosh; Intel Mac OS X 10_7_0; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9
] "GET / HTTP/1.1" 200 4084 "-" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_7_0; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /snapbird.css HTTP/1.1" 200 5809 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_7_0; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /images/header.jpg HTTP/1.1" 200 24716 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_7_0; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /images/background.jpg HTTP/1.1" 200 635 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_7_0; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /twitter-search.js HTTP/1.1" 200 3040 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_7_0; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
] "GET /snapbird.js?2009-11-01 HTTP/1.1" 200 985 "http://www.snapbird.com/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_7_0; rv:3.0) AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9"
```

Server: serve all



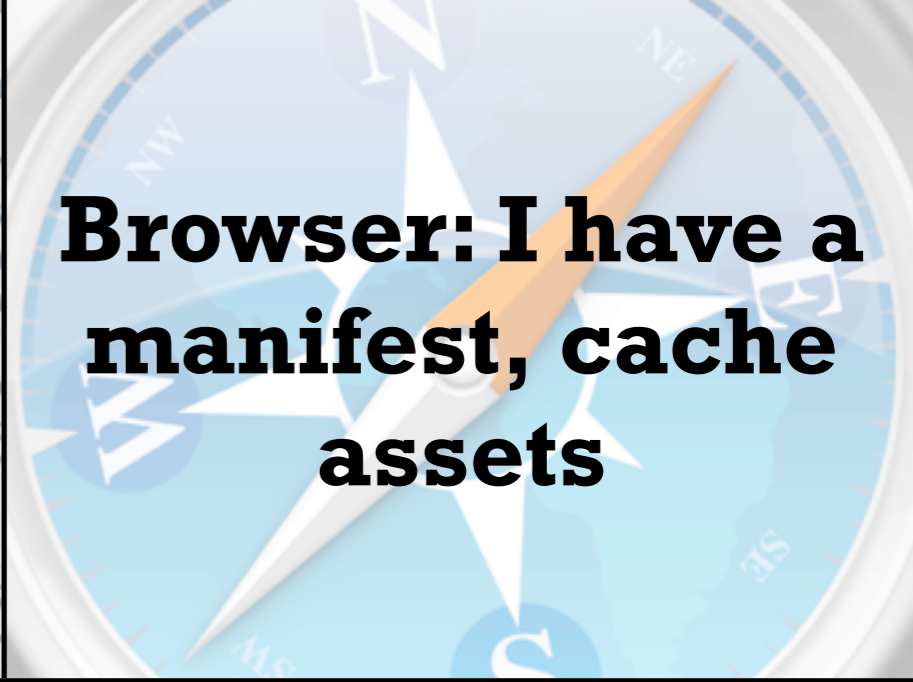
Browser: I have a manifest, cache assets



Browser: request

```
Version/4.0.3 Safari/531.9
] "GET / HTTP/1.1" 200 4084 "-" "Mozilla/5.0 (Mac
Version/4.0.3 Safari/531.9"
] "GET /snapbird.css HTTP/1.1" 200 5809 "http://
leWebKit/531.9 (KHTML, like Gecko) Version/4.0.3
] "GET /images/header.jpg HTTP/1.1" 200 24716 "h
(us) AppleWebKit/531.9 (KHTML, like Gecko) Versio
] "GET /images/button-bg.gif HTTP/1.1" 200 864 "
(us) AppleWebKit/531.9 (KHTML, like Gecko) Versio
] "GET /twitter-search.js HTTP/1.1" 200 3040 "ht
s) AppleWebKit/531.9 (KHTML, like Gecko) Version/
] "GET /images/background.jpg HTTP/1.1" 200 635
n-us) AppleWebKit/531.9 (KHTML, like Gecko) Versi
] "GET /snapbird.js?2009-11-01 HTTP/1.1" 200 985
en-us) AppleWebKit/531.9 (KHTML, like Gecko) Ver
] "GET /images/manifest HTTP/1.1" 200 22512 "
```

Server: serve all



**Browser: I have a
manifest, cache
assets**

```
Version/4.0.3 Safari/531.9"
] "GET / HTTP/1.1" 200 4084 "-" "Mozilla/5.0 (Ma
Version/4.0.3 Safari/531.9"
] "GET /snapbird.css HTTP/1.1" 200 5809 "http://
leWebKit/531.9 (KHTML, like Gecko) Version/4.0.3
] "GET /images/header.jpg HTTP/1.1" 200 24716 "h
(us) AppleWebKit/531.9 (KHTML, like Gecko) Version
] "GET /images/button-bg.gif HTTP/1.1" 200 864 "
(us) AppleWebKit/531.9 (KHTML, like Gecko) Versio
] "GET /twitter-search.js HTTP/1.1" 200 3040 "ht
s) AppleWebKit/531.9 (KHTML, like Gecko) Version/
] "GET /images/background.jpg HTTP/1.1" 200 635
n-us) AppleWebKit/531.9 (KHTML, like Gecko) Versi
] "GET /snapbird.js?2009-11-01 HTTP/1.1" 200 985
en-us) AppleWebKit/531.9 (KHTML, like Gecko) Ver
] "GET /images/manifest HTTP/1.1" 200 22512 "
```

**Server: serve
manifest assets**



Browser: request

```
Version/4.0.3 Safari/531.9  
] "GET / HTTP/1.1" 200 4084 "-" "Mozilla/5.0 (Mac  
Version/4.0.3 Safari/531.9"  
] "GET /snapbird.css HTTP/1.1" 200 5809 "http://  
leWebKit/531.9 (KHTML, like Gecko) Version/4.0.3  
] "GET /images/header.jpg HTTP/1.1" 200 24716 "h  
us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /images/button-bg.gif HTTP/1.1" 200 864 "  
-us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /twitter-search.js HTTP/1.1" 200 3040 "ht  
s) AppleWebKit/531.9 (KHTML, like Gecko) Version/  
] "GET /images/background.jpg HTTP/1.1" 200 635  
n-us) AppleWebKit/531.9 (KHTML, like Gecko) Versi  
] "GET /snapbird.js?2009-11-01 HTTP/1.1" 200 985  
en-us) AppleWebKit/531.9 (KHTML, like Gecko) Ver  
] "GET /images/favicon.ico HTTP/1.1" 200 92512 "
```

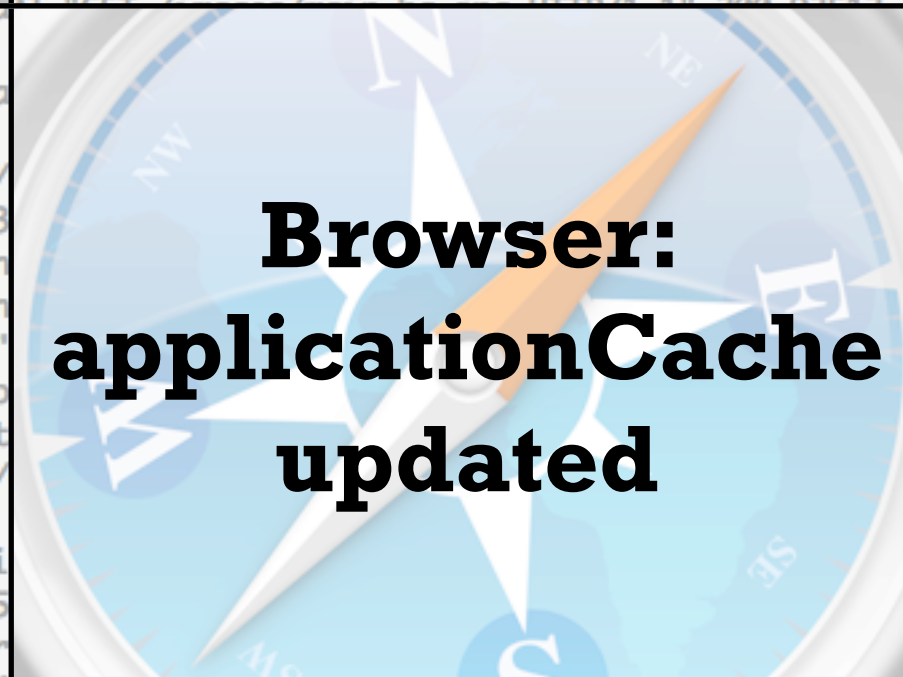
Server: serve all



**Browser: I have a
manifest, cache
assets**

```
Version/4.0.3 Safari/531.9"  
] "GET / HTTP/1.1" 200 4084 "-" "Mozilla/5.0 (Ma  
Version/4.0.3 Safari/531.9"  
] "GET /snapbird.css HTTP/1.1" 200 5809 "http://  
leWebKit/531.9 (KHTML, like Gecko) Version/4.0.3  
] "GET /images/header.jpg HTTP/1.1" 200 24716 "h  
us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /images/button-bg.gif HTTP/1.1" 200 864 "  
-us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /twitter-search.js HTTP/1.1" 200 3040 "ht  
s) AppleWebKit/531.9 (KHTML, like Gecko) Version/  
] "GET /images/background.jpg HTTP/1.1" 200 635  
n-us) AppleWebKit/531.9 (KHTML, like Gecko) Versi  
] "GET /snapbird.js?2009-11-01 HTTP/1.1" 200 985  
en-us) AppleWebKit/531.9 (KHTML, like Gecko) Ver  
] "GET /images/favicon.ico HTTP/1.1" 200 92512 "
```

**Server: serve
manifest assets**



**Browser:
applicationCache
updated**



Browser: request

```
Version/4.0.3 Safari/531.9  
] "GET / HTTP/1.1" 200 4084 "-" "Mozilla/5.0 (Mac  
Version/4.0.3 Safari/531.9"  
] "GET /snapbird.css HTTP/1.1" 200 5809 "http://  
AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3  
] "GET /images/header.jpg HTTP/1.1" 200 24716 "h  
(us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /images/button-bg.gif HTTP/1.1" 200 864 "  
(-us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /twitter-search.js HTTP/1.1" 200 3040 "ht  
(s) AppleWebKit/531.9 (KHTML, like Gecko) Version/  
] "GET /images/background.jpg HTTP/1.1" 200 635  
(n-us) AppleWebKit/531.9 (KHTML, like Gecko) Versi  
] "GET /snapbird.js?2009-11-01 HTTP/1.1" 200 985  
(en-us) AppleWebKit/531.9 (KHTML, like Gecko) Ver  
] "GET /images/manifest HTTP/1.1" 200 92512 "
```

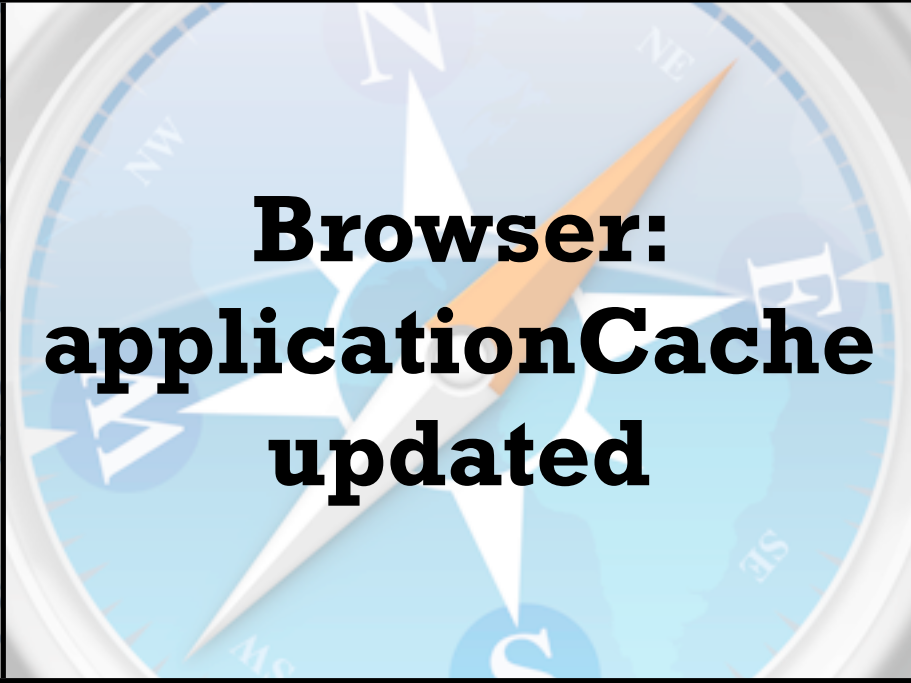
Server: serve all



**Browser: I have a
manifest, cache
assets**

```
Version/4.0.3 Safari/531.9"  
] "GET / HTTP/1.1" 200 4084 "-" "Mozilla/5.0 (Mac  
Version/4.0.3 Safari/531.9"  
] "GET /snapbird.css HTTP/1.1" 200 5809 "http://  
AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3  
] "GET /images/header.jpg HTTP/1.1" 200 24716 "h  
(us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /images/button-bg.gif HTTP/1.1" 200 864 "  
(-us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /twitter-search.js HTTP/1.1" 200 3040 "ht  
(s) AppleWebKit/531.9 (KHTML, like Gecko) Version/  
] "GET /images/background.jpg HTTP/1.1" 200 635  
(n-us) AppleWebKit/531.9 (KHTML, like Gecko) Versi  
] "GET /snapbird.js?2009-11-01 HTTP/1.1" 200 985  
(en-us) AppleWebKit/531.9 (KHTML, like Gecko) Ver  
] "GET /images/manifest HTTP/1.1" 200 92512 "
```

**Server: serve
manifest assets**



**Browser:
applicationCache
updated**



Browser: reload



Browser: request

```
GET / HTTP/1.1 200 4085 Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_2; rv:42.0) AppleWebKit/537.53.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET / HTTP/1.1 200 4084 Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_2; rv:42.0) AppleWebKit/537.53.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /snapbird.css HTTP/1.1 200 5809 http://localhost:8080/snapbird.css AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /images/header.jpg HTTP/1.1 200 24716 http://localhost:8080/images/header.jpg AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /images/button-bg.gif HTTP/1.1 200 864 http://localhost:8080/images/button-bg.gif AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /twitter-search.js HTTP/1.1 200 3040 http://localhost:8080/twitter-search.js AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /images/background.jpg HTTP/1.1 200 635 http://localhost:8080/images/background.jpg AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /snapbird.js?2009-11-01 HTTP/1.1 200 985 http://localhost:8080/snapbird.js?2009-11-01 AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9
```

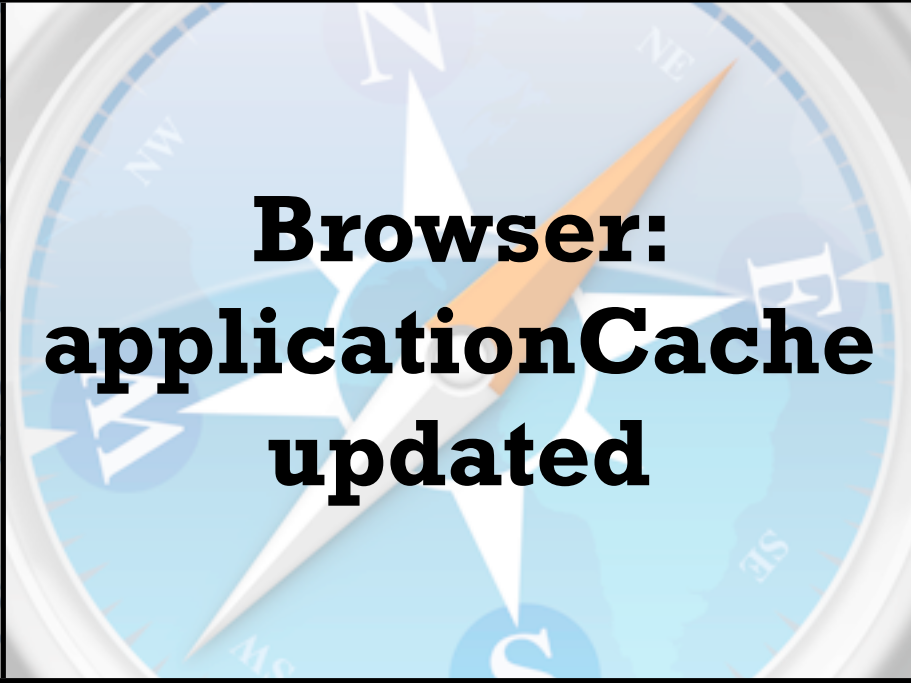
Server: serve all



Browser: I have a manifest, cache assets

```
GET / HTTP/1.1 200 4085 Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_2; rv:42.0) AppleWebKit/537.53.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET / HTTP/1.1 200 4084 Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_2; rv:42.0) AppleWebKit/537.53.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /snapbird.css HTTP/1.1 200 5809 http://localhost:8080/snapbird.css AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /images/header.jpg HTTP/1.1 200 24716 http://localhost:8080/images/header.jpg AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /images/button-bg.gif HTTP/1.1 200 864 http://localhost:8080/images/button-bg.gif AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /twitter-search.js HTTP/1.1 200 3040 http://localhost:8080/twitter-search.js AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /images/background.jpg HTTP/1.1 200 635 http://localhost:8080/images/background.jpg AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9  
GET /snapbird.js?2009-11-01 HTTP/1.1 200 985 http://localhost:8080/snapbird.js?2009-11-01 AppleWebKit/531.9 (KHTML, like Gecko) Version/4.0.3 Safari/531.9
```

Server: serve manifest assets



Browser: applicationCache updated



Browser: reload



Browser: serve locally



Browser: request

```
Version/4.0.3 Safari/531.9  
] "GET / HTTP/1.1" 200 4084 "-" "Mozilla/5.0 (Mac  
Version/4.0.3 Safari/531.9"  
] "GET /snapbird.css HTTP/1.1" 200 5809 "http://  
leWebKit/531.9 (KHTML, like Gecko) Version/4.0.3  
] "GET /images/header.jpg HTTP/1.1" 200 24716 "h  
(us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /images/button-bg.gif HTTP/1.1" 200 864 "  
(us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /twitter-search.js HTTP/1.1" 200 3040 "ht  
(s) AppleWebKit/531.9 (KHTML, like Gecko) Version/  
] "GET /images/background.jpg HTTP/1.1" 200 635  
(n-us) AppleWebKit/531.9 (KHTML, like Gecko) Versi  
] "GET /snapbird.js?2009-11-01 HTTP/1.1" 200 985  
(en-us) AppleWebKit/531.9 (KHTML, like Gecko) Ver
```

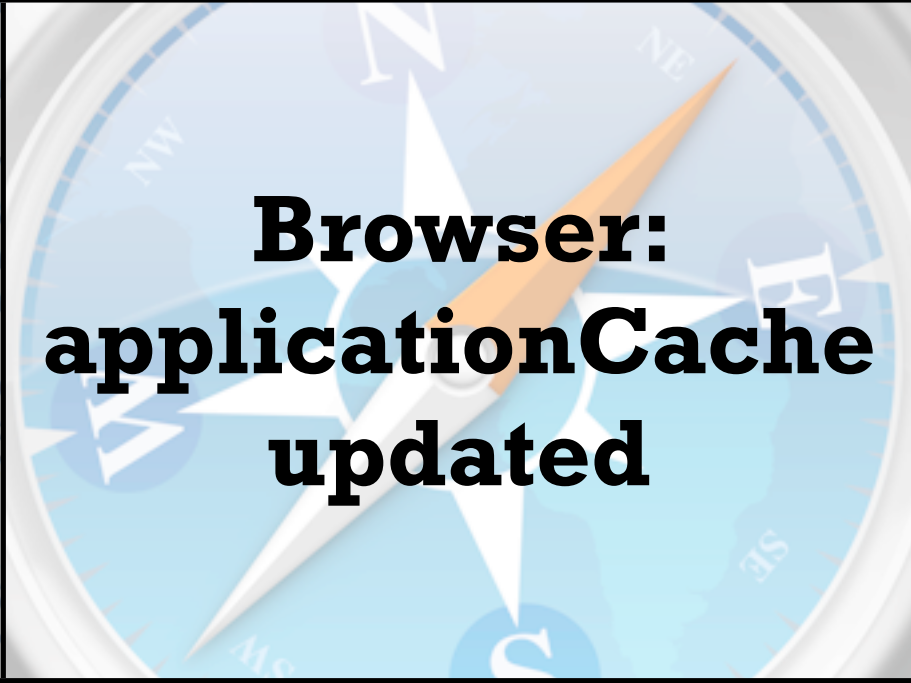
Server: serve all



**Browser: I have a
manifest, cache
assets**

```
Version/4.0.3 Safari/531.9  
] "GET / HTTP/1.1" 200 4084 "-" "Mozilla/5.0 (Ma  
Version/4.0.3 Safari/531.9"  
] "GET /snapbird.css HTTP/1.1" 200 5809 "http://  
leWebKit/531.9 (KHTML, like Gecko) Version/4.0.3  
] "GET /images/header.jpg HTTP/1.1" 200 24716 "h  
(us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /images/button-bg.gif HTTP/1.1" 200 864 "  
(us) AppleWebKit/531.9 (KHTML, like Gecko) Versio  
] "GET /twitter-search.js HTTP/1.1" 200 3040 "ht  
(s) AppleWebKit/531.9 (KHTML, like Gecko) Version/  
] "GET /images/background.jpg HTTP/1.1" 200 635  
(n-us) AppleWebKit/531.9 (KHTML, like Gecko) Versi  
] "GET /snapbird.js?2009-11-01 HTTP/1.1" 200 985  
(en-us) AppleWebKit/531.9 (KHTML, like Gecko) Ver
```

**Server: serve
manifest assets**



**Browser:
applicationCache
updated**



Browser: reload



**Browser: serve
locally**



**Browser: only
request manifest
file**



Browser: request

```
GET / HTTP/1.1 200 4084 "-" Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_2; rv:42.0) Gecko/20100101 Firefox/42.0
```

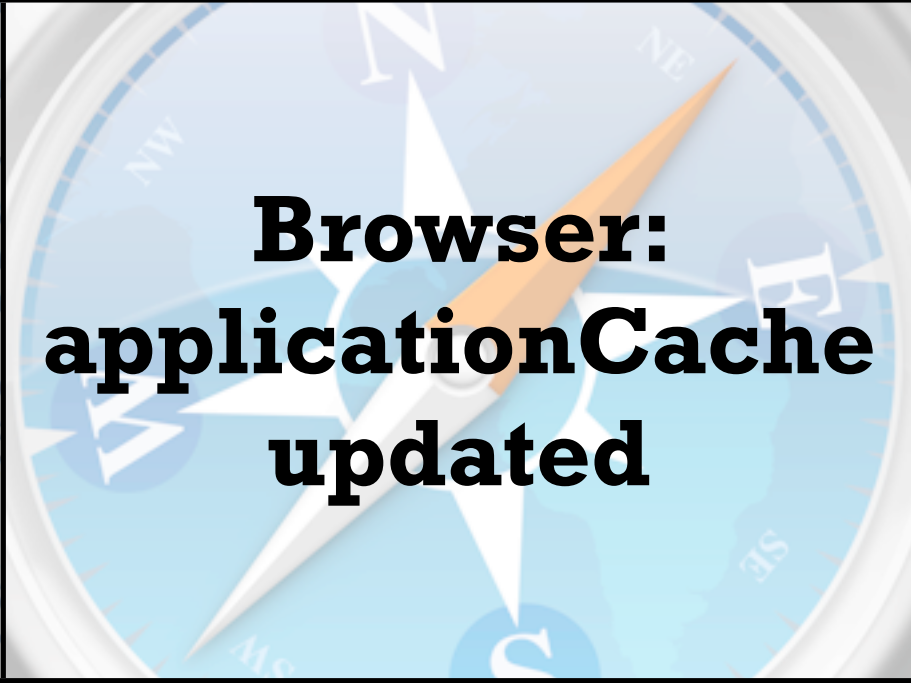
Server: serve all



Browser: I have a manifest, cache assets

```
GET / HTTP/1.1 200 4084 "-" Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_2; rv:42.0) Gecko/20100101 Firefox/42.0
```

Server: serve manifest assets



Browser: applicationCache updated



Browser: reload



Browser: serve locally

```
GET / HTTP/1.1 200 4084 "-" Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_2; rv:42.0) Gecko/20100101 Firefox/42.0
```

Browser: only request manifest file

```
GET / HTTP/1.1 200 4084 "-" Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_2; rv:42.0) Gecko/20100101 Firefox/42.0
```

Server: 304 Not Modified

Problem:

Change of content

requires 2 refreshes

Browser:

Server: serve all

**Browser: I have a
manifest, cache
assets**

**Server: serve
manifest asset**

**Browser:
applicationCache
updated**

Browser: reload



**Browser: serve
locally**

**Browser: only
request manifest
file**

**Server: 304 Not
Modified**


```
applicationCache.onUpdateReady =  
function () {  
    applicationCache.swapCache();  
    notice('reload');  
};
```

```
window.onOnline =  
function () {  
    // fire an update to the cache  
    applicationCache.update();  
};
```

A row of seven spools of thread in various colors: orange, green, yellow, purple, blue, and two shades of green. The spools are arranged in a slightly descending line from left to right. The threads are wound around dark metal bobbins. The background is a dark, reflective surface, and the text 'Web Workers' is overlaid in the center in a large, white, bold font.

Web Workers

- **'Threads'**

- **"Threads"**

- **Sandboxed**

- **"Threads"**
- **Sandboxed**
- **Debugging can be tricky**

HTML5 Demo: worker reference point

http://html5demos.com/non-worker


Google



Non Worker (for reference)

Canvas is running whilst an prime number finder runs - this will cause your browser to hang

Prime found: 2363741

start worker



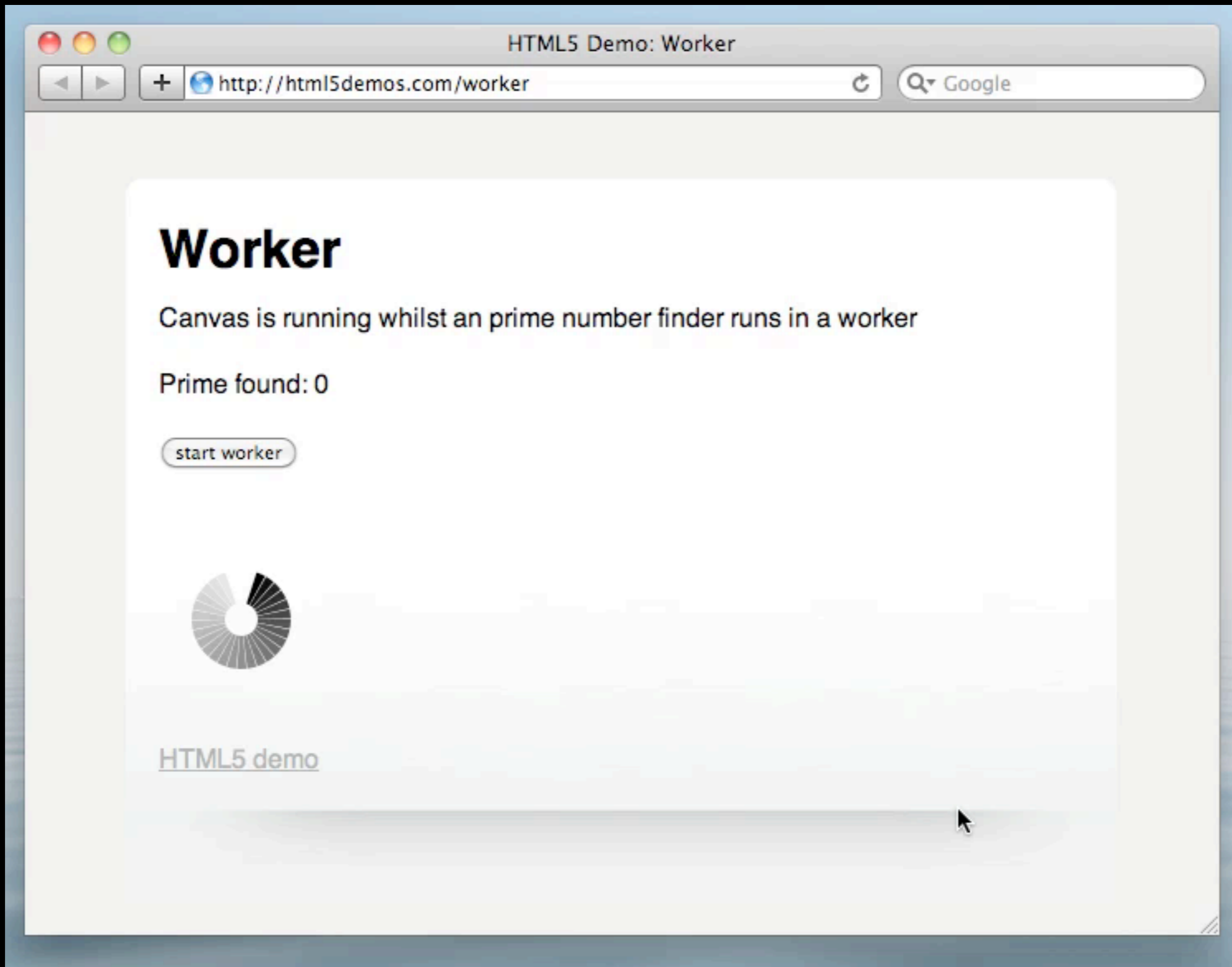


Slow Script

Safari is no longer responding because of a script on the webpage "HTML5 Demo: worker reference point" (<http://html5demos.com/non-worker>). Do you want to stop running the script, or let it continue?

Stop Continue

[HTML5 demo](#)



<http://html5demos.com/worker>

app.html

```
var w = new Worker('worker.js');
```


app.html

```
var w = new Worker('worker.js');
```

```
w.onmessage = function (event) {  
    alert("msg: " + event.data);  
};
```

app.html

```
var w = new Worker('worker.js');
```

```
w.onmessage = function (event) {  
    alert("msg: " + event.data);  
};
```

```
w.postMessage('run');
```

worker.js

```
onmessage = function (event) {  
  if (event.data == 'run') {  
    run();  
  }  
};
```

```
function run() {  
  var n = 1;  
  search: while (running) {  
    n += 1;  
    for (var i = 2; i <= Math.sqrt(n); i += 1)  
      if (n % i == 0)  
        continue search;  
    // found a prime!  
    postMessage(n);  
  }  
}
```

worker.js

```
onmessage = function (event) {  
  if (event.data == 'run') {  
    run();  
  }  
};
```

```
function run() {  
  var n = 1;  
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      if (n % i == 0)  
        continue search;  
    // found a prime!  
    postMessage(n);  
  }  
}
```

worker.js

```
onmessage = function (event) {  
  if (event.data == 'run') {  
    run();  
  }  
};
```

```
function run() {  
  var n = 1;  
  search: while (running) {  
    n += 1;  
    for (var i = 2; i <= Math.sqrt(n); i += 1)  
      if (n % i == 0)  
        continue search;  
    // found a prime!  
    postMessage(n);  
  }  
}
```

Can dos

- **Spawn more workers**
- **setTimeout/Interval & clear**
- **Access navigator**
- **Error handling onerror**
- **XHR (though responseXML is null)**

Oliver's JS Raytracer

http://nerget.com/rayjs-mt/rayjs.html

Number of Workers: Use ImageData API:

8 workers

Oliver's JS Raytracer

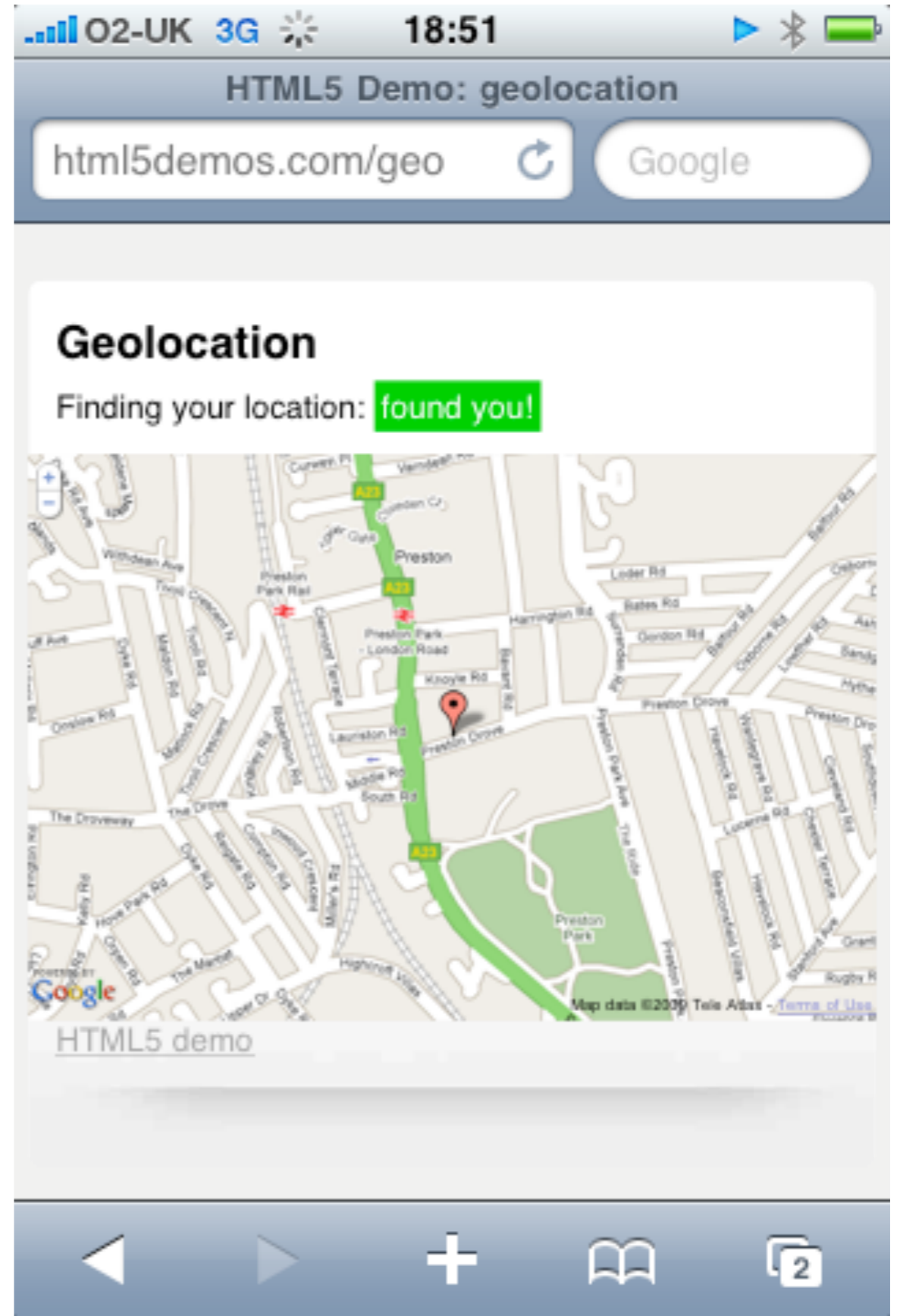
http://nerget.com/rayjs-mt/rayjs.html

Number of Workers: Use ImageData API:

Workers disabled



Geolocation





London

Not always accurate!

```
navigator.geolocation.getCurrentPosition(function (geo) {  
    console.log(geo);  
}, function () {  
    // error handler  
});
```

```
navigator.geolocation.getCurrentPosition(function (geo) {  
  console.log(geo);  
}, function () {  
  // error handler  
});
```

▼ coords

CONTENT_NODE
DOM_OBJECT
EAGER_CLASSINFO
MAIN_THREAD_ONLY
PLUGIN_OBJECT
RESERVED
SINGLETON
THREADSAFE
accuracy
altitude
altitudeAccuracy
classDescription
classID
contractID
flags

undefined latitude=51.500152 longitude=-0.126236 altit

64

8

32

4

16

2147483648

1

2

140000

0

0

"wifi geo position coords object"

null

""

8

0

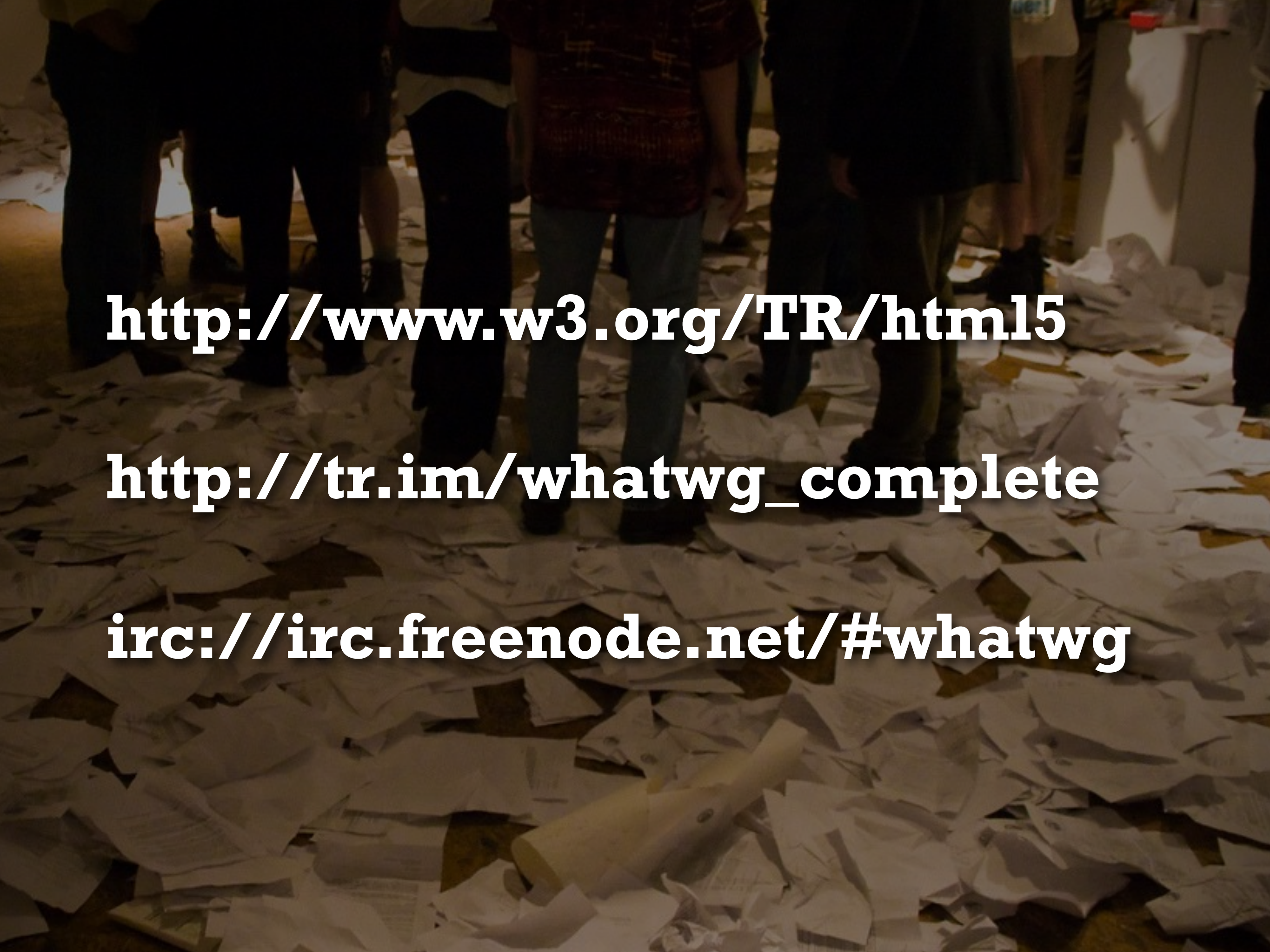
EAGER_CLASSINFO	32
MAIN_THREAD_ONLY	4
PLUGIN_OBJECT	16
RESERVED	2147483648
SINGLETON	1
THREADSAFE	2
accuracy	140000
altitude	0
altitudeAccuracy	0
classDescription	"wifi geo position coords object"
classID	null
contractID	""
flags	8
heading	0
implementationLanguage	2
latitude	51.500152
longitude	-0.126236
speed	0

**Microdata,
datagrids,
XHR2 & upload
progress events**

**History
manager,
drag & drop**

**Accessible
Rich
Internet
Applications**

...and more!

A group of people is standing on a floor completely covered with crumpled white paper. The scene is dimly lit, and the focus is on the lower half of the people and the sea of paper.

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

http://tr.im/whatwg_complete

<irc://irc.freenode.net/#whatwg>



@rem

remy@leftlogic.com

<http://delicious.com/remy.sharp/fb022010>