90 Minute Optimization Life Cycle

“Fast by Default” before our eyes

Author of presentation
Today’s Hosts

Hooman Beheshti
VP Products
Strangeloop

Joshua Bixby
President
Strangeloop
Agenda

• Why is faster better
• Making a site faster
  • Measurement
  • Diagnosis
  • Demos
• What did we miss
• Q&A
Methodology
Why is faster better?


The Need for Speed II

In this report, we expand on our original Need for Speed report to consider the changes in Web-based buying behavior over the past two years with an eye to examining how user site abandonment causes may have shifted from delays in the Internet plumbing to latencies experienced due to transactional Web applications. We review the so-called 8-second rule, assessing whether user patience is a variable factor that is fixed, or whether it changes as a function of the importance that the user assigns to the specific Web activity. In addition, we consider the impact of multi-page transactions, positing a new theory about cumulative impatience leading to site abandonment. Finally, we expand assigned importance of the type of shopping transaction, as well as for the natural patience of the user. Our familiar 8-second rule is the constant in this equation:

\[ \text{Patience} = (8 \text{ seconds}) \times (Ténacity) \times (Importance) \times (\text{natural patience}) \]

We set normal importance at 1.0 and define it as those set of transactions for which we are most inclined to hop to a competitor, e.g. the purchase of a commonly available item. If the items are harder-to-find specialties, we assign importance of up to a factor of two, but assign individual trades a low level of importance.
Forrester Consulting
MAKING LEADERS SUCCESSFUL EVERY DAY

August 17, 2009
eCommerce Web Site Performance Today
An Updated Look At Consumer Reaction To A Poor Online Shopping Experience

Base: 933 US online consumers who have abandoned a purchase
Source: A commissioned study conducted by Forrester Consulting on behalf of Akamai Technologies, July 2009

Web Page Rendering Should Be Kept Under 2 Seconds

If site performance is a problem to address, what do consumers expect? Online shopping sites need to consider a consumer’s expectation when designing and optimizing their sites. Based on recent survey data, Forrester found that:

- Retailers should keep page rendering to under 2 seconds. Forty-seven percent of consumers expect a Web page to load in 2 seconds or less (see Figure 4). This represents
Impact of page load time on average daily searches per user
Impact of additional delay on business metrics

![Bar chart showing the impact of added delay on business metrics like queries per visitor, query refinement, revenue per visitor, any clicks, and satisfaction. The chart displays the percent change in these metrics for different added delays ranging from 50 to 2000.](chart.png)
Shopzilla had another angle

- Big, high-traffic site
  - 100M impressions a day
  - 8,000 searches a second
  - 20-29M unique visitors a month
  - 100M products

- 16 month re-engineering
  - Page load from 6 seconds to 1.2
  - Uptime from 99.65% to 99.97%
  - 10% of previous hardware needs

5-12% increase in revenue
<table>
<thead>
<tr>
<th>Factor</th>
<th>Conversion Rate</th>
<th>Conversion Rate (from ie.html)</th>
<th>Avg Page Load Time</th>
<th>Unique Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>66.01%</td>
<td>58.11%</td>
<td>4.97 sec</td>
<td>145,076</td>
</tr>
<tr>
<td>Variation</td>
<td>76.13%</td>
<td>74.16%</td>
<td>2.81 sec</td>
<td>148,866</td>
</tr>
</tbody>
</table>
Using site speed in web search ranking

Friday, April 09, 2010 at 11:00 AM
Webmaster Level: All
Conversion rate fall-off by landing page speed

-80% -60% -40% -20% 0%

1000ms 3000ms 5000ms 7500ms 11000ms 16000ms 22000ms 28000ms
Performance Impact, Part Two: More Findings from the Front Lines of Web Acceleration

Joshua Bixby (Strangeloop Networks)
1:00pm Wednesday, 06/23/2010
Velocity Culture, Web Performance Ballroom AB
This is presentation will be streamed live along with the other keynotes.
Measurement:
Where should we start?
Learning from Your Customers & Competitors

Complete Web Monitoring

O'Reilly®

Alistair Croll & Sean Power
Example: Gomez

Gomez “Backbone” test results:

Gomez “Last Mile” test results:
HTTP Watch
Welcome. Pagetest allows you to provide the URL of a webpage to be tested. The test will be conducted from the location specified and you will be provided a waterfall of your page load performance as well as a comparison against an optimization checklist. Please visit the Pagetest wiki page for more information. Sample results for AOL.com can be seen here.

This tool lets you test web pages that are directly accessible as an URL from the Internet. If you need to test a page inside of a firewall or something more complicated than a web page (an authenticated product like webmail for example) please download the desktop version of Pagetest which this is based on.

Start Testing

By The Numbers

Virtual Comparison

Here are some useful resources that will help you get the most out of Pagetest:
Visualizing the problem
Web Performance Problem

Definitions

• Backend:
  Time from when the user makes the request to when the last byte of the HTML document arrives. Includes the time for the initial request to go up, the Web server to stitch together the HTML, and for the response to come back.

• Frontend:
  Shorthand for everything after the HTML document arrives. In reality, includes backend time (primarily reading static files) and network time, as well as true frontend activities such as parsing HTML, CSS, and JS, and executing JS.
Front-end Problem is getting worse

- Total Bytes (K)
- Average Page Size (K)
- Average Number of Objects

Graph showing the increase in Total Bytes (K) and the change in Average Page Size (K) and Average Number of Objects over time from Jan-95 to Jan-10.
Waterfall chart

HTML
Waterfall chart

Start
Render

Document
Complete

Fully
Loaded
Waterfall component breakdown

DNS Lookup

- Takes one packet in each direction
- Time is limited to the latency of the connection (DSL/Cable/etc) for the single round trip
Waterfall component breakdown

TCP Connection

- 3 packets
  - Client→Server (SYN)
  - Server→Client (SYN/ACK)
  - Client→Server (ACK)

- Time is limited to the latency of the connection (DSL/Cable/etc) for the single round trip
Waterfall component breakdown

Time To First Byte

- **Time to First Byte**
  - Time from the request packet (usually 1) to the first packet of the response
  - Includes the latency of the connection (DSL/Cable/etc) for a single round trip
  - Also includes whatever server think time was involved in generating the response
Waterfall component breakdown

**Content Download**

- test-site/
- mootools1.js 525 ms
- mootools2.js 326 ms
- reset.css 205 ms
- styles.css 221 ms
- hacks.css 172 ms
- ga.js 377 ms
- __utm.gif 112 ms
- __utm.gif 195 ms
- abstract-1.gif 353 ms

**Download**

- Time it takes for the entire content of the response to get to the browser
- Mostly limited by the bandwidth limit of the connection (DSL/Cable/etc)
Let’s Accelerate

The unsuspecting victim
Velocity Web Performance and Operations Conference
Fast by Default

Velocity 2010 is now sold out!
If you'd like to be notified if more space opens up, join the wait list. Be sure to check out the News & Coverage page for highlights and announcements from the event.

Web performance and operations is an emerging discipline which requires incredible breadth, focusing less on specific technologies and more on how the entire system works together. While people often specialize in particular components, great engineers and developers understand web performance and operations in relation to the whole.
A Few Points of Clarification

• We’re using this page because it’s more fun!
• We’ll use it to describe where performance pain points are, but that doesn’t mean the page actually has these problems
• What we’re going to do:

  - Not so good (slow)
  - Improve performance incrementally
  - Awesome (fast)

* The real Velocity site is somewhere in the middle!
Performance Summary

<table>
<thead>
<tr>
<th></th>
<th>Load Time</th>
<th>First Byte</th>
<th>Start Render</th>
<th>Document Complete</th>
<th>Fully Loaded</th>
</tr>
</thead>
<tbody>
<tr>
<td>First View</td>
<td>17.872s</td>
<td>0.528s</td>
<td>7.006s</td>
<td>17.872s 80 1,014 KB</td>
<td>23.805s 107 1,373 KB</td>
</tr>
<tr>
<td>Repeat View</td>
<td>16.233s</td>
<td>0.556s</td>
<td>9.671s</td>
<td>16.233s 78 337 KB</td>
<td>20.630s 92 501 KB</td>
</tr>
</tbody>
</table>

Key Optimizations

<table>
<thead>
<tr>
<th>Enable keep-alive</th>
<th>Compress Text</th>
<th>Compress Images</th>
<th>Cache static content</th>
<th>Combine js and css files</th>
<th>Use a CDN</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
</tbody>
</table>

[click for optimization details]

Waterfall

First View

Repeat View
## Per Object

<table>
<thead>
<tr>
<th>#</th>
<th>Resource</th>
<th>Content Type</th>
<th>Start Offset</th>
<th>DNS Lookup</th>
<th>Initial Connection</th>
<th>Time to First Byte</th>
<th>Content Download</th>
<th>Bytes Downloaded</th>
<th>Error/Status Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><a href="http://en.oreilly.com/velocity2010/">http://en.oreilly.com/velocity2010/</a></td>
<td>text/html</td>
<td>-</td>
<td>73 ms</td>
<td>127 ms</td>
<td>333 ms</td>
<td>564 ms</td>
<td>40.3 KB</td>
<td>200</td>
</tr>
<tr>
<td>2</td>
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<td>text/css</td>
<td>0.54 s</td>
<td>129 ms</td>
<td>171 ms</td>
<td>289 ms</td>
<td>313.1 KB</td>
<td>18.5 KB</td>
<td>200</td>
</tr>
<tr>
<td>3</td>
<td>http://en.oreilly.com_nodejs/1272882516</td>
<td>text/javascript</td>
<td>0.542 s</td>
<td>56 ms</td>
<td>73 ms</td>
<td>97 ms</td>
<td>124 ms</td>
<td>16.5 KB</td>
<td>200</td>
</tr>
<tr>
<td>4</td>
<td>http://en.oreilly.com_nodejs/1272882516</td>
<td>text/css</td>
<td>1.139 s</td>
<td>129 ms</td>
<td>154 ms</td>
<td>414 ms</td>
<td>17.8 KB</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>5</td>
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<td>text/css</td>
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<td>130 ms</td>
<td>162 ms</td>
<td>0 ms</td>
<td>1.1 KB</td>
<td>200</td>
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</tr>
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<td>155 ms</td>
<td>398 ms</td>
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</tr>
<tr>
<td>7</td>
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<td>text/css</td>
<td>2.143 s</td>
<td>129 ms</td>
<td>148 ms</td>
<td>0 ms</td>
<td>1.2 KB</td>
<td>200</td>
<td></td>
</tr>
<tr>
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<td>127 ms</td>
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<td>179.3 KB</td>
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</tr>
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<td>9</td>
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<td>4.086 s</td>
<td>129 ms</td>
<td>152 ms</td>
<td>0 ms</td>
<td>1.6 KB</td>
<td>200</td>
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<td>3.7 KB</td>
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<td>200</td>
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<td>154 ms</td>
<td>281 ms</td>
<td>10.1 KB</td>
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<td>414 ms</td>
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<td>200</td>
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</tr>
<tr>
<td>14</td>
<td>http://assets.en.oreilly.com_ider_l1/1.png</td>
<td>text/css</td>
<td>5.665 s</td>
<td>144 ms</td>
<td>156 ms</td>
<td>0 ms</td>
<td>1.7 KB</td>
<td>200</td>
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<td>15</td>
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<td>200</td>
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<td>200</td>
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<td>17</td>
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<td>6.826 s</td>
<td>130 ms</td>
<td>268 ms</td>
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<td>1.0 KB</td>
<td>200</td>
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<td>image/png</td>
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<td>268 ms</td>
<td>0 ms</td>
<td>0.8 KB</td>
<td>200</td>
<td></td>
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<tr>
<td>19</td>
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<td>200</td>
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<td>http://assets.en.oreilly.com_ider_l1/1.png</td>
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<td>7.229 s</td>
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<td>192 ms</td>
<td>1 ms</td>
<td>1.0 KB</td>
<td>200</td>
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<td>22</td>
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<td>1.0 KB</td>
<td>200</td>
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<td>23</td>
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<tr>
<td>24</td>
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<td>1 ms</td>
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<td>191 ms</td>
<td>1 ms</td>
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<td>200</td>
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<td>302 ms</td>
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<td>23.8 KB</td>
<td>200</td>
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<td>150 ms</td>
<td>0 ms</td>
<td>1.1 KB</td>
<td>200</td>
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<td>image/png</td>
<td>7.501 s</td>
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<td>153 ms</td>
<td>2 ms</td>
<td>0.8 KB</td>
<td>200</td>
<td></td>
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<td>109 ms</td>
<td>117 ms</td>
<td>3.2 KB</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>http://assets.en.oreilly.com_ider_l1/1.png</td>
<td>image/png</td>
<td>8.135 s</td>
<td>150 ms</td>
<td>123 ms</td>
<td>0 ms</td>
<td>1.1 KB</td>
<td>200</td>
<td></td>
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<td>8.199 s</td>
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<td>2.1 KB</td>
<td>200</td>
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<td>2.6 KB</td>
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<td>8.582 s</td>
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<td></td>
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<tr>
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<td>image/png</td>
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<td>162 ms</td>
<td>197 ms</td>
<td>0 ms</td>
<td>2.3 KB</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>
Content Analysis by Type

Content breakdown by MIME type (First View)

<table>
<thead>
<tr>
<th>MIME Type</th>
<th>Requests</th>
</tr>
</thead>
<tbody>
<tr>
<td>image/gif</td>
<td>40</td>
</tr>
<tr>
<td>image/jpeg</td>
<td>24</td>
</tr>
<tr>
<td>javascript</td>
<td>14</td>
</tr>
<tr>
<td>image/png</td>
<td>13</td>
</tr>
<tr>
<td>text/css</td>
<td>6</td>
</tr>
<tr>
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<td>text/xml</td>
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<td>application/json</td>
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Content Analysis by Domain

Content breakdown by domain (First View)

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<tr>
<td>en.oreilly.com</td>
<td>14</td>
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<tr>
<td>lyting.com</td>
<td>9</td>
</tr>
<tr>
<td>farm4.static.flickr.com</td>
<td>3</td>
</tr>
<tr>
<td>gdata.youtube.com</td>
<td>2</td>
</tr>
<tr>
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<td>s.lyting.com</td>
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<tr>
<td>search.twitter.com</td>
<td>1</td>
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<tr>
<td>api.flickr.com</td>
<td>1</td>
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<tr>
<td>ajax.googleapis.com</td>
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<table>
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<td>377950</td>
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<td>s.lyting.com</td>
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<td>farm4.static.flickr.com</td>
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<td>lyting.com</td>
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<td>17294</td>
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<td>ajax.googleapis.com</td>
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<td>gdata.youtube.com</td>
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<tr>
<td>search.twitter.com</td>
<td>8660</td>
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<tr>
<td><a href="http://www.google-analytics.com">www.google-analytics.com</a></td>
<td>7517</td>
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<td>api.flickr.com</td>
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<td><a href="http://www.youtube.com">www.youtube.com</a></td>
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Show Me Where It Hurts

Problem Analysis
Performance Problems

• Too many connections (too much orange)
Too Many Connections

97 Connections (almost one per request)
Too Many Connections

<table>
<thead>
<tr>
<th>#</th>
<th>Resource</th>
<th>Content Type</th>
<th>Start Offset</th>
<th>DNS Lookup</th>
<th>Initial Connection</th>
<th>Time to First Byte</th>
<th>Content Download</th>
<th>Bytes Downloaded</th>
<th>Error/Status Code</th>
</tr>
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<tbody>
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<td>1</td>
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<td>73 ms</td>
<td>127 ms</td>
<td>335 ms</td>
<td>564 ms</td>
<td>40.9 KB</td>
<td>200</td>
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<td>2</td>
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<td>text/css</td>
<td>0.54 s</td>
<td>-</td>
<td>120 ms</td>
<td>179 ms</td>
<td>289 ms</td>
<td>13.1 KB</td>
<td>200</td>
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<td>3</td>
<td><a href="http://ogos.googleloop/1.2.6p/jquery.min.js">http://ogos.googleloop/1.2.6p/jquery.min.js</a></td>
<td>text/javascript</td>
<td>0.542 s</td>
<td>56 ms</td>
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<td>97 ms</td>
<td>124 ms</td>
<td>16.5 KB</td>
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<td>4</td>
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<td>text/css</td>
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<td>-</td>
<td>120 ms</td>
<td>154 ms</td>
<td>414 ms</td>
<td>17.8 KB</td>
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<td><a href="http://en.oreilly.com/eshsheets/us/start.css">http://en.oreilly.com/eshsheets/us/start.css</a></td>
<td>text/css</td>
<td>1.14 s</td>
<td>-</td>
<td>130 ms</td>
<td>162 ms</td>
<td>0 ms</td>
<td>1.1 KB</td>
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<td><a href="http://en.oreilly.com/ylshheets/odball.css">http://en.oreilly.com/ylshheets/odball.css</a></td>
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<td>155 ms</td>
<td>398 ms</td>
<td>12.8 KB</td>
<td>200</td>
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<tr>
<td>7</td>
<td>http://en.oreilly.com_marcies/1272862516</td>
<td>application/javascript</td>
<td>2.143 s</td>
<td>-</td>
<td>120 ms</td>
<td>148 ms</td>
<td>0 ms</td>
<td>1.2 KB</td>
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<td>9</td>
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<td>4.086 s</td>
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<td>152 ms</td>
<td>0 ms</td>
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<td>200</td>
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<td>10</td>
<td><a href="http://en.oreilly.com/valuepack/1.2.6p/jquery.min.js">http://en.oreilly.com/valuepack/1.2.6p/jquery.min.js</a></td>
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<td>-</td>
<td>164 ms</td>
<td>414 ms</td>
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<td>14</td>
<td><a href="http://assets.en.ore.i_pidentally.css.css">http://assets.en.ore.i_pidentally.css.css</a></td>
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<td>5.663 s</td>
<td>144 ms</td>
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<td>15</td>
<td>http://assets.en.ore.i_0_bat.js_combined.js</td>
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<td>5.809 s</td>
<td>-</td>
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<td>165 ms</td>
<td>277 ms</td>
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<tr>
<td>17</td>
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<td>-</td>
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<td>6.834 s</td>
<td>391 ms</td>
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<td>202 ms</td>
<td>0 ms</td>
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<td>http://conferences.o_nogas/comparative-1.gif</td>
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<td>-</td>
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<td>0 ms</td>
<td>1.0 KB</td>
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<td>1 ms</td>
<td>1.1 KB</td>
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<td>150 ms</td>
<td>0 ms</td>
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<td>1.1 KB</td>
<td>200</td>
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<td>http://assets.en.ore.i_1liccon-call-septet.png</td>
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<td>8.139 s</td>
<td>-</td>
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<td>0 ms</td>
<td>2.1 KB</td>
<td>200</td>
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<td>-</td>
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<td>160 ms</td>
<td>0 ms</td>
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<td>image/png</td>
<td>8.432 s</td>
<td>-</td>
<td>129 ms</td>
<td>150 ms</td>
<td>0 ms</td>
<td>1.4 KB</td>
<td>200</td>
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<tr>
<td>35</td>
<td>http://assets.en.ore.i_13_glass_1860_100x.png</td>
<td>image/png</td>
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<td>-</td>
<td>135 ms</td>
<td>150 ms</td>
<td>146 ms</td>
<td>4.0 KB</td>
<td>200</td>
</tr>
<tr>
<td>36</td>
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<td>8.582 s</td>
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<td>153 ms</td>
<td>423 ms</td>
<td>23.0 KB</td>
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<td>37</td>
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<td>161 ms</td>
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<td>1.3 KB</td>
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<td>image/png</td>
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<td>159 ms</td>
<td>356 ms</td>
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<td>image/png</td>
<td>9.026 s</td>
<td>-</td>
<td>163 ms</td>
<td>197 ms</td>
<td>0 ms</td>
<td>2.3 KB</td>
<td>200</td>
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</table>
Performance Problems

• Too many connections (too much orange)
• Too many bytes (too much blue)
Too Many Bytes

By Type

<table>
<thead>
<tr>
<th>MIME Type</th>
<th>Bytes</th>
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<tbody>
<tr>
<td>image/jpeg</td>
<td>464364</td>
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<tr>
<td>javascript</td>
<td>273878</td>
</tr>
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<td>248319</td>
</tr>
<tr>
<td>application/x-shockwave-flash</td>
<td>147813</td>
</tr>
<tr>
<td>text/html</td>
<td>165099</td>
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<td>image/png</td>
<td>73594</td>
</tr>
<tr>
<td>text/css</td>
<td>65528</td>
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<tr>
<td>application/atom+xml</td>
<td>10736</td>
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<td>application/json</td>
<td>8660</td>
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<td>text/xml</td>
<td>6017</td>
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<td>text/plain</td>
<td>1419</td>
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<tr>
<td>text/x-cross-domain-policy</td>
<td>566</td>
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By Domain

<table>
<thead>
<tr>
<th>Domain</th>
<th>Bytes</th>
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<tr>
<td>assets.en.oreilly.com</td>
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<td>146251</td>
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<td>conferences.oreillynet.com</td>
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<td>farm4.static.flickr.com</td>
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<td>assets.oreilly.com</td>
<td>17294</td>
</tr>
<tr>
<td>ajax.googleapis.com</td>
<td>17178</td>
</tr>
<tr>
<td>gdata.youtube.com</td>
<td>11302</td>
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</table>

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Performance Problems

• Too many connections (too much orange)
• Too many bytes (too much blue)
• Concurrency
Concurrency

- Browsers can only open and use so many connections at once

<table>
<thead>
<tr>
<th>Domain</th>
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- [www.browserscope.org](http://www.browserscope.org)
Performance Problems

• Too many connections (too much orange)
• Too many bytes (too much blue)
• Concurrency
• Bad Caching for repeat views
Bad Repeat View

Full Fetches

Validation
<table>
<thead>
<tr>
<th>#</th>
<th>Resource</th>
<th>Content Type</th>
<th>Start Offset</th>
<th>DNS Lookup</th>
<th>Initial Connections</th>
<th>Time to First Byte</th>
<th>Content Duration</th>
<th>Bytes Downloaded</th>
<th>Error/Status Code</th>
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<td>129 ms</td>
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<td>0 ms</td>
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Performance Problems

• Too many connections (too much orange)
• Too many bytes (too much blue)
• Concurrency
• Bad Caching for repeat views
• No CDN (the greens are too big)
The Green Problem #1: No CDN

<table>
<thead>
<tr>
<th>#</th>
<th>Resource</th>
<th>Content Type</th>
<th>Start Offset</th>
<th>DNS Lookup</th>
<th>Initial Connection</th>
<th>Time to First Byte</th>
<th>Content Download</th>
<th>Bytes Downloaded</th>
<th>Error/Status Code</th>
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<td>0.54 s</td>
<td>-</td>
<td>120 ms</td>
<td>177 ms</td>
<td>289 ms</td>
<td>13.1 KB</td>
<td>200</td>
</tr>
<tr>
<td>3</td>
<td><a href="http://oreilly.co.uk/css/272862516">http://oreilly.co.uk/css/272862516</a></td>
<td>text/css</td>
<td>0.542 s</td>
<td>56 ms</td>
<td>73 ms</td>
<td>97 ms</td>
<td>124 ms</td>
<td>16.5 KB</td>
<td>200</td>
</tr>
<tr>
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<td>1.130 s</td>
<td>-</td>
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<td>154 ms</td>
<td>414 ms</td>
<td>17.8 KB</td>
<td>200</td>
</tr>
<tr>
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<td><a href="http://oreilly.co.uk/css/272862516">http://oreilly.co.uk/css/272862516</a></td>
<td>text/css</td>
<td>1.14 s</td>
<td>-</td>
<td>150 ms</td>
<td>162 ms</td>
<td>0 ms</td>
<td>1.1 KB</td>
<td>200</td>
</tr>
<tr>
<td>6</td>
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<td>1.433 s</td>
<td>-</td>
<td>155 ms</td>
<td>398 ms</td>
<td>12.8 KB</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td><a href="http://oreilly.co.uk/css/272862516">http://oreilly.co.uk/css/272862516</a></td>
<td>application/javascript</td>
<td>2.143 s</td>
<td>-</td>
<td>150 ms</td>
<td>162 ms</td>
<td>0 ms</td>
<td>1.2 KB</td>
<td>200</td>
</tr>
<tr>
<td>8</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
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<td>2.424 s</td>
<td>-</td>
<td>152 ms</td>
<td>148 ms</td>
<td>1545 ms</td>
<td>179.5 KB</td>
<td>200</td>
</tr>
<tr>
<td>9</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>application/javascript</td>
<td>4.086 s</td>
<td>-</td>
<td>152 ms</td>
<td>152 ms</td>
<td>0 ms</td>
<td>1.6 KB</td>
<td>200</td>
</tr>
<tr>
<td>10</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>application/javascript</td>
<td>4.371 s</td>
<td>-</td>
<td>152 ms</td>
<td>150 ms</td>
<td>154 ms</td>
<td>3.7 KB</td>
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<tr>
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<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
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<td>4.903 s</td>
<td>-</td>
<td>152 ms</td>
<td>151 ms</td>
<td>0 ms</td>
<td>2.5 KB</td>
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<tr>
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<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>application/javascript</td>
<td>5.995 s</td>
<td>-</td>
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<td>151 ms</td>
<td>281 ms</td>
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<td>13</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
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<td>5.663 s</td>
<td>-</td>
<td>146 ms</td>
<td>161 ms</td>
<td>414 ms</td>
<td>17.2 KB</td>
<td>200</td>
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<tr>
<td>14</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>text/css</td>
<td>5.665 s</td>
<td>144 ms</td>
<td>129 ms</td>
<td>156 ms</td>
<td>0 ms</td>
<td>1.7 KB</td>
<td>200</td>
</tr>
<tr>
<td>15</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
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<td>5.809 s</td>
<td>-</td>
<td>131 ms</td>
<td>163 ms</td>
<td>277 ms</td>
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</tr>
<tr>
<td>16</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>application/javascript</td>
<td>6.4 s</td>
<td>-</td>
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<td>152 ms</td>
<td>142 ms</td>
<td>5.9 KB</td>
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<tr>
<td>17</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>6.826 s</td>
<td>-</td>
<td>130 ms</td>
<td>268 ms</td>
<td>0 ms</td>
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<td>268 ms</td>
<td>0 ms</td>
<td>0.8 KB</td>
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<tr>
<td>19</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/gif</td>
<td>6.834 s</td>
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<td>202 ms</td>
<td>0 ms</td>
<td>2.3 KB</td>
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</tr>
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<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
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<td>-</td>
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<td>202 ms</td>
<td>0 ms</td>
<td>2.7 KB</td>
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</tr>
<tr>
<td>21</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>7.229 s</td>
<td>-</td>
<td>131 ms</td>
<td>191 ms</td>
<td>1 ms</td>
<td>1.0 KB</td>
<td>200</td>
</tr>
<tr>
<td>22</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>7.23 s</td>
<td>-</td>
<td>131 ms</td>
<td>193 ms</td>
<td>0 ms</td>
<td>1.0 KB</td>
<td>200</td>
</tr>
<tr>
<td>23</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>7.563 s</td>
<td>-</td>
<td>134 ms</td>
<td>154 ms</td>
<td>0 ms</td>
<td>1.1 KB</td>
<td>200</td>
</tr>
<tr>
<td>24</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>7.563 s</td>
<td>-</td>
<td>129 ms</td>
<td>155 ms</td>
<td>1 ms</td>
<td>1.1 KB</td>
<td>200</td>
</tr>
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<td>25</td>
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<td>7.564 s</td>
<td>-</td>
<td>132 ms</td>
<td>191 ms</td>
<td>1 ms</td>
<td>2.5 KB</td>
<td>200</td>
</tr>
<tr>
<td>26</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>7.578 s</td>
<td>-</td>
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<td>302 ms</td>
<td>275 ms</td>
<td>24.9 KB</td>
<td>200</td>
</tr>
<tr>
<td>27</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>7.848 s</td>
<td>-</td>
<td>130 ms</td>
<td>150 ms</td>
<td>0 ms</td>
<td>1.1 KB</td>
<td>200</td>
</tr>
<tr>
<td>28</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>7.851 s</td>
<td>-</td>
<td>132 ms</td>
<td>155 ms</td>
<td>2 ms</td>
<td>0.8 KB</td>
<td>200</td>
</tr>
<tr>
<td>29</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/gif</td>
<td>7.89 s</td>
<td>-</td>
<td>200 ms</td>
<td>169 ms</td>
<td>117 ms</td>
<td>3.2 KB</td>
<td>200</td>
</tr>
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<td>8.135 s</td>
<td>-</td>
<td>130 ms</td>
<td>152 ms</td>
<td>0 ms</td>
<td>1.1 KB</td>
<td>200</td>
</tr>
<tr>
<td>31</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>8.139 s</td>
<td>-</td>
<td>130 ms</td>
<td>150 ms</td>
<td>0 ms</td>
<td>2.1 KB</td>
<td>200</td>
</tr>
<tr>
<td>32</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/gif</td>
<td>8.275 s</td>
<td>-</td>
<td>147 ms</td>
<td>159 ms</td>
<td>7 ms</td>
<td>2.6 KB</td>
<td>200</td>
</tr>
<tr>
<td>33</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>8.378 s</td>
<td>-</td>
<td>132 ms</td>
<td>160 ms</td>
<td>0 ms</td>
<td>1.6 KB</td>
<td>200</td>
</tr>
<tr>
<td>34</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>8.378 s</td>
<td>-</td>
<td>132 ms</td>
<td>160 ms</td>
<td>0 ms</td>
<td>1.6 KB</td>
<td>200</td>
</tr>
<tr>
<td>35</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>8.42 s</td>
<td>-</td>
<td>129 ms</td>
<td>150 ms</td>
<td>0 ms</td>
<td>1.4 KB</td>
<td>200</td>
</tr>
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<td>36</td>
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<td>image/png</td>
<td>8.432 s</td>
<td>-</td>
<td>133 ms</td>
<td>170 ms</td>
<td>148 ms</td>
<td>4.0 KB</td>
<td>200</td>
</tr>
<tr>
<td>37</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>8.388 s</td>
<td>-</td>
<td>134 ms</td>
<td>153 ms</td>
<td>423 ms</td>
<td>23.6 KB</td>
<td>200</td>
</tr>
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<td>38</td>
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<td>image/png</td>
<td>8.735 s</td>
<td>-</td>
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<td>161 ms</td>
<td>0 ms</td>
<td>1.3 KB</td>
<td>200</td>
</tr>
<tr>
<td>39</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>8.702 s</td>
<td>-</td>
<td>159 ms</td>
<td>151 ms</td>
<td>2.8 KB</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/png</td>
<td>8.862 s</td>
<td>-</td>
<td>142 ms</td>
<td>159 ms</td>
<td>356 ms</td>
<td>7.2 KB</td>
<td>200</td>
</tr>
<tr>
<td>41</td>
<td><a href="http://oreilly.co.uk/cms/272862516">http://oreilly.co.uk/cms/272862516</a></td>
<td>image/gif</td>
<td>9.026 s</td>
<td>-</td>
<td>162 ms</td>
<td>197 ms</td>
<td>0 ms</td>
<td>2.3 KB</td>
<td>200</td>
</tr>
</tbody>
</table>
Time To First Byte

- HTTP overhead
- Subjected to latency every time
- The more objects, the bigger the problem
- Concurrency helps, but not a lot

GET /javascripts/application.js?1276735447 HTTP/1.1
Accept: */*
Accept-Language: en-us
User-Agent: Mozilla/4.0 (compatible; MSIE 8.0; Windows NT 5.2;
Trident/4.0; .NET CLR 1.1.4322; .NET CLR 2.0.50727; .NET CLR
3.0.4506.2152; .NET CLR 3.5.30729)
Accept-Encoding: gzip, deflate
Host: en.oreilly.com
Cookie: _session_id=6e76e8d4a4eccc63b4be7937e719ca9e
Performance Problems

- Too many connections (too much orange)
- Too many bytes (too much blue)
- Concurrency
- Bad Caching for repeat views
- No CDN (the greens are too big)
- Too Many Roundtrips (too many greens)
The Green Problem #2: Roundtrips

<table>
<thead>
<tr>
<th></th>
<th>Load Time</th>
<th>First Byte</th>
<th>Start Render</th>
<th>Time</th>
<th>Requests</th>
<th>Bytes In</th>
</tr>
</thead>
<tbody>
<tr>
<td>First View</td>
<td>17.872s</td>
<td>0.528s</td>
<td>7.006s</td>
<td>17.872s</td>
<td>80</td>
<td>1,014 KB</td>
</tr>
<tr>
<td>Repeat View</td>
<td>16.233s</td>
<td>0.556s</td>
<td>9.671s</td>
<td>16.233s</td>
<td>78</td>
<td>337 KB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Time</th>
<th>Requests</th>
<th>Bytes In</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully Loaded</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First View</td>
<td>23.805s</td>
<td>107</td>
<td>1,373 KB</td>
</tr>
<tr>
<td>Repeat View</td>
<td>20.630s</td>
<td>92</td>
<td>501 KB</td>
</tr>
</tbody>
</table>

First View: 80 Requests

Repeat View: 78 Requests

27 Requests

14 Requests
The Green Problem #2: Roundtrips

• Every fetch still pays the HTTP overhead penalty → TTFB is still a problem
• Exacerbated by concurrency issues
• Getting worse as number of objects per page grows
• Generally, the hardest problem to solve
Performance Problems

• Too many connections
• Too many bytes (too much blue)
• Concurrency
• Bad Caching for repeat views
• No CDN (the greens are too big)
• Too Many Roundtrips (too many greens)
• Others
Examples of Other Problems

• Blocking Javascript

• 3rd party calls (http://stevesouders.com/p3pc/)
What does it look like

http://bit.ly/a6COcQ
## Summary

<table>
<thead>
<tr>
<th>Load Time</th>
<th>First Byte</th>
<th>Start Render</th>
<th>Result (error code)</th>
<th>Document Complete</th>
<th>Fully Loaded</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.872s</td>
<td>0.528s</td>
<td>7.006s</td>
<td>0</td>
<td>17.872s 80 1,014 KB</td>
<td>23.805s 107 1,373 KB</td>
</tr>
</tbody>
</table>

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Let’s Fix It!!
Set-Up
Testing Environment
Possible Deployments

SERVICE (CLOUD)  APPLIANCE  VIRTUAL
Acceleration Methodology
Stepwise Acceleration

• Start from the beginning and fix the easy stuff

• Step by step acceleration of the page
  – Apply techniques/methods/etc and see the result
  – Try to make it as fast as possible
Kind of Like a Video Game

Page Performance vs. Level

- Easy
- Hard
Kind of Like a Video Game

Not Good Enough
Strangeloop Site Optimizer UI

Overview

% Offloaded

Bytes Saved
0 0 0 0 7 3 4 0 0

Transactions
0 per second

Tokens Rewritten
0 per second

Appliance

Device Name: HOO MAN-DevRig1
Version: 4.4.14923.1
Date: Mon Jun 21 2010
Uptime: 19d 5h 46m 51s
High Availability: Stand-alone
CPU Utilization: 0%
Disk Utilization: 51%

Traffic

Transactions: 0 per second
348 total

Pages:
0 per second
164 total

Optimized Pages: 0 per second
140 total

Tokens Rewritten: 0 per second
4,126 total

Server Pools

Bandwidth(Mbps):
0 in/0 out

Last reset time: Tue, 18 May 2010 02:21:12 GMT
Step 1:
Low Hanging Fruit
Keep-Alive

Solves the too-many connection problem (Less Orange!)

- Will help alleviate the TCP connection setup overhead
**Compression**

- Addresses the too-many-bytes problem (Less Blue!)
- We’ll compress textual content (html/css/etc)
- Not the only solution to less blue, but the...

### MIME Type

<table>
<thead>
<tr>
<th>MIME Type</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>image/jpeg</td>
<td>464984</td>
</tr>
<tr>
<td>javascript</td>
<td>273667</td>
</tr>
<tr>
<td>image/gif</td>
<td>248319</td>
</tr>
<tr>
<td>application/x-shockwave-flash</td>
<td>147513</td>
</tr>
<tr>
<td>text/html</td>
<td>105099</td>
</tr>
<tr>
<td>image/png</td>
<td>73594</td>
</tr>
<tr>
<td>text/css</td>
<td>65528</td>
</tr>
<tr>
<td>application/atom+xml</td>
<td>10736</td>
</tr>
<tr>
<td>application/json</td>
<td>8660</td>
</tr>
<tr>
<td>text/xml</td>
<td>6917</td>
</tr>
<tr>
<td>text/plain</td>
<td>1419</td>
</tr>
<tr>
<td>text/x-cross-domain-policy</td>
<td>566</td>
</tr>
</tbody>
</table>
WebPageTest

Before and After

~17.8sec

~10.5sec
What We Helped: Keep-Alive

97 Connections ➔ 19 Connections
# What We Helped: Compression

<table>
<thead>
<tr>
<th>#</th>
<th>Resource</th>
<th>Content Type</th>
<th>Start Offset</th>
<th>DNS Lookup</th>
<th>Initial Connection</th>
<th>Time to First Byte</th>
<th>Content Download</th>
<th>Bytes Downloaded</th>
<th>Error/Status Code</th>
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</thead>
<tbody>
<tr>
<td>1</td>
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<td>58 ms</td>
<td>147 ms</td>
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<td>text/css</td>
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<td>137 ms</td>
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<td>16.8 KB</td>
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<td>-</td>
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<td>3.0 KB</td>
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<td>3.3 KB</td>
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<td>0 ms</td>
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<td>-</td>
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<td>application-x-javascript</td>
<td>2.642 s</td>
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<td>157 ms</td>
<td>165 ms</td>
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<td>4.1 KB</td>
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</tr>
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<td>3.099 s</td>
<td>-</td>
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<td>image/png</td>
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<td>-</td>
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<td>0 ms</td>
<td>1.0 KB</td>
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<td>image/png</td>
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<td>1 ms</td>
<td>0.8 KB</td>
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<td>http://conferences.oiteratedemo_white.png</td>
<td>image/gif</td>
<td>3.249 s</td>
<td>49 ms</td>
<td>126 ms</td>
<td>232 ms</td>
<td>1 ms</td>
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<tr>
<td>20</td>
<td>http://conferences.oiteratedemo_compressor.png</td>
<td>image/gif</td>
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<td>21</td>
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<td>3.391 s</td>
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<td>-</td>
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<td>http://conferences.oiteratedemo_1.png</td>
<td>image/png</td>
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<td>-</td>
<td>-</td>
<td>154 ms</td>
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<td>-</td>
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<td>3.924 s</td>
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<td>4.039 s</td>
<td>-</td>
<td>-</td>
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<td>1.1 KB</td>
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<td>31</td>
<td>http://assets.en.orei_10_call_register.png</td>
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<td>4.049 s</td>
<td>-</td>
<td>-</td>
<td>187 ms</td>
<td>2 ms</td>
<td>2.1 KB</td>
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<tr>
<td>32</td>
<td>http://conferences.oiteratedemo_10_pages.png</td>
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<td>4.081 s</td>
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<td>-</td>
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<td>1 ms</td>
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<td>33</td>
<td>http://assets.en.orei_11_1user_1009.png</td>
<td>image/png</td>
<td>4.342 s</td>
<td>-</td>
<td>-</td>
<td>146 ms</td>
<td>0 ms</td>
<td>1.4 KB</td>
<td>200</td>
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<tr>
<td>34</td>
<td>http://assets.en.orei_11_google.png</td>
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<td>4.243 s</td>
<td>-</td>
<td>-</td>
<td>196 ms</td>
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<td>4.0 KB</td>
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How Did We Do?

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<td>First Byte</td>
<td>Start Render</td>
</tr>
<tr>
<td>First View</td>
<td>17.872s</td>
<td>0.528s</td>
<td>7.006s</td>
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<td>Repeat View</td>
<td>16.233s</td>
<td>0.556s</td>
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<td>Start Render</td>
</tr>
<tr>
<td>First View</td>
<td>10.691s</td>
<td>0.514s</td>
<td>3.437s</td>
</tr>
<tr>
<td>Repeat View</td>
<td>6.274s</td>
<td>0.578s</td>
<td>2.770s</td>
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<table>
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<td>Requests</td>
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<td>52%</td>
<td>40%</td>
<td>34%</td>
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<tr>
<td>Repeat View</td>
<td>71%</td>
<td>62%</td>
<td>94%</td>
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</table>
How Does It Look

Pros and Cons

• Pros
  – Really easy to do
  – Single configuration switches in servers, proxies, or load balancers
  – Good benefit seen right away

• Cons
  – Compression has processing overhead
  – On their own they’re just not enough
Step 2: Repeat View Problem
## Poor Client Side Caching

### Original

<table>
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<tr>
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<th>First Byte</th>
<th>Start Render</th>
<th>Document Complete</th>
<th>Fully Loaded</th>
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</thead>
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<td>First View</td>
<td>17.872s</td>
<td>0.528s</td>
<td>7.006s</td>
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<td>9.671s</td>
<td>16.233s 78 337 KB</td>
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### KA+Comp

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<td>0.578s</td>
<td>2.770s</td>
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<td>10.092s 92 122 KB</td>
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Problem Still Exists

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<tr>
<td>0.50s</td>
<td>Server Response</td>
<td>6.2sec</td>
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~6.2sec
How Do We Get Better Caching

• RFC 2616, Section 13
• Caching headers should be used on static (non-changing) objects, so they can be cached browser-side
  – And by intermediate caching proxies
• Validators are not enough
WebPageTest

Before and After

~6.2sec

~2.0sec
How Did We Do?

**KA+Comp**

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<td>Requests</td>
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<td><strong>First Byte</strong></td>
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<tr>
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<td><strong>Start Render</strong></td>
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</tr>
<tr>
<td>First View</td>
<td>3.437s</td>
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**With Good Caching**

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</tbody>
</table>

**Improvement**

|                      |                 |              |             |
| Repeat View          | 70%             | 67%↑         | 42%↑         |
Pros and Cons

• Pros
  – Good caching can have a major performance impact on repeat visits to a page
  – Sometimes it’s easy to do
  – Browsers generally pay attention (although interpretation may vary slightly)

• Cons
  – The spec appears scary
  – Invalidation and stale content
Step 3: CDN
What Does a CDN do?

• Global network of proxy caches

• Get cacheable content close to users

• Reduce TTFB (smaller greens)
## TTFB Problem

<table>
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<th>Resource</th>
<th>Content Type</th>
<th>Start Offset</th>
<th>DNS Lookup</th>
<th>Initial Connection</th>
<th>Time to First Byte</th>
<th>Content Download</th>
<th>Bytes Downloaded</th>
<th>Error/Status Code</th>
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<td>564 ms</td>
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<td>text/javascript</td>
<td>0.542 s</td>
<td>56 ms</td>
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<td>97 ms</td>
<td>124 ms</td>
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WebPageTest

http://bit.ly/a9ZJcF
Before and After

~10.5 sec → ~8.3 sec
## TTFB Savings

<table>
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<tr>
<th>Time to First Byte</th>
<th>Time to First Byte</th>
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<td>310 ms</td>
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<td>130 ms</td>
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<td>111 ms</td>
<td>107 ms</td>
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<tr>
<td>161 ms</td>
<td>133 ms</td>
</tr>
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<td>154 ms</td>
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<td>144 ms</td>
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<td>82 ms</td>
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<td>74 ms</td>
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<td>152 ms</td>
<td>76 ms</td>
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<td>158 ms</td>
<td>76 ms</td>
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<tr>
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<td>132 ms</td>
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<td>155 ms</td>
<td>173 ms</td>
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<td>162 ms</td>
<td>45 ms</td>
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Per object TTFB savings of ~50%
How Did We Do?

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<td>Load Time</td>
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<tr>
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<td>0.514s</td>
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<table>
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<td>Load Time</td>
<td>First Byte</td>
</tr>
<tr>
<td>First View</td>
<td>8.340s</td>
<td>0.911s</td>
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**Improvement**

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<th>22%</th>
<th>17%</th>
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<tbody>
<tr>
<td>Seconds Gained</td>
<td>0.7 sec</td>
<td>2.3 sec</td>
<td>2.7 sec</td>
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</table>
How Does It Look

http://bit.ly/92DbI0
Pros and Cons

• Pro
  – Good mitigation of the TTFB problem
  – Established industry: lots of vendors to choose from

• Cons
  – Sometimes costly
  – May require code change (CDN’ed objects should be written to the CDN domain)
Step 4:
Steroids- the Hard Stuff
We Can Get Better!

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<th>Load Time</th>
<th>First Byte</th>
<th>Start Render</th>
<th>Document Complete</th>
<th>Time</th>
<th>Requests</th>
<th>Bytes In</th>
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<td>2.736s</td>
<td>8.340s</td>
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<td>792 KB</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>1,118 KB</td>
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</tbody>
</table>

Still too many roundtrips

Still too many bytes

Not Fast Enough!!
What to do Next?

• Reduce Roundtrips
  – Combine images
  – Combine JavaScript
  – Combine CSS

• Reduce Payload even more
  – Minify CSS and JavaScript
  – Add Image Compression

• Increase Concurrency
  – Add a couple of domains to the mix
WebPageTest

Before and After

~8.3sec

~3.8sec
## How Did We Do?

### +CDN

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<th>Document Complete</th>
<th>Fully Loaded</th>
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<tbody>
<tr>
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<td>Time</td>
<td>Requests</td>
</tr>
<tr>
<td>First View</td>
<td>8.340s</td>
<td>81</td>
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<td>13.716s</td>
<td>107</td>
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<tr>
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<td>Seconds Gained</td>
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### +Strangloop

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<tr>
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### Improvement

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<tr>
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<td>30%</td>
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<td></td>
<td>31%</td>
<td></td>
</tr>
</tbody>
</table>
How Does It Look

Pros and Cons

• **Pros**
  – Most significant benefit for the hardest part of the acceleration lifecycle
  – Address multiple performance points (sometimes multiple ones with the same technique)

• **Cons**
  – It’s not easy
  – Regression
Congratulations - we are done…right?
3rd Party Content

Performance of 3rd Party Content

Ads, widgets, and analytics are a major cause for slow websites. 3rdPartyContent is a project focused on analyzing the performance of 3rd party content. The goal is to find the key wins to evangelize to make 3rd party content faster.

The table below summarizes my findings. Click on the links to read the detailed analysis of each snippet. As I do new analyses I’ll add them to this table. You can leave suggestions for other 3rd party content to investigate on my original 3rdPartyContent blog post.

You can help out this project by clicking on the Compare button and measuring how long these snippets take to load in your browser.

<table>
<thead>
<tr>
<th>Snippet</th>
<th>Impact on Page</th>
<th>Page Speed</th>
<th>YSlow</th>
<th>Doc. Write</th>
<th>Total Requests</th>
<th>Total Xfer Size</th>
<th>JS Ungzip</th>
<th>DOM Elements</th>
<th>Median Δ Load Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digg widget</td>
<td>big</td>
<td>90</td>
<td>84</td>
<td>y</td>
<td>9</td>
<td>52 kB</td>
<td>107 kB</td>
<td>84</td>
<td>681 ms</td>
</tr>
<tr>
<td>Facebook Share</td>
<td>small</td>
<td>90</td>
<td>92</td>
<td>n</td>
<td>5</td>
<td>8 kB</td>
<td>7 kB</td>
<td>15</td>
<td>149 ms</td>
</tr>
<tr>
<td>Google Analytics</td>
<td>small</td>
<td>91</td>
<td>99</td>
<td>n</td>
<td>2</td>
<td>18 kB</td>
<td>24 kB</td>
<td>2</td>
<td>27 ms</td>
</tr>
<tr>
<td>Buy Sell Ads*</td>
<td>small</td>
<td>81</td>
<td>92</td>
<td>n</td>
<td>3</td>
<td>7 kB</td>
<td>14 kB</td>
<td>9</td>
<td>29 ms</td>
</tr>
<tr>
<td>Google AdSense*</td>
<td>big</td>
<td>87</td>
<td>84</td>
<td>y</td>
<td>8</td>
<td>41 kB</td>
<td>76 kB</td>
<td>9</td>
<td>96 ms</td>
</tr>
<tr>
<td>ValueClick*</td>
<td>med</td>
<td>89</td>
<td>98</td>
<td>y</td>
<td>3</td>
<td>2 kB</td>
<td>1 kB</td>
<td>1</td>
<td>na**</td>
</tr>
<tr>
<td>Quantcast</td>
<td>small</td>
<td>93</td>
<td>98</td>
<td>n</td>
<td>2</td>
<td>3 kB</td>
<td>3 kB</td>
<td>2</td>
<td>118 ms</td>
</tr>
<tr>
<td>Collective Media*</td>
<td>big</td>
<td>86</td>
<td>90</td>
<td>y</td>
<td>6</td>
<td>8 kB</td>
<td>9 kB</td>
<td>7</td>
<td>na**</td>
</tr>
<tr>
<td>Glam Media*</td>
<td>big</td>
<td>89</td>
<td>83</td>
<td>y</td>
<td>11</td>
<td>68 kB</td>
<td>63 kB</td>
<td>7</td>
<td>na**</td>
</tr>
</tbody>
</table>

* Stats for ads only include the ad framework and not any ad content
** It’s not possible to gather timing stats for snippets with live ads

Leave a comment on the related 3rdPartyContent blog post
Browsers?

Performance differences across browsers

- Chrome 4
- Chrome 5
- Firefox 2
- Firefox 3
- IE 6
- IE 7
- IE 8
- Safari 4
- Safari Mobile
Mobile Web

fast by default
Flow

3.8 Seconds
11 Roundtrips
Regression

“Our Developers have repeatedly redesigned the web site’s software to scale but the job is never done. It’s kind of like painting the Golden Gate Bridge, where every time you finish, it’s time to start over again. There are many lessons to be learned and we learn them the hard way by coding.”

Jim Benedetto

*MySpace Vice President Technology*