Empirical Results from Page Speed and mod_pagespeed

Matthew Steele, Google
Joshua Marantz, Google
What is Page Speed?
What is Page Speed?

- Provides specific suggestions on how to speed up a given webpage
What is Page Speed?

- Provides specific suggestions on how to speed up a given webpage

![Page Speed Score: 91/100](image)
Tuning Page Speed

• We currently estimate an “impact” score for each Page Speed rule.

• Following the rule’s suggestions improves the impact score, reflecting e.g. saved bytes or saved requests

• But how does this translate into latency improvements?

• We need data to back this up!
Requirements
Requirements

- Controlled experiment: test a single kind of page modification at a time
Requirements

• Controlled experiment: test a single kind of page modification at a time

• Large sample set: test a large number of real websites, not a small number of contrived websites
Requirements

• Controlled experiment: test a single kind of page modification at a time

• Large sample set: test a large number of real websites, not a small number of contrived websites

• To make this practical, we must be able to automatically produce modified versions of sites
What will we be needing?
mod_pagespeed

Page Speed

Chrome Browser
Optimize Images
Optimize Images

• Reduce the size of image files to save bytes on the network.
Optimize Images

- Header
- Metadata
- Pixel Data (compressed)
Optimize Images

Diagram showing the process of optimizing images:

1. Header
2. Metadata
3. Pixel Data (compressed)

Flow to:

4. Header
5. Pixel Data (compressed better)
Optimize Images

• Reduce the size of image files to save bytes on the network.

• On bandwidth-limited connections, this can significantly reduce page load time.
Optimize Images

Following Page Speed's "Optimize Images" Rule

Reduction in page load time (ms)

Change in "Optimize Images" impact score
Inline Small CSS Files
Inline Small CSS Files

- Include small pieces of CSS directly in the HTML (with `<style>`) rather than in separate files (with `<link>`) to save requests.
Inline Small CSS Files

index.html

```html
<html>
<head>
  <link rel=stylesheet href="style.css">
</head>
... 
</html>
```

style.css

```css
body {
  color: red;
}
```
Inline Small CSS Files

```
<html>
<head>
  <link rel=stylesheet href="style.css">
</head>
...
</html>
```

```
body {
  color: red;
}
```

```
<html>
<head>
  <style>
    body {
      color: red;
    }
  </style>
</head>
...
</html>
```
Inline Small CSS Files

• Include small pieces of CSS directly in the HTML (with `<style>`) rather than in separate files (with `<link>`) to save requests.

• On connections with large round-trip times, this can reduce page load time.
Inline Small CSS Files

Following Page Speed's "Inline Small CSS" Rule

Reduction in page load time (ms)

Change in "Inline Small CSS" impact score
What’s next?

- Much more data to be collected
- Using this data to tune existing Page Speed rules and to evaluate potential new rules
- Improving our measurement framework, with the hope that others will use it to conduct their own experiments
Page Speed tools:
http://code.google.com/speed/page-speed/

Follow us on Twitter: @pagespeed

Watch out for a blog post from us on the Google Code Blog