

Even Faster Web Sites



stevesouders.com/docs/velocity-efws-20101208.pptx

Disclaimer: This content does not necessarily reflect the
opinions of my employer.

flickr.com/photos/ddfic/722634166/



how exciting is web dev?



darn exciting!

Blog:

30 March 2010

950
tweets

retweet

Fred Wilson's 10 Golden Principles of Successful Web Apps

BY KEIR WHITAKER



FUTURE OF
CONFERENCE 14 MAY 2010 DUBLIN

In February 2010 [Fred Wilson](#), a New York-based tech investor, spoke at the annual [Future of Web Apps](#) conference in Dublin, clocking in at just under 30 minutes, looks at his top 10 principles for creating a successful web app. A full transcript is available below.

The 10 Golden Principles of Successful Web Apps



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"First and

foremost, we believe that speed is more than a feature. Speed is the most important feature."

Think Vitamin Radio

Think Vitamin Radio: Episode #5

0:00

Join host [Keir Whitaker](#), [Ryan Carson](#) and [Mike Kus](#) for Think Vitamin Radio, a bi-weekly chat about web design, development and entrepreneurship. Listen to [previous shows](#).



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Recent Articles

Server Delays Experiment: Results

	Distinct Queries/User	Query Refinement	Revenue/User	Any Clicks	Satisfaction	Time to Click (increase in ms)
50ms	-	-	-	-	-	-
200ms	-	-	-	-0.3%	-0.4%	500
500ms	-	-0.6%	-1.2%	-1.0%	-0.9%	1200
1000ms	-0.7%	-0.9%	-2.8%	-1.9%	-1.6%	1900
2000ms	-1.8%	-2.1%	-4.3%	-4.4%	-3.8%	3100

- Means no statistically significant change

- Strong negative impacts
- Roughly linear changes with increasing delay
- Time to Click changed by roughly double the delay

Search Traffic Impact

Type of Delay	Delay (ms)	Experiment Duration (weeks)	Impact on Average Daily Searches Per User
Pre-header	50	4	Not measurable
Pre-header	100	4	-0.20%
Post-header	200	6	-0.29%
Post-header	400	6	-0.59%
Post-ads	200	4	-0.30%

- Increase in abandonment heuristic = less satisfaction
 - Abandonment heuristic measures if a user stops interacting with search engine before they find what they are looking for
 - Active users (users that search more often a priori) are more sensitive

Importance of performance

- Yahoo!: 400 ms slower = 5-9% drop in full-page traffic

Browsing all articles in website optimization

APR

5

19

FIREFOX & PAGE LOAD SPEED – PART II

Blake Cutler speed, website optimization

Let's start with the punchline: By making a few minor tweaks to our top landing pages we can drive an additional 60 million Firefox downloads per year.

60 million is a big number, so let's add a little context. Looking back at our record-breaking download day during the 2010 Firefox 3.6 launch, 100 million unique visitors downloaded Firefox during 10 Download Day campaigns per year.

What are the tweaks?

It comes down just one factor — speed. As it stands, our landing pages can be painfully slow. Take a look:

...shaved 2.2 seconds off the average page load time and increased download conversions by 15.4%!



Recent Posts

Menu Item Usage Study: The 80-20 Rule?

Why People Don't Upgrade Their Browser – Part IV

Automation Study: An Update to the Initial Analysis

Web Analytics and Mozilla Websites

What Are the Most Common Components in Firefox

Menu Item Usage Study: An Update to the Data

Page Load Speed – Part II

Firefox & Page Load Speed – Part I

Firefox's Q1 2010 Analyst Report – State of the Internet

Firefox's Adoption Funnel

Archives

April 2010

March 2010

February 2010

January 2010

December 2009

November 2009

October 2009

September 2009

Performance Summary

- Conversion Rate +7% - 12%
- Page View's +25%
- US SEM Sessions +8%
- Bizrate.co.uk SEM Sessions +120%
- Infrastructure Required (US) -50% (200 vs 402 nodes)
99.71% → 99.94%
- Availability +225%
- Product Velocity \$1,000's → \$80
- Release Cost



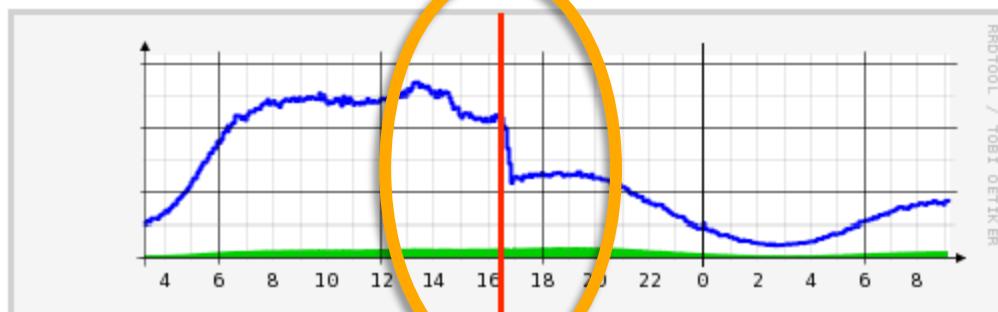
Improving Performance: Gzip

- Payload reduced in some cases 15x (typically in half)

Empty Cache	Primed Cache
804.8K 1HTML/Text	804.8K 1HTML/Text
284.5K 3JavaScript Files	284.5K 3JavaScript Files
73.4K 2Stylesheet Files	73.4K 2Stylesheet Files
8.0K20CSS Images	0.0K20CSS Images
55.0K60Images	0.0K60Images
1225.8KTotal size	1162.8KTotal size
86HTTP requests	86HTTP requests

Empty Cache	Primed Cache
51.6K 1HTML/Text	51.6K 1HTML/Text
0.0K 1XMLHttpRequest	0.0K 1XMLHttpRequest
63.9K 3JavaScript Files	0.0K23CSS Images
15.4K 2Stylesheet Files	0.0K61Images
21.9K23CSS Images	51.6KTotal size
56.3K61Images	86HTTP requests
209.3KTotal size	
91HTTP requests	

- User experience performance improvement **13% - 25%**
- Network outbound traffic cut in half





Using site speed in web search ranking

Friday, April 09, 2010 at 11:00 AM

Webmaster Level: All

You may have heard that here at Google we're obsessed with speed in our products and on the web. As part of that effort, today we're going to talk about how we use site speed in our search algorithms: site speed.

Speeding up websites is important — not just to site owners, but to all internet users. Faster sites create happy users and we've seen in our [internal studies](#) that when a site responds slowly, visitors spend less time there. But faster sites don't just improve user experience; recent data shows that improving site speed also [reduces operating costs](#). Like us, our users place a lot of value in speed — that's why we've decided to take site speed into account in our search rankings. We use a variety of sources to determine the speed of a site relative to other sites.

If you are a site owner, webmaster or a web author, here are some free tools that you can use to evaluate the speed of your site:

- [Page Speed](#), an open source Firefox/Firebug add-on that evaluates the performance of web pages and gives suggestions for improvement.
- [YSlow](#), a free tool from Yahoo! that suggests ways to improve website speed.
- [WebPagetest](#) shows a waterfall view of your pages' load performance plus an optimization checklist.
- In [Webmaster Tools](#), Labs > Site Performance shows the speed of your website as experienced by users around the world as in the chart below. We've also blogged about [site performance](#).

Site performance

This page shows you performance statistics of your site. You can use this information to improve the speed of your site and create a faster experience for your users. [Learn more](#)

Google webmaster tools

stevesouders.com

[« Back to Home](#)[Dashboard](#)[Site configuration](#)[Your site on the web](#)[Diagnostics](#)[Labs](#)[Fetch as Googlebot](#)[Sidewiki](#)[Site performance](#)

Site performance

This page shows you performance statistics of your site. You can use this information to improve the speed of your site and create a faster experience for your users. [Learn more](#)

Performance overview

On average, pages in your site take **1.4 seconds to load** (updated on Apr 13, 2010). This is **faster than 83% of sites**. These estimates are of **medium accuracy** (between 100 and 1000 data points). The chart below shows how your site's average page load time has changed over the last few months. For your reference, it also shows the 20th percentile value across all sites, separating slow and fast load times.



Example pages

These are some example pages from your site and the time that they take to load in a browser (in seconds).

[URL](#)[/hpws/imagemap-no.php](#)[/hpws/expireson.php](#)[Load time](#)

1.1

0.0

Both

- combine scripts**
- combine stylesheets**
- add an Expires header**
- gzip responses**
- put stylesheets at the top**
- put scripts at the bottom**
- avoid CSS expressions**
- make JS and CSS external**
- reduce DNS lookups**
- minify JS and CSS**
- avoid redirects**
- remove duplicate scripts**
- make Ajax cacheable**
- reduce cookie size**
- use cookie-free domains**
- don't scale images**

YSlow

- use CSS sprites**
- use a CDN**
- configure ETags**
- use GET for Ajax requests**
- reduce # of DOM elements**
- no 404s**
- avoid image filters**
- optimize favicon**

Page Speed

- defer loading JS**
- remove unused CSS**
- use efficient CSS selectors**
- optimize images**
- optimize order of CSS & JS**
- shard domains**
- leverage proxy caching**



Wave® music system

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TEST A WEBSITE'S PERFORMANCE

[Analytical Review](#)[Visual Comparison](#)

Test Location

 [Change](#)

Browser

[Advanced Settings ▾](#)

Connection

Number of Tests to Run

Up to 10

Repeat View

 First View and Repeat View First View Only

Keep Test Private

Label

[Test Settings](#)[Auth](#)[Script](#)[Block](#)[Video](#) Capture Video
(Beta)

This is an early stage feature

[START TEST](#)

Provided by



Page Speed Score: 87/100

[Share](#) |
 [Twitter](#)
[Facebook](#)
[LinkedIn](#)
[Email](#)

Web Page Performance Test for www.wikipedia.org/

From: Dulles, VA - IE8 - DSL


[Summary](#) [Details](#) [Performance Review](#) [Page Speed](#) [Content Breakdown](#) [Domains](#) [Screen Shot](#)
[Raw page data](#) - [Raw object data](#)[Export HTTP Archive \(.har\)](#)

	Load Time			First View			Document Complete			Fully Loaded		
	Time	Requests	Bytes In	Time	Requests	Bytes In	Time	Requests	Bytes In	Time	Requests	Bytes In
	1.968s	0.411s	1.671s	1.968s	15	90 KB	1.968s	15	90 KB	1.968s	15	90 KB

	Waterfall	Optimization Checklist	Screen Shot	Video
First View (1.968s)				Filmstrip View - Watch Video - Compare to



1.6s

1.7s

1.8s

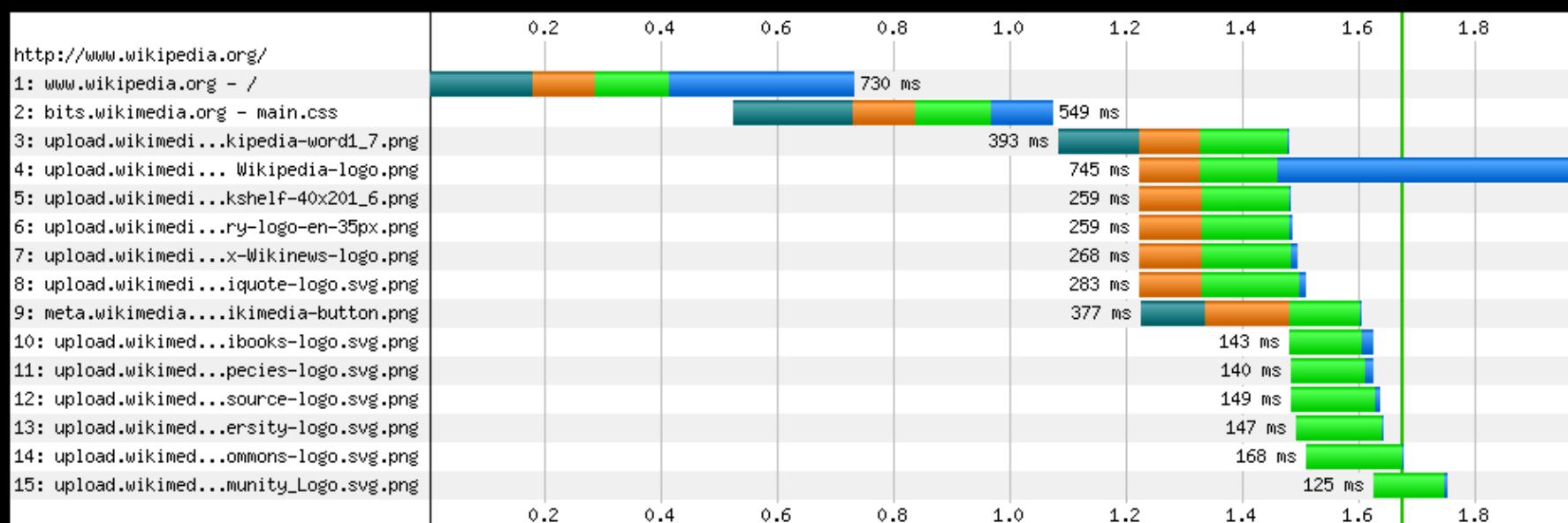
1.9s

 www.wikipe
dia.org/


Export filmstrip as an image...

 Slow Motion
Select up to 9 tests and [Create Video](#)
Thumbnail Size Thumbnail Interval

- Small 0.1 sec
- Medium 0.5 sec
- Large 1 sec
- 5 sec



WPO

Web
Performance
Optimization

drives traffic
improves UX
increases revenue
reduces costs

What makes sites feel slow?



[flickr.com/photos/
kevincollins/234678305/](https://flickr.com/photos/kevincollins/234678305/)



(lack of) B U M P E R Progressive Rendering

[flickr.com/photos/
kevincollins/234678305/](https://flickr.com/photos/kevincollins/234678305/)

Google

Bing

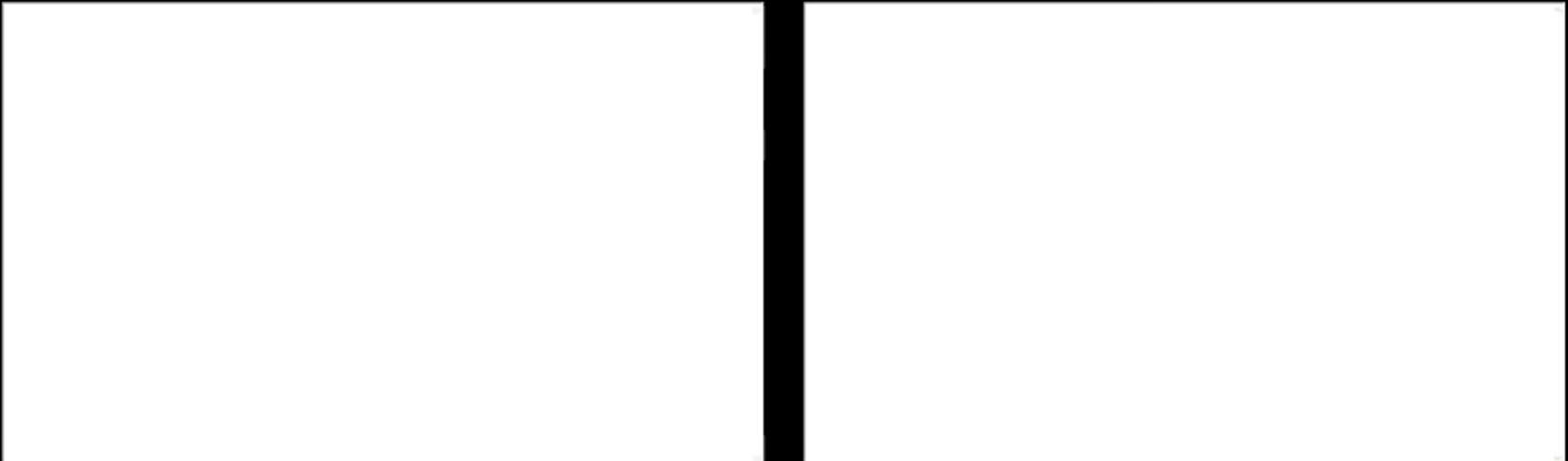
Yahoo!

Ask.com

0.0

Amazon.com

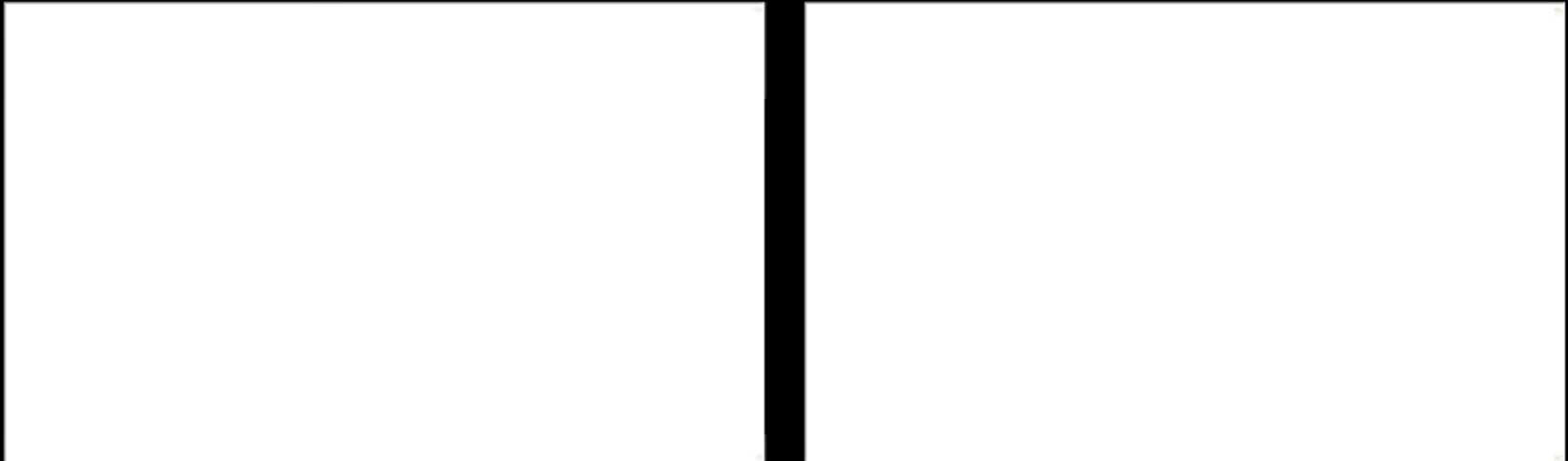
Target.com



0.0

Google News

CNN.com



0.0

Search

0.0s

0.5s

1.0s

1.5s

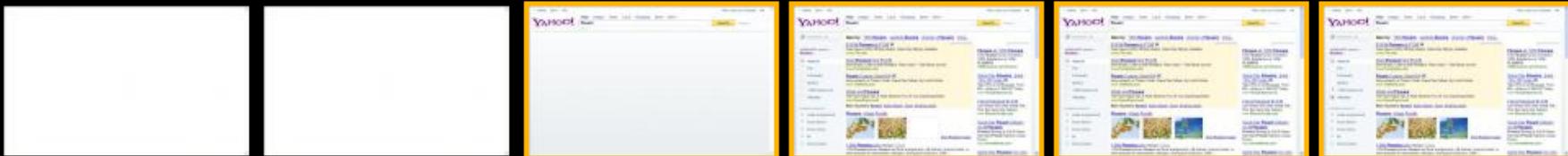
2.0s

2.5s

Google Search



Yahoo! Search



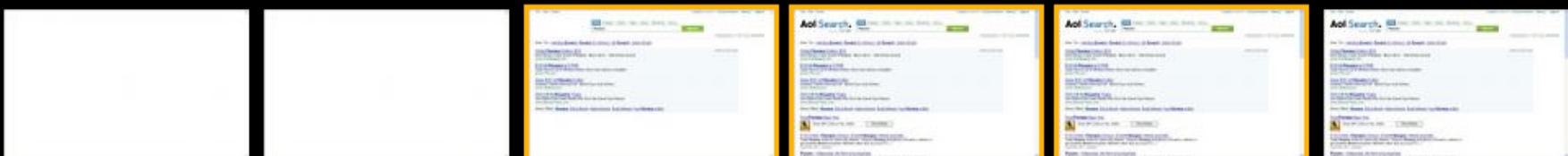
Bing



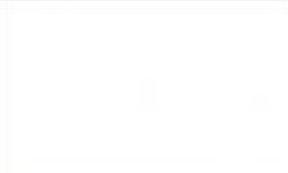
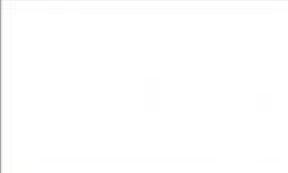
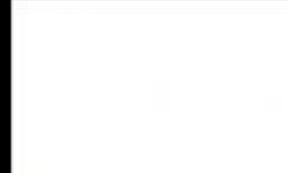
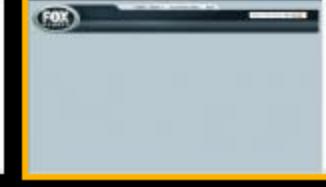
Ask.com Search



AOL Search



Sports

	0.0s	1.0s	2.0s	3.0s	4.0s
ESPN					
Yahoo! Sports					
FOX Sports					
Sports Illustrated					

News

1.0s

2.0s

3.0s

4.0s

5.0s

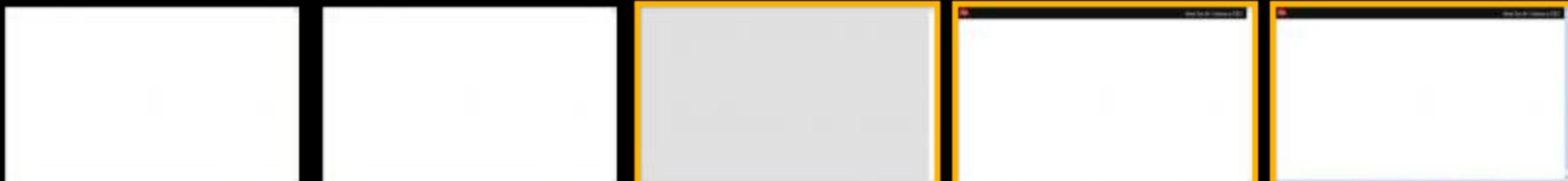
Yahoo!
News



CNN.com



CNET



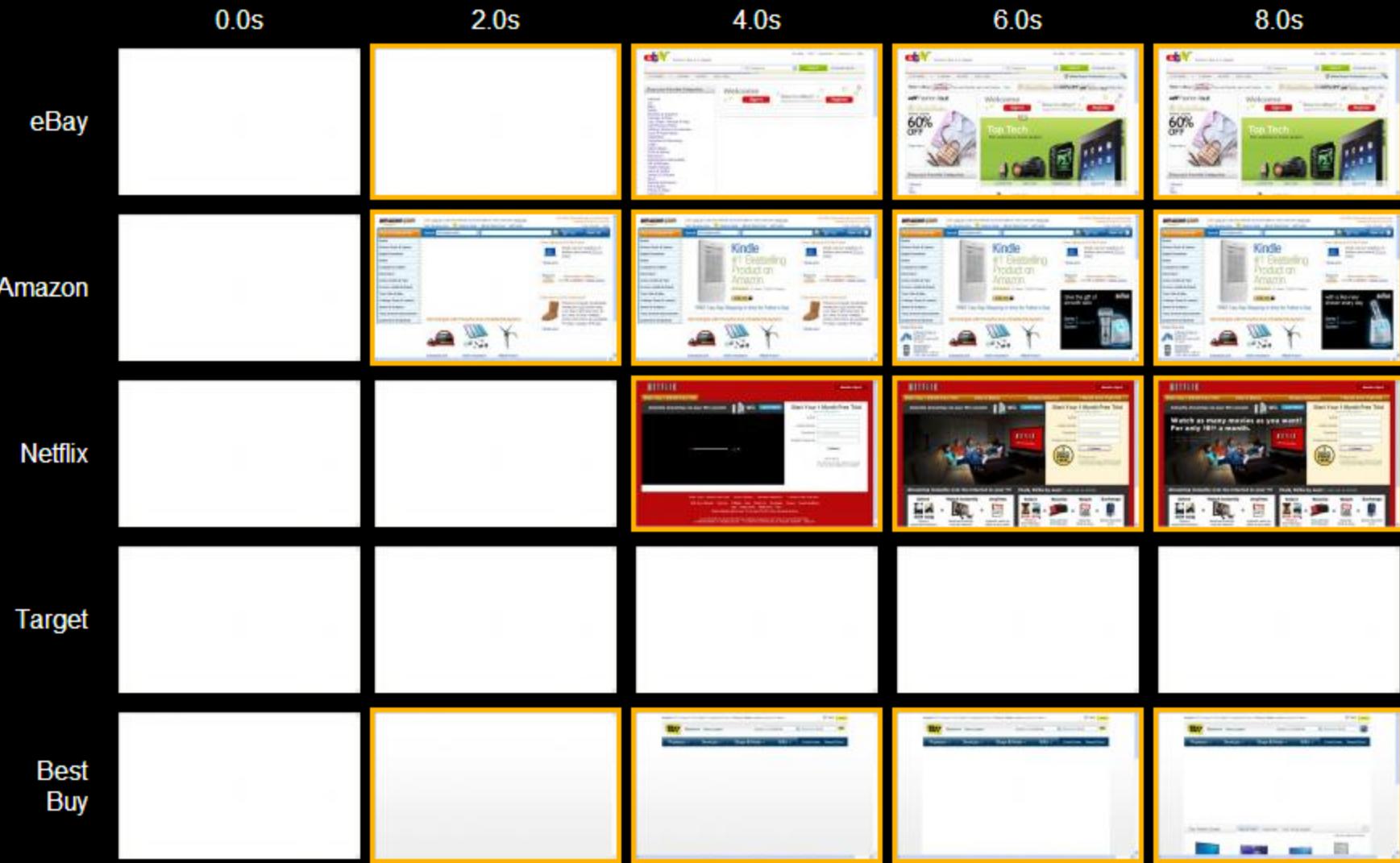
Google
News



NYTimes



Shopping



Progressive Enhancement

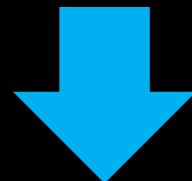
deliver HTML

defer JS

avoid DOM

decorate later

Progressive Enhancement



Progressive Rendering

Why focus on JavaScript?

`<script src="A.js">` blocks parallel
downloads and rendering



9 secs: IE 6-7, FF 3.0, Chr 1, Op 9-10, Saf 3



7 secs: IE 8-9, FF 3.6, Chr 6, Saf 4

initial payload and execution

	JavaScript	Functions Executed before onload
www.aol.com	324 K	30%
www.ebay.com	234 K	34%
www.facebook.com	553 K	7%
www.google.com/search	21 K	??%
www.bing.com/search	10 K	35%
www.msn.com	152 K	55%
www.myspace.com	248 K	29%
en.wikipedia.org/wiki	99 K	19%
www.yahoo.com	381 K	33%
www.youtube.com	274 K <i>229 K avg</i>	16% <i>29% avg</i>

Now
20° Min
14°Possible shower
Warning
[Full details](#)

smh.com.a
SUNDAY NEWSPAPER OF THE YEAR
The Sun-Herald

[NSW](#) [National](#) [World](#) [Business](#) [Sport](#) [Environment](#) [National Times](#) [Tech](#) [Digital Life](#) [Entertainment](#)

Today's News

Video: Chile miners success

Hot Topics » Socceroos win | Delhi Games | Mark McGowan



Getting kids to do the talking

Food firms recruiting children to market products.



The Sydney Morning Herald
 SYDNEY INTERNATIONAL FOOD FESTIVAL
 PRESENTED BY

Crave somethin' yummy?

Spend this weekend with world's best chefs.


[Console](#) [HTML](#) [CSS](#) [Script](#) [DOM](#) [Net](#) [Coder](#) [Page Speed](#) ▾ [YSlow](#)

[Performance](#) [Resources](#) [Export](#) ▾ [Help](#) ▾

Page Speed Score: 77/100 ! [Refresh Analysis](#)

- ! [Combine external JavaScript](#)
- ! [Leverage browser caching](#)
- ! [Parallelize downloads across hostnames](#)
- ! [Specify image dimensions](#)
- ▲ [Minify HTML](#)
- ▲ [Optimize images](#)
- ▲ [Serve static content from a cookieless domain](#)
- ▲ [Defer loading of JavaScript](#)

67.6% of the JavaScript loaded by this page had not been invoked by the time the onload handler completed.

- <http://www.smh.com.au> 26 functions uncalled of 35 total functions. ([Toggle Function View](#))
- http://s0.2mdn.net/879366/flashwrite_1_2.js 2 functions uncalled of 3 total functions. ([Toggle Function View](#))
- <http://ad-apac.doubleclick.net/adi/onl.smh.news/news/homepage;ctype=index;cat=news;cat1=homepage;pos...> 24 functions uncalled of 24 total functions. ([Toggle Function View](#))
- http://resources.smh.com.au/common/media-common-1.0/js/fdjsf/output/fd_min.js 313 functions uncalled of 450 total functions. ([Toggle Function View](#))
- http://resources.smh.com.au/common/media-common-1.0/js/fdjsf/output/fd.video_min.js 112 functions uncalled of 132 total functions. ([Toggle Function View](#))

Uncalled functions:

```
function d(m, p, l) {
    var k = flashembed.getVersion();
    f(this, {getContainer: function () {return m;}, getConf: function () {return p;}, getVersion: function () {return k;}, getFl...});
    var q = p.version;
```

08032900/

Loading Scripts Without Blocking

XHR Eval

XHR Injection

Script in Iframe

Script DOM Element

Script Defer

`document.write` Script Tag

XHR Eval

```
var xhrObj = getXHRObject();  
xhrObj.onreadystatechange =  
function() {  
    if ( xhrObj.readyState != 4 ) return;  
    eval(xhrObj.responseText);  
};  
xhrObj.open('GET', 'A.js', true);  
xhrObj.send('');
```

script & page must be same domain

Script DOM Element

```
var se = document.createElement('script');  
se.src = 'http://anydomain.com/A.js';  
document.getElementsByTagName('head')[0].appendChild(se);
```

script & page domains can differ
may not preserve execution order

Meebo Iframed JS

```
var iframe = document.createElement('iframe');  
document.body.appendChild(iframe);  
var doc = iframe.contentWindow.document;  
doc.open().write('<body onload="insertJS()">');  
doc.close();
```

loads asynchronously

delays parent's load event: FF, Chr, Saf
great for 3rd party scripts

better for sandboxing & security

avoids iframe src roundtrip

GMail Mobile

```
<script type="text/javascript">  
/*  
var ...  
*/  
</script>
```

get script DOM element's text
remove comments
eval() when invoked
inline or iframe
awesome for prefetching JS that *might*
(not) be needed



The Web Information Company

Home

Top Sites

Site Info

What's Hot

Toolbar

For Site Owners

Register Login Help

Global

By Country

By Category

Search

Ads by Google

Social Network AnalysisSAS Helps Analyze & Detect Fraud By Looking at the Entire Network!
www.SAS.com**Social Networking Sites**Create A Social Networking Website Free to Start & Easily Customisable
www.SocialGO.com**Celeb Videos Online**Love Celeb Gossip? Find Stories, Videos, & More at AOL® PopEater!
PopEater.com

Advertise with Alexa



Santa Clara Valley Water District

**It's easy to save
20 gallons a day.***And just like that,
you've saved your
20 gallons today.*

shuffle tips

click to learn more

**Top Sites In United States**

The top 100 sites in United States.

1 **Google**

google.com

Enables users to search the Web, Usenet, and images. Features include PageRank, caching and tra...
More

Search Analytics ► Audience ►

2 **Facebook - Bill Farmer**

facebook.com

[Requires membership] Wikipedia entry page with related Facebook posts and links.

Search Analytics ► Audience ►

3 **Yahoo!**

yahoo.com

Personalized content and search options. Chatrooms, free e-mail, clubs, and pager.

Search Analytics ► Audience ►

4 **YouTube - Broadcast yourself**

youtube.com

YouTube is a way to get your videos to the people who matter to you. Upload, tag and share your... More

Search Analytics ► Audience ►

5 **Wikipedia**

wikipedia.org

An online collaborative encyclopedia.

Search Analytics ► Audience ►

6 **Amazon.com**

amazon.com

Amazon.com seeks to be Earth's most customer-centric company, where customers can find and disc...

More

Search Analytics ► Audience ►

7 **Craigslist.org**

craigslist.org

Search Analytics ► Audience ►

8 **eBay**

ebay.com

International person to person auction site, with products sorted into categories.

Search Analytics ► Audience ►

9 **Twitter**

twitter.com

Social networking and microblogging service utilising instant messaging, SMS or a web interface.

Search Analytics ► Audience ►

10 **Windows Live**

live.com

Google Search

```
window.setTimeout(  
function() {  
var a=document.createElement("script");  
a.src="/extern_js/f/CgJlbhz8US8_w.js";  
(document.getElementById("xjsd") ||  
document.body).appendChild(a);},  
0);
```

Facebook

```
Bootloader.setResourceMap (   
 { "CDYbm":   
 { "name": "js\\32kskxvl4c8w0848.pkg.js",   
 "type": "js",   
 "src": "http://\\...\\   
 1fakc64i.js"}, ...});   
 var c=a ? document.body :   
 document.getElementsByTagName ('head') [0];   
 var d=document.createElement ('script');   
 d.type='text/javascript';   
 d.src=f;
```

Yahoo! FP

```
YUI.presentation.lazyScriptList =  
["http://l.yimg.com/a/combo?arc/yui/  
substitute_0.1.9.js&arc/yui/oop_0.1.10.js&  
[...58 more!...]"];
```

```
d = w.document;  
h = d.getElementsByTagName ("head") [0] ;  
n = d.createElement ("script") ,  
n.src = url;  
h.appendChild(n) ;
```

YouTube

```
<head>
```

```
...
```

```
<script src="http://s.ytimg.com/yt/jsbin/w...
```

```
...
```

```
</head>
```

Amazon

<body>

<div>

<table>

[~40%]

<script src="http://z-ecx.images-amazon.com/images/C

Craigslist

```
<script src="/js/jquery-1.4.2.js"></script>
</body>
</html>
```

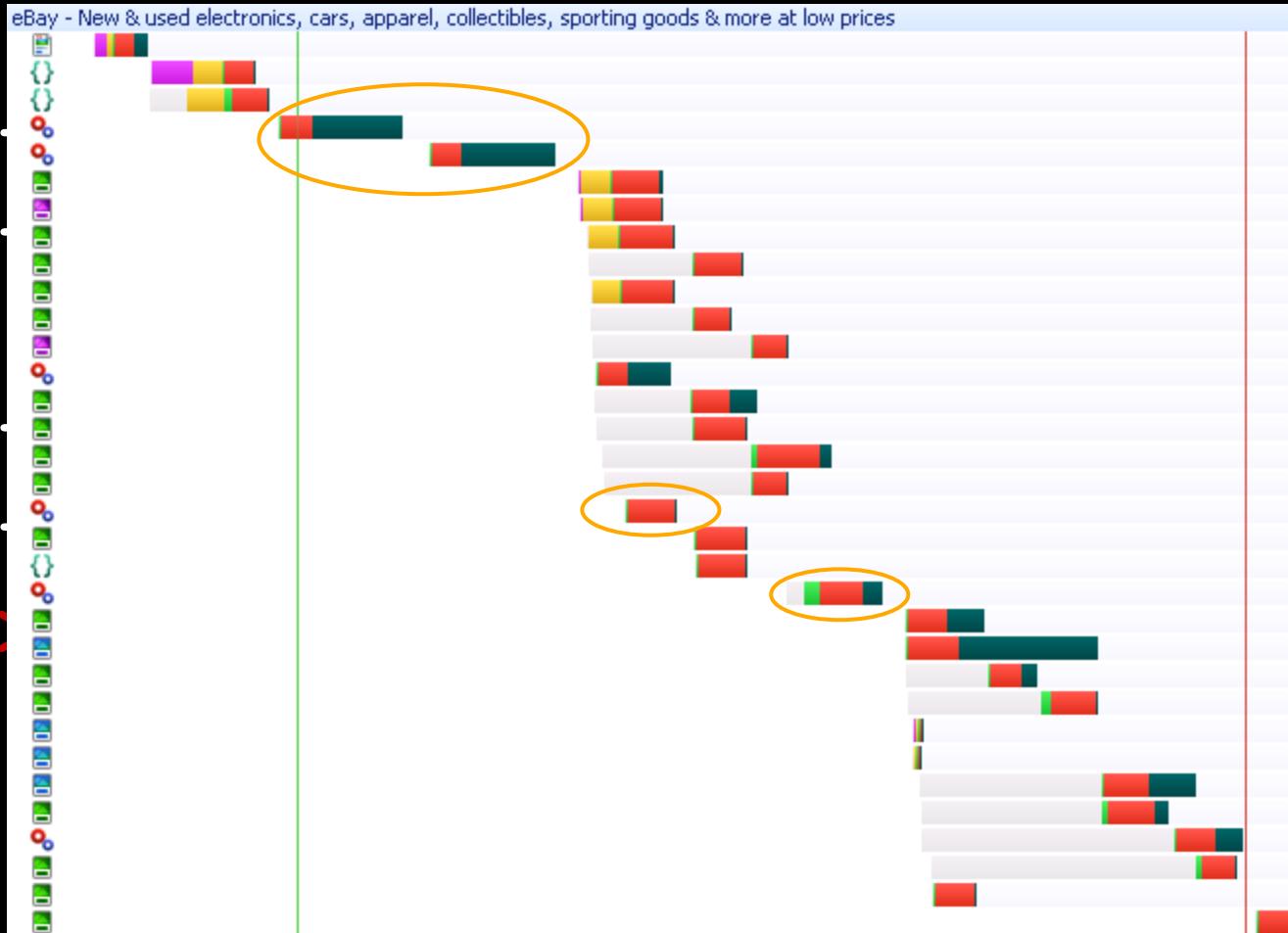
subsequent page:

```
<script src="/js/jquery-1.4.2.js"></script>
<script src="/js/toChecklist.js"></script>
<script src="/js/tocs.js"></script>
</body>
</html>
```

prefetching?

eBay

```
<body>  
<script>  
<script>  
...  
<script>  
<script>  
</body>
```



(new)Twitter

\$LAB

```
.wait(function() {
```

\$LAB

```
.script("http://a1.twimg.com/a/12865633")
```

```
.wait(function() {
```

```
    ...
```

```
});
```

\$LAB

```
.script("http://a1.twimg.com/a/12865633")
```

```
.wait(function() {
```

```
    ...
```

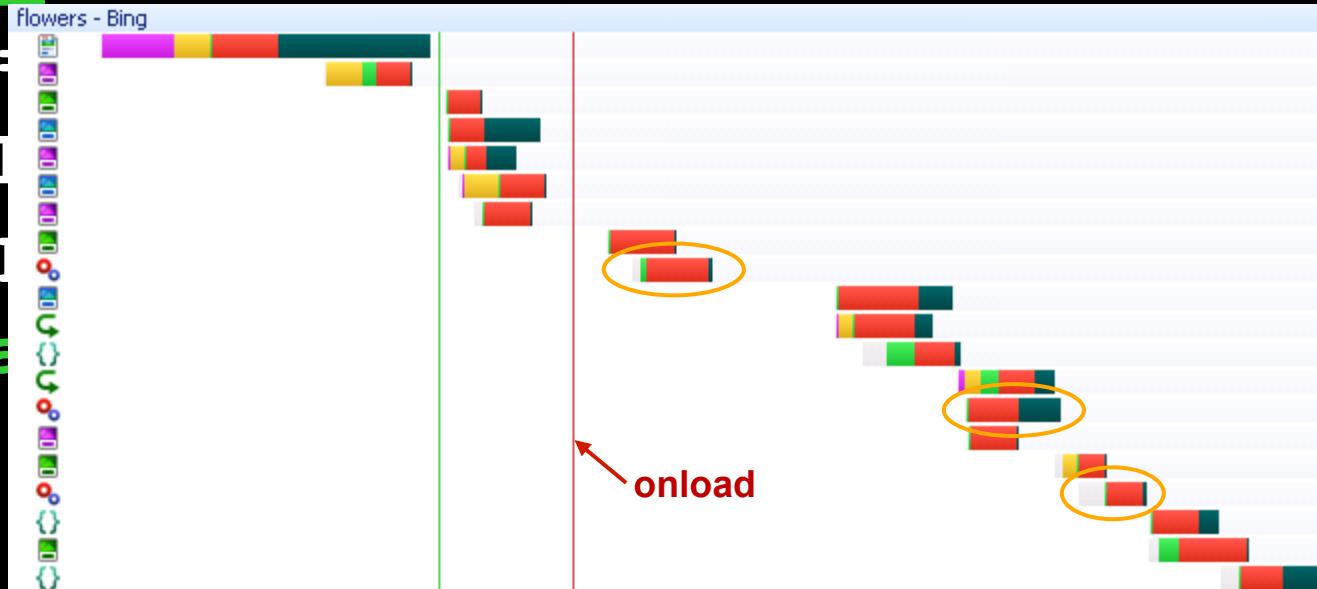
```
});
```

```
});
```

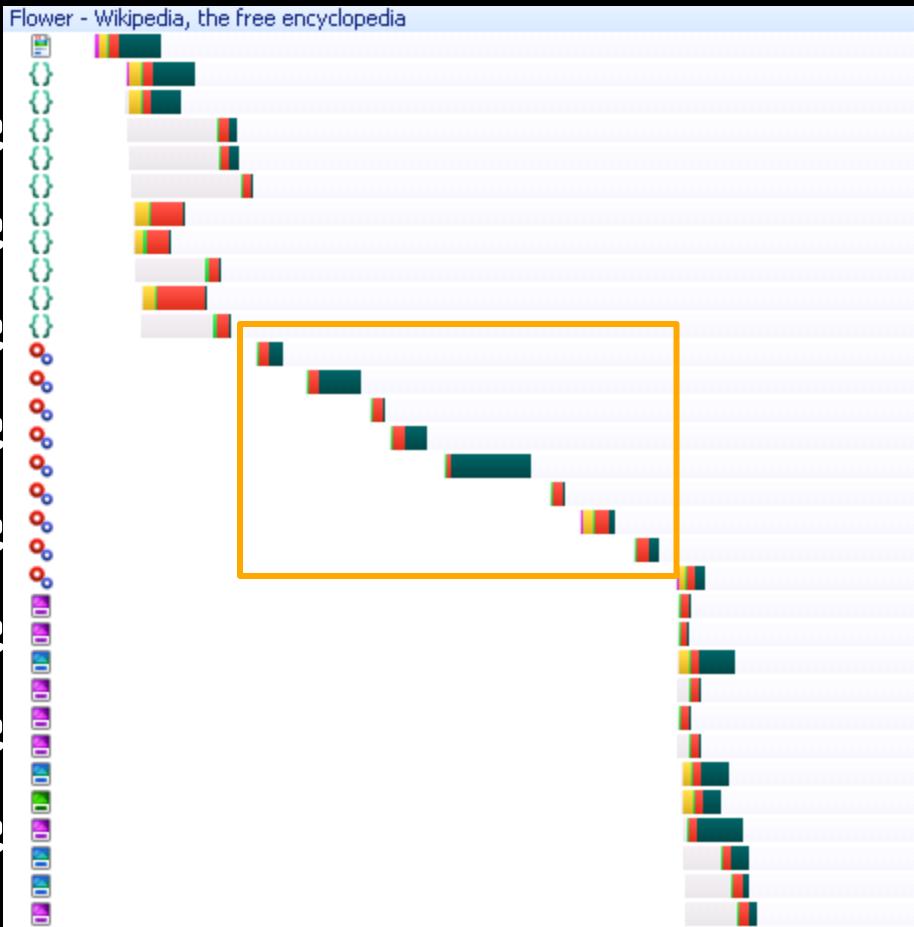
<http://labjs.com/>

Bing

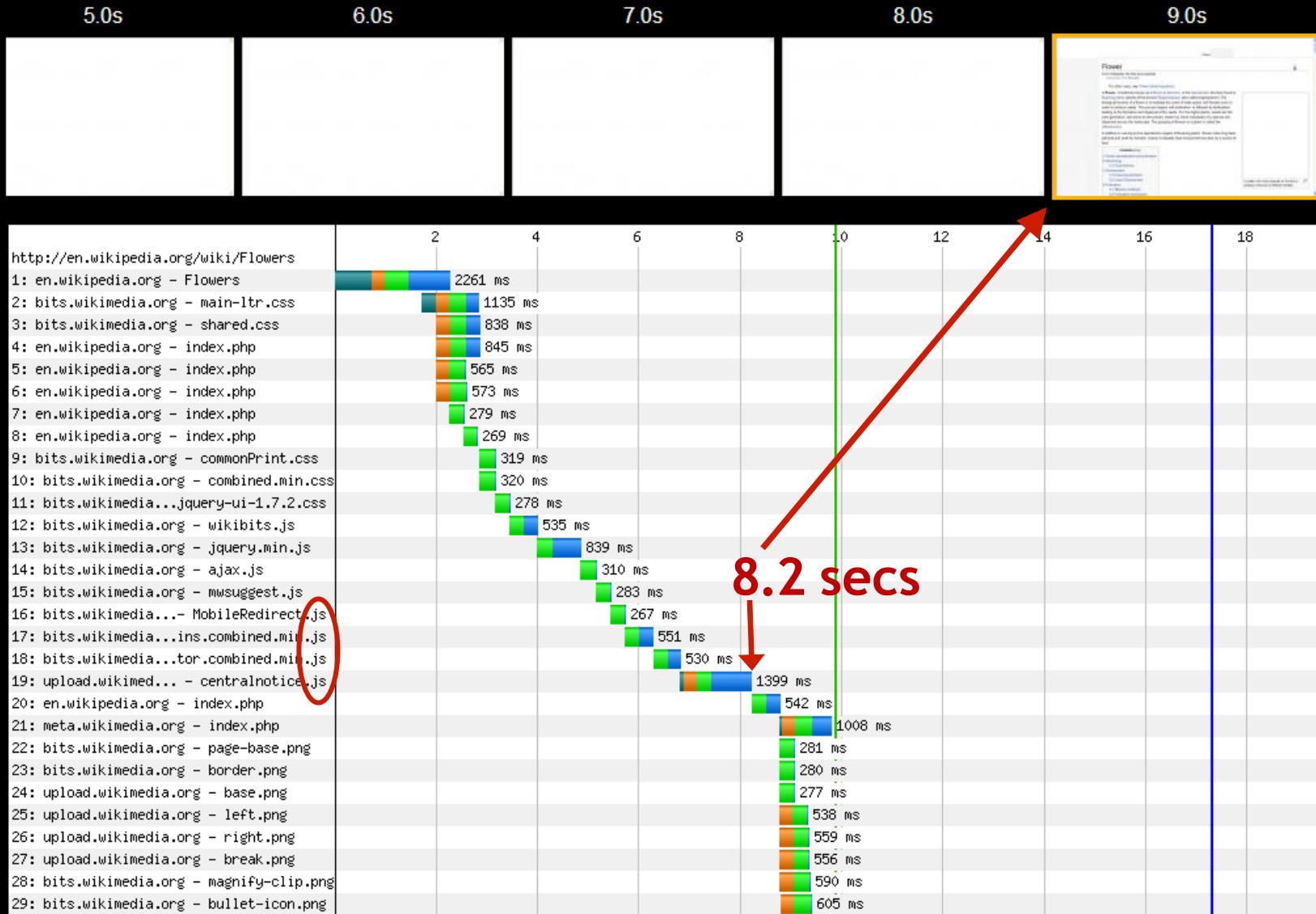
```
var a=_d.createElement("script");  
a.type="text/javascript";  
a.src="http://www.bing.com/flowers/js/flowers.js";  
_d.getElementsByTagName("head")[0].appendChild(a);
```



Wikipedia



frontend SPOF



<http://en.wikipedia.org/wiki/Flowers> (from NZ)

SEARCH

Find

Frontend SPOF

June 1, 2010 7:49 PM

My evangelism of high performance web sites started off in the context of quality code and development best practices. It's easy for a style of coding to permeate throughout a company.

Frontend SPOF test	Chrome	Firefox	IE	Opera	Safari
External Script	blank below	blank below	blank below	blank below	blank below
Stylesheet	blank below	flash	blank below	flash	blank below
inlined @font-face	delayed	flash	flash	flash	delayed
Stylesheet with @font-face	delayed	flash	totally blank	flash	delayed
Script then @font-face	delayed	flash	totally blank	flash	delayed

The failure cases are highlighted in red. Here are the four possible outcomes sorted from worst to best:

- **totally blank** - Nothing in the page is rendered - the entire page is blank.
- **blank below** - All the DOM elements below the resource in question are not rendered.
- **delayed** - Text that uses the @font-face style is invisible until the font file arrives.
- **flash** - DOM elements are rendered immediately, and then redrawn if necessary after the stylesheet or font has finished downloading.

```
<html>
<head>
<script src="http://www.snippet.com/main.js" type="text/javascript">
</script>
```

JS Performance History

scripts in HEAD

```
<head>  
<script src="..."></script>  
</head>
```

block other downloads

downloaded sequentially in IE 6-7

blocks rendering during download & parse-execute

JS Performance History

move scripts to bottom (2007)

...

```
<script src="..."></script>  
</body>
```

doesn't block other downloads

downloaded sequentially in IE 6-7

blocks rendering during download & parse-execute

JS Performance History

load scripts async (2009)

```
var se = document.createElement  
    ('script');  
se.src = 'http://anydomain.com/A.js';  
document.getElementsByTagName ('head')  
[0].appendChild(se);
```

doesn't block other downloads
downloaded in parallel (all browsers)
blocks rendering during parse-execute

JS Performance History

async + on-demand exec (2010)

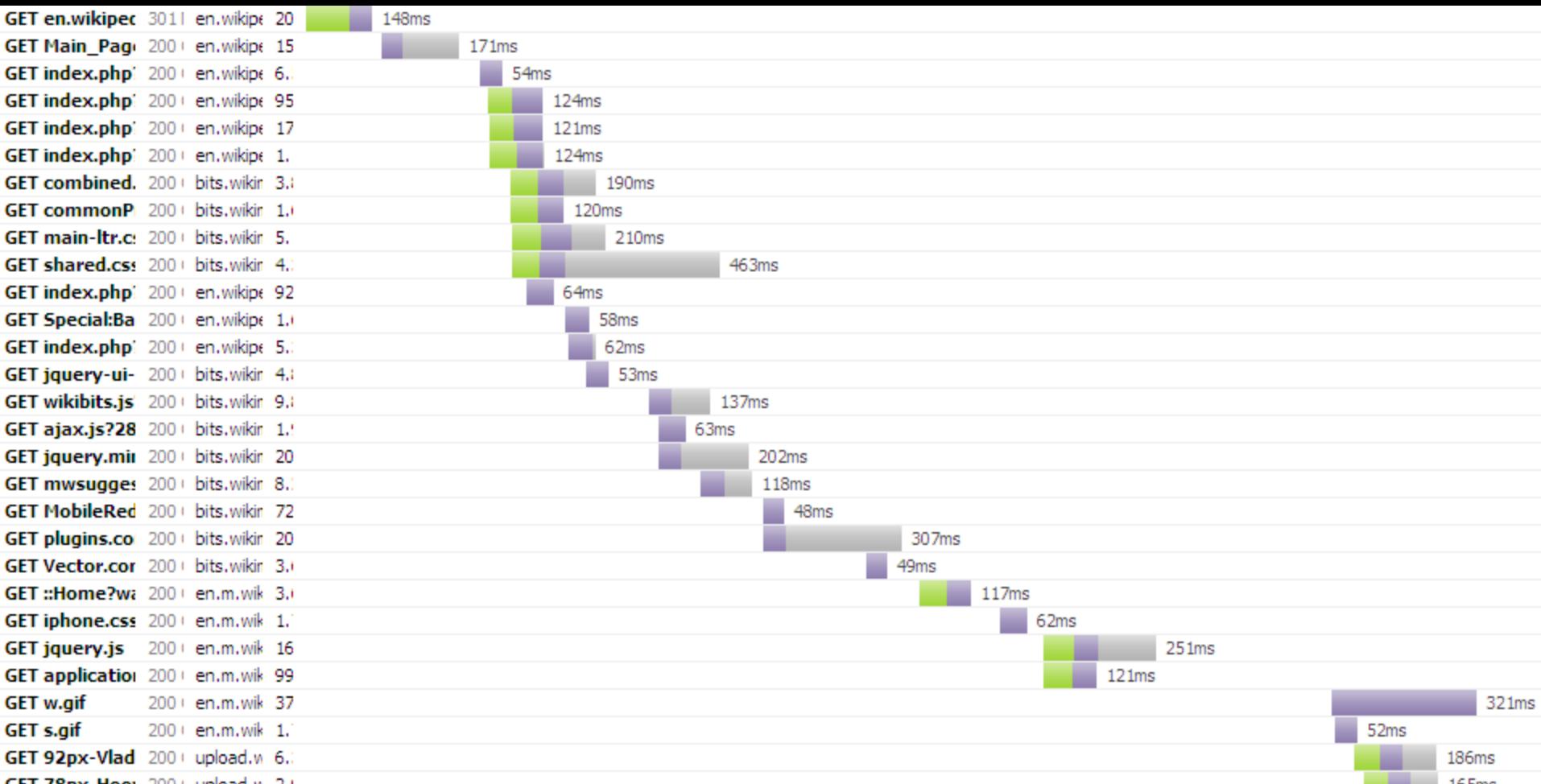
```
var se = new Image();  
se.onload = registerScript();  
se.src = 'http://anydomain.com/A.js';
```

separate download from parse-execute
doesn't block other download

downloaded in parallel (all browsers)
doesn't block rendering until demanded

new stuff

mobile waterfalls!



Headers Response

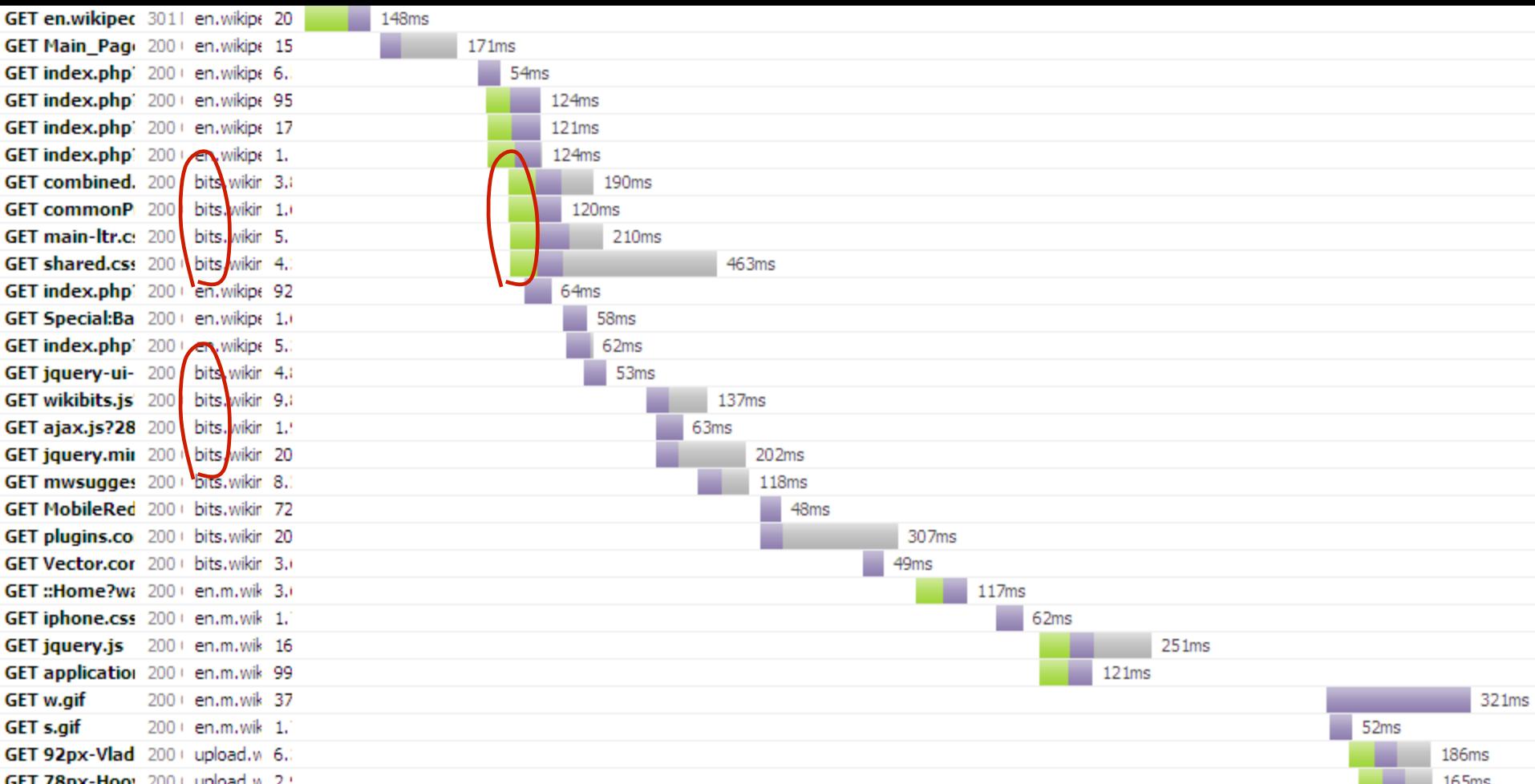
Request Headers

accept-language: en-us
accept-encoding: gzip, deflate
connection: keep-alive
accept: */*
user-agent: Mozilla/5.0 (iPhone; U; CPU iPhone OS 4_1 like Mac OS X; en-us) AppleWebKit/532.9 (KHTML, like Gecko) Version/4.0 Mobile/8B117 Safari/6531.22.7

Compare name	score	Connections per Hostname		Max Connections		Script	Script	Script	Iframe	Async Scripts	CSS	CSS +	Cache	Cache	Cache	Cache	Link	Compre
		Script	Stylesheet	Image	Script	Async	CSS	Inline Script	Expires	Resource Redirects	Prefetch	Support						
<input type="checkbox"/> Android 2 →	9/16	4	4	yes	yes	yes	no	no	yes	no	yes	no	yes	no	yes	no	yes	
<input type="checkbox"/> Blackberry 6 →	10/16	5	5	yes	yes	yes	no	no	yes	no	yes	yes	yes	yes	no	yes	yes	
<input type="checkbox"/> Blackberry 8330 →	11/16	8	8	yes	yes	yes	no	no	yes	no	yes	yes	yes	yes	yes	yes	yes	
<input type="checkbox"/> Blackberry 9700 →	11/16	4	16	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no	no	
<input checked="" type="checkbox"/> Chrome 6 →	11/16	6	30	yes	yes	yes	no	no	yes	no	yes	yes	yes	yes	yes	no	yes	
<input type="checkbox"/> Firefox 3 →	13/16	6	30	yes	yes	yes	no	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	
<input type="checkbox"/> IE 8 →	8/16	6	30	yes	yes	no	no	no	yes	no	yes	no	no	no	no	yes	yes	
<input type="checkbox"/> IE Mobile 8 →	6/16	4	15	yes	yes	no	no	no	yes	no	yes	no	no	no	no	no	yes	
<input type="checkbox"/> iPad 4 →	11/16	6	30	yes	yes	yes	no	no	yes	no	yes	yes	yes	yes	no	yes	yes	
<input type="checkbox"/> iPhone 4 →	11/16	4	30	yes	yes	yes	no	no	yes	no	yes	yes	yes	yes	no	no	yes	
<input type="checkbox"/> Nokia 97 →	6/16	7	7	yes	yes	yes	no	no	no	yes	no	no	no	no	no	no	no	
<input type="checkbox"/> Opera Mini 4 →	6/16	10	60	no	no	no	no	no	yes	no	no	no	no	no	no	no	yes	
<input type="checkbox"/> Opera Mobile 10 →	9/16	2	4	yes	yes	yes	yes	no	yes	no	yes	no	no	no	no	no	yes	
<input type="checkbox"/> Palm Pre 1 →	10/16	10	10	yes	yes	yes	no	no	yes	no	yes	no	yes	yes	yes	no	yes	
<input type="checkbox"/> Safari 4 →	10/16	6	60	yes	yes	yes	no	no	yes	no	yes	yes	no	yes	yes	no	yes	

[Compare Browsers](#)

mobile waterfalls!



Headers Response

Request Headers

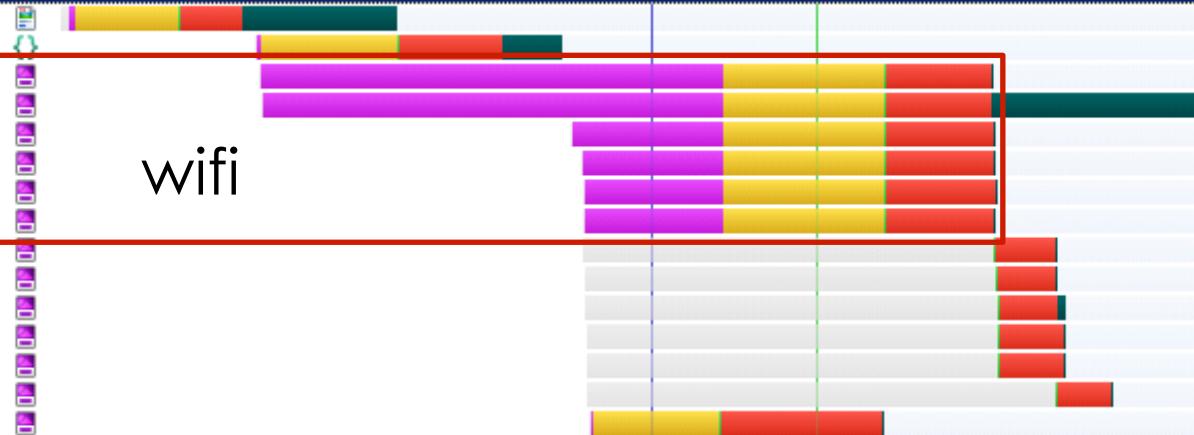
accept-language: en-us
accept-encoding: gzip, deflate
connection: keep-alive
accept: */*
user-agent: Mozilla/5.0 (iPhone; U; CPU iPhone OS 4_1 like Mac OS X; en-us) AppleWebKit/532.9 (KHTML, like Gecko) Version/4.0 Mobile/8B117 Safari/6531.22.7

carrier transcoding

Wikipedia

http://www.wikipedia.org/
http://bits.wikimedia.org/skins-1.5/monobook/main.css
http://upload.wikimedia.org/wikipedia/commons/6/62/174px-Wikipe...
http://upload.wikimedia.org/wikipedia/commons/6/63/Wikipedia-logo...
http://upload.wikimedia.org/wikipedia/commons/b/bd/Bookshelf-40x...
http://upload.wikimedia.org/wikipedia/commons/4/4a/Wiktionsary-log...
http://upload.wikimedia.org/wikipedia/commons/thumb/8/8a/Wikine...
http://upload.wikimedia.org/wikipedia/commons/thumb/f/fa/Wikiquo...
http://upload.wikimedia.org/wikipedia/commons/thumb/r/ra/wikiboo...
http://upload.wikimedia.org/wikipedia/commons/thumb/d/df/Wikispe...
http://upload.wikimedia.org/wikipedia/commons/thumb/4/4c/Wikisou...
http://upload.wikimedia.org/wikipedia/commons/thumb/9/91/Wikiver...
http://upload.wikimedia.org/wikipedia/commons/thumb/4/4a/Commo...
http://upload.wikimedia.org/wikipedia/commons/thumb/7/75/Wikime...
http://meta.wikimedia.org/images/wikimedia-button.png

wifi



Wikipedia

http://www.wikipedia.org/
http://64.19.142.12/upload.wikimedia.org/wikipedia/commons/6/62/...
http://64.19.142.10/upload.wikimedia.org/wikipedia/commons/6/63/...
http://64.19.142.12/upload.wikimedia.org/wikipedia/commons/b/bd/...
http://64.19.142.10/upload.wikimedia.org/wikipedia/commons/4/4a/...
http://64.19.142.12/upload.wikimedia.org/wikipedia/commons/thumb/...
http://64.19.142.11/upload.wikimedia.org/wikipedia/commons/thumb/...
http://64.19.142.12/upload.wikimedia.org/wikipedia/commons/thumb/...
http://64.19.142.10/upload.wikimedia.org/wikipedia/commons/thumb/...
http://64.19.142.13/upload.wikimedia.org/wikipedia/commons/thumb/...
http://64.19.142.10/upload.wikimedia.org/wikipedia/commons/thumb/...
http://64.19.142.11/upload.wikimedia.org/wikipedia/commons/thumb/...
http://64.19.142.11/upload.wikimedia.org/wikipedia/commons/thumb/...
http://64.19.142.10/meta.wikimedia.org/images/wikimedia-button.png
http://2.2.2.2/irsheets/imgreload.js

OPTUS

??!



<http://2.2.2.2/irscripts/imgreload.js>

```
function FN_ImageReload() {  
    var FN_IR_TIMEOUT=2000;  
    var FN_IR_SUFFIX=_hyuncompressed;  
    var FN_IR_ALT="please wait 2 seconds for an  
uncompressed image, or press Ctrl+F5 for  
original quality page";  
  
var FN_IR_register=function() {  
    ...  
    var docAll=document.getElementsByTagName('*');  
    for(i=0;i<docAll.length;i++) {  
        var currEl=docAll[i];  
    }  
}
```

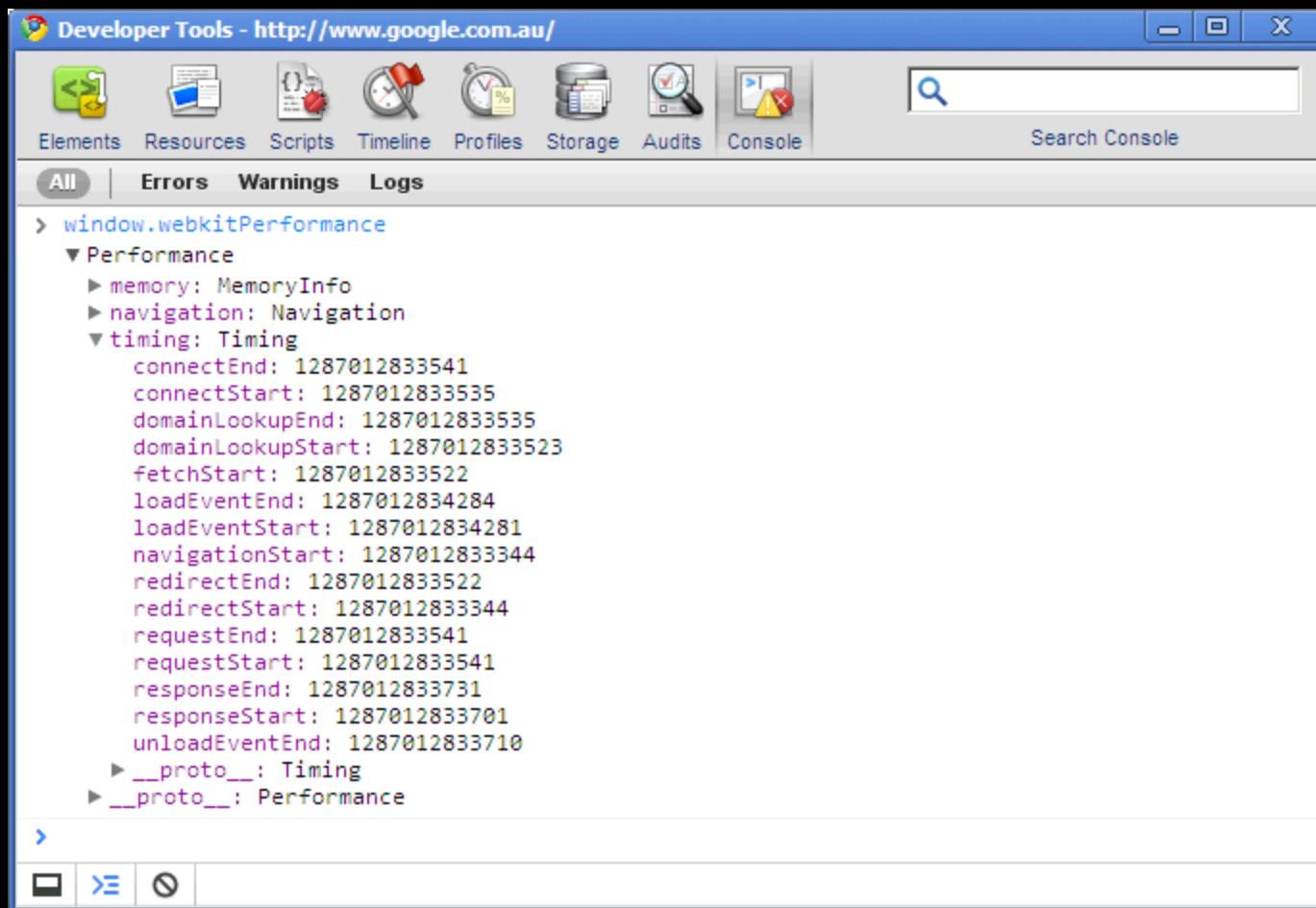
WebP image format

39% size reduction
based on VP8 codec
loss of quality?

<http://englishhard.com/2010/10/01/real-world-analysis-of-googles-webp-versus-jpg/>

W3C Web Timing Spec

window. [webkit|moz|ms] Performance



takeaways

speed matters

focus on the frontend

run Page Speed and YSlow

progressive enhancement

→ progressive rendering

be excited!

Enjoy

Thank
You

Steve Souders
@souders
stevesouders.com/docs/velocity-efws-20101208.pptx
flickr.com/photos/myklroventine/4062102754/