Design + Performance
Bringing designers & developers closer together
I used to be a reckless designer.
THE ROAD TRIP IS LIVE!
Follow along as the Flaming Lips attempt to break a world record.

MEMPHIS  CLARKSDALE  OXFORD  JACKSON  HATTIESBURG  BILOXI  BATON ROUGE  NEW ORLEANS

VOTING IS STILL OPEN IN SOME CATEGORIES! ENTER YOUR CODE TO UNLOCK VOTING:

WINNERS & NEWS  FAN FEED

NOW PLAYING:
Channel 1: The Bus Route

THE LIVE FEEDS:

@OMusicAwards
Lady Gaga has won the title of Best Artist With A Cameraphone!
#winners

Just now!

ThatGuyDave
Lovin Yeah Dog on Camera 3.
#omashow

5 minutes ago

TeamTokioHotel
Tokio Hotel better win Fan Army
FTV or else I'll cry!!!!!!! #omashow

5 minutes ago

Kim Slayer
<table>
<thead>
<tr>
<th>Request Path</th>
<th>Status Code</th>
<th>Content Type</th>
<th>Size (KB)</th>
<th>Response Time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GET_hpsec0=hpg</td>
<td>200 OK</td>
<td>text/html</td>
<td>317 B</td>
<td>144 ms</td>
</tr>
<tr>
<td>GET_act-banner_30</td>
<td>200 OK</td>
<td>text/html</td>
<td>79.7 KB</td>
<td>157 ms</td>
</tr>
<tr>
<td>GET_hpsec0=hpg</td>
<td>200 OK</td>
<td>text/html</td>
<td>317 B</td>
<td>157 ms</td>
</tr>
<tr>
<td>GET_act-banner_72</td>
<td>200 OK</td>
<td>text/html</td>
<td>64 KB</td>
<td>290 ms</td>
</tr>
<tr>
<td>GET_hpsec0=hpg</td>
<td>200 OK</td>
<td>text/html</td>
<td>320 B</td>
<td>138 ms</td>
</tr>
<tr>
<td>GET_1-act-banner_72</td>
<td>200 OK</td>
<td>text/html</td>
<td>77.1 KB</td>
<td>372 ms</td>
</tr>
<tr>
<td>GET_hpsec0=hpg</td>
<td>200 OK</td>
<td>text/html</td>
<td>317 B</td>
<td>137 ms</td>
</tr>
<tr>
<td>GET_act-banner_72</td>
<td>200 OK</td>
<td>text/html</td>
<td>63.8 KB</td>
<td>312 ms</td>
</tr>
<tr>
<td>GET_hpsec0=hpg</td>
<td>200 OK</td>
<td>text/html</td>
<td>317 B</td>
<td>139 ms</td>
</tr>
<tr>
<td>GET_act-banner_30</td>
<td>200 OK</td>
<td>text/html</td>
<td>79.7 KB</td>
<td>590 ms</td>
</tr>
</tbody>
</table>

Total Requests: 136
Page Weight: 5.9 MB
Load Time: 2M 46S
Server Delays Experiment: Results

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

- 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

<table>
<thead>
<tr>
<th>Type of Delay</th>
<th>Delay (ms)</th>
<th>Experiment Duration (weeks)</th>
<th>Impact on Average Daily Searches Per User</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-header</td>
<td>50</td>
<td>4</td>
<td>Not measurable</td>
</tr>
<tr>
<td>Pre-header</td>
<td>100</td>
<td>4</td>
<td>-0.20%</td>
</tr>
<tr>
<td>Post-header</td>
<td>200</td>
<td>6</td>
<td>-0.29%</td>
</tr>
<tr>
<td>Post-header</td>
<td>400</td>
<td>6</td>
<td>-0.59%</td>
</tr>
<tr>
<td>Post-ads</td>
<td>200</td>
<td>4</td>
<td>-0.30%</td>
</tr>
</tbody>
</table>

- 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
...shaved 2.2 seconds off the average page load time and increased download conversions by 15.4%!
Meet the Obama campaign's $250 million fundraising platform

We made the new platform 60% faster and this resulted in a 14% increase in donation conversions.

- 6 month life span
- $250 million dollars, 4,276,463 donations
- 81,548,259 pageviews, 17,807,917 unique visitors
- 60% faster time to paint than previous platform
- 240 a/b tests, 49% increase in donation conversion rate
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)
- Availability: 99.71% → 99.94%
- Product Velocity: +225%
- Release Cost: $1,000’s → $80
Improving Performance: Gzip

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

<table>
<thead>
<tr>
<th>Empty Cache</th>
<th>Primed Cache</th>
<th>Empty Cache</th>
<th>Primed Cache</th>
</tr>
</thead>
<tbody>
<tr>
<td>804.8K 1HTML/Text</td>
<td>804.8K 1HTML/Text</td>
<td>51.6K 1HTML/Text</td>
<td>51.6K 1HTML/Text</td>
</tr>
<tr>
<td>284.5K 3JavaScript Files</td>
<td>284.5K 3JavaScript Files</td>
<td>0.0K 1XMLHttpRequest</td>
<td>0.0K 1XMLHttpRequest</td>
</tr>
<tr>
<td>73.4K 2StyleSheet Files</td>
<td>73.4K 2StyleSheet Files</td>
<td>63.9K 3JavaScript Files</td>
<td>63.9K 3JavaScript Files</td>
</tr>
<tr>
<td>8.0K 20CSS Images</td>
<td>0.0K 20CSS Images</td>
<td>15.4K 2StyleSheet Files</td>
<td>15.4K 2StyleSheet Files</td>
</tr>
<tr>
<td>55.0K 60Images</td>
<td>0.0K 60Images</td>
<td>21.9K 23CSS Images</td>
<td>21.9K 23CSS Images</td>
</tr>
<tr>
<td>1225.8K Total size</td>
<td>1662.8K Total size</td>
<td>56.2K 61Images</td>
<td>56.2K 61Images</td>
</tr>
<tr>
<td>86HTTP requests</td>
<td>86HTTP requests</td>
<td>209.5K Total size</td>
<td>209.5K Total size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>91HTTP requests</td>
<td>91HTTP requests</td>
</tr>
</tbody>
</table>

- User experience performance improvement 13% - 25%
- Network outbound traffic cut in half
Quick Wins: CACHING!

- Solution
  Added Expires Header + Removed Etags

- Result:
  34% reduction in bandwidth
  = 34TB annual savings
  = FREE video streaming for 2 years
  = Faster pages when cache is primed
“traffic jumped from 6M to 11M uniques... time spent on site rose from 5.9 to 7.8 minutes... interaction rate on ads rose 108%”

How GQ cut its webpage load time by 80 percent
Lucia Moses | @lmoses | August 12, 2015

It used to be that publishers measured their success in audience size. Now, with the importance of mobile visited scores in the mix, the race is to be the fastest. Before GQ relaunched its site on July 1, pages took a painfully long seven seconds to load on a mobile device. "We were aware of the problem, but there was no way to fix it," said Howard Mittman, vp and publisher of the Condé Nast men's monthly. “If you can't load pages fast enough, you can't compete. Consumer expectations in a mobile-led world are extreme.”

GQ set out to tackle that with its reboot. Over the years, the site had gotten weighed down with ad tags and features that direct the server to load certain elements, like autoplay, but had become obsolete or redundant. The site also was publishing on multiple content-management systems, which added to the slowdown.
...we've decided to take site speed into account in our search rankings.
“To stay in Google's good graces, websites must be designed so they load quickly on mobile devices.”
Fast is Good
Designers & developers often work in silos.
Designers & developers often work in silos.

Some designs are hard to make fast.
Designers & developers often work in silos.

Some designs are hard to make fast.

Being fast is important.
Small Interdisciplinary Teams
Speed is more important than design embellishment.

People are filling small gaps in their day with news. It must load fast on all touchpoints.

The design should feel light and nibble, always fresh and up to date. Never heavy, slow to load or clogged up with content.

Users expect sites to load in under 2 seconds.
Engage quickly and then make it feel like you're there.

Tourists are making a big important decision so they want to know that it's worth it.

People need to know they are in the right place - hook them immediately with engaging imagery.

Unobtrusively stream in lots of rich content.
Prototype Early
Kia Ora
Welcome to New Zealand
Kia Ora.
Welcome to your New Zealand.
First layer with 1 sprite sheet (34k)
Second layer of 2 sprite sheets (117k)
Third layer of 8 sprite sheets (829k)
201 high quality frames (22.6MB)
We’re designing timelines not static pages
UX Content flow
Measuring Performance
Filmstrips
<table>
<thead>
<tr>
<th>Current Start Render</th>
<th>Start Render Budget</th>
<th>Increase over 30 days (186%)</th>
<th>Over budget (-100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2s</td>
<td>1s</td>
<td>1.3s</td>
<td>-1s</td>
</tr>
</tbody>
</table>

Graph showing the start render time over time, marked with "US goes responsive" on 1st November.
W3C Web Timing Specs

**Navigation Timing**
overall page metrics
*performance.timing, .now()*

**Resource Timing**
individual HTTP requests
*performance.getEntries()*

**User Timing**
custom metrics
*performance.mark(), .measure()*
window.onload is not the best metric for measuring website speed

Moving beyond window.onload()

May 13, 2013 9:13 am | 11 Comments

[Originally posted in the 2012 Performance Calendar. Reposting here for folks who missed it.]

There’s an elephant in the room that we’ve been ignoring for years:

window.onload is not the best metric for measuring website speed

We haven’t actually been “ignoring” this issue. We’ve acknowledged it, but we haven’t coordinated our efforts to come up with a better replacement. Let’s do that now.

window.onload

What we’re after is a clearer perception of when a page is ready. Unfortunately, the initial domready event is not a good proxy.

Ten years ago, when the web was young, the page was ready. Back then, pages were much less common, as were the delays and blocked connections. That was close enough. Plus it had other desirable attributes:

- **standard across browsers** - window.onload means the same thing across all browsers. (The only exception I’m aware of is that IE 6-9 don’t wait for async scripts before firing window.onload, while most other browsers do.)
- **measurable by 3rd parties** - window.onload is a page milestone that can be measured by someone other than the website owner, e.g., metrics services like Keynote Systems and tools like Boomerang. It doesn’t require website owners to add custom code to their pages.
- **measurable for real users** - Measuring window.onload is a lightweight operation, so it can be performed on real user traffic without harming the user experience.

Web 2.0 is more dynamic

Fast forward to today and we see that window.onload doesn’t reflect the user perception as well as it once did.
overly optimistic

onload: 3.9s
98% ATF rendered: 4.7s

too critical

99% ATF rendered: 2.0s
onload: 9.7s
User Interface Design patterns

User Interface Design patterns are recurring solutions that solve common design problems. Design patterns are standard reference points for the experienced user interface designer.

Newest blog post: Review: Heatmap

Getting input
Getting the user to input data is a task that should be tailored to the context of use.

Dealing with data
Data can be searched, formatted, overviewed, and browsed in a variety of ways.

Miscellaneous
Patterns that haven't found their main category yet.

Not all pixels are the same.
Custom Metrics
Custom Metrics
Define most important elements on the page
Custom Metrics

Define most important elements on the page

Measure using User Timing
Custom Metrics
Define most important elements on the page
Measure using User Timing
Track with RUM and synthetic
Improving performance on twitter.com

Tuesday, May 29, 2012 | By Twitter (@twitter) 05/29/2012 - 21:23

To connect you to information in real time, it's important for Twitter to be fast. That's why we've been reviewing our entire technology stack to optimize for speed.

When we shipped #NewTwitter in September 2010, we built it around a web application architecture that pushed all of the UI rendering and logic to JavaScript running on our users' browsers and consumed the Twitter REST API directly, in a similar way to our mobile clients. That architecture broke new ground by offering a number of advantages over a more traditional approach, but it lacked support for various optimizations available only on the server.

...  

Reducing time to first tweet

Before starting any of this work we added instrumentation to find the performance pain points and identify which categories of users we could serve better. The most important metric we used was “time to first Tweet”. This is a measurement we took from a sample of users, (using the Navigation Timing API) of the amount of time it takes from navigation (clicking the link) to viewing the first Tweet on each page's timeline. The metric gives us a good idea of how snappy the site feels.
If you're going to mangle your JPEG into a 256 color PNG, at least have the decency to use Zopfi to deflate it.
<div class="stream-item-header">
  <a class="account-group js-account-group js-action-profile js-user-profile-link js-nav" href="/ericlaw" data-user-id="5725652">
    <img class="avatar js-action-profile-avatar" src="https://pbs.twimg.com/profile_images/...d8a_bigger.jpeg" alt="">
    <strong class="fullname js-action-profile-name show-popup-with-id" data-aria-label-part> Eric Lawrence </strong>
  </a>
</div>
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    <strong class="fullname js-action-profile-name show-popup-with-id" data-aria-label-part> Eric Lawrence </strong>  
  </a>
</div>
<link rel="stylesheet" href="/huge-slow.css">

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</div>

<script>
  performance.measure('imgDisplayed');
</script>
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</div>

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    <img class="avatar js-action-profile-avatar" src="https://pbs.twimg.com/profile_images/...d8a_bigger.jpeg" alt="" onload="performance.clearMeasures('imgDisplayed');
    performance.measure('imgDisplayed')">
    <strong class="fullname js-action-profile-name show-popup-with-id" data-aria-label-part> Eric Lawrence </strong>
  </a>
</div>

<link rel="stylesheet" href="/huge-slow.css">

<script>
  performance.clearMeasures('imgDisplayed');
  performance.measure('imgDisplayed');
</script>
Eric Lawrence @ericlaw - 45m
If you're going to mangle your JPEG into a 256 color PNG, at least have the decency to use OptiPNG to deflate it.
Custom Metrics

**Current:** 5.6s

**Change over 30 days:** 2.3s

**Change over 30 days:** 70%
Measure content for users
Small Interdisciplinary Teams
Kia Ora
Welcome to New Zealand

Time based

Landscapes

Milford Sound
Measure your content flow
Have an awesome BT!