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11
I/O

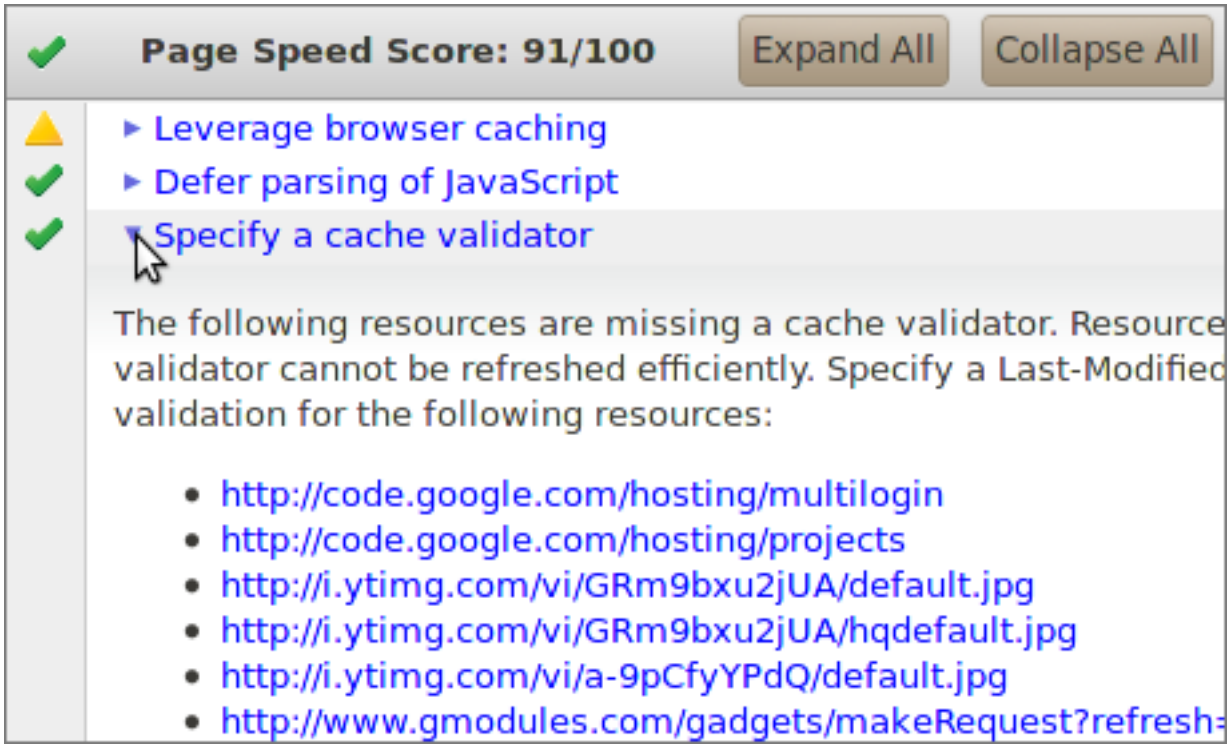
Use Page Speed to Optimize Your Web Site for Mobile

Bryan McQuade and Libo Song, May 10, 2011

Hashtags: #io2011 #DevTools
Feedback: http://goo.gl/CE1ZU

Page Speed Background

- Help developers optimize their web pages
- Products
  - Firefox add-on
  - Chrome extension
  - Page Speed Online
  - Page Speed API
- 3rd-party integrations
  - WebPagetest
  - *Gomez Recorder*
  - *W3 Total Cache*



Agenda

- Web performance overview
- Key differences on mobile
- Page Speed rules for mobile
- Tools for mobile web performance analysis

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- **Web performance overview**
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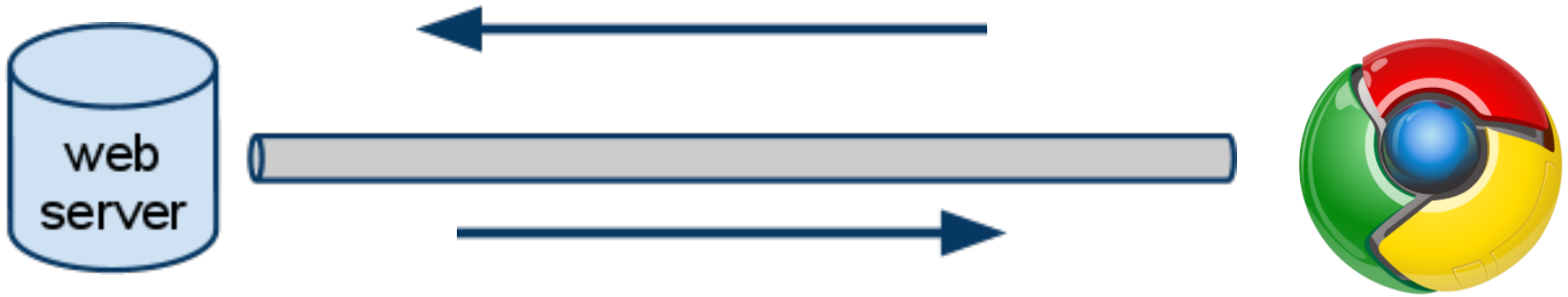
Web performance 101: speed matters

- Google
  - 400 ms latency increase
  - 0.6% search decrease
- Shopzilla
  - 5 second latency decrease
  - 12% revenue increase
  - 50% decrease in hardware costs
- Google Maps on mobile
  - App Cache = 3 second reduction in load time

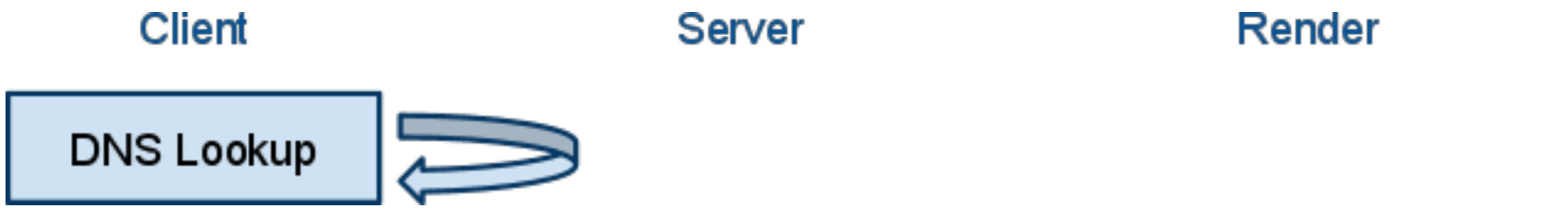
Sources: O'Reilly Velocity Conference, May 2009; Google

Life of a web page load



- Processing time
- Bandwidth
- Round-trip time
- Parse
- Resource fetches
- Layout and Render
- JavaScript

Example Page Load



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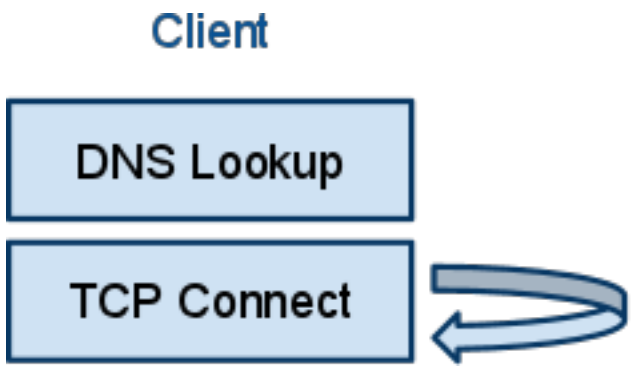

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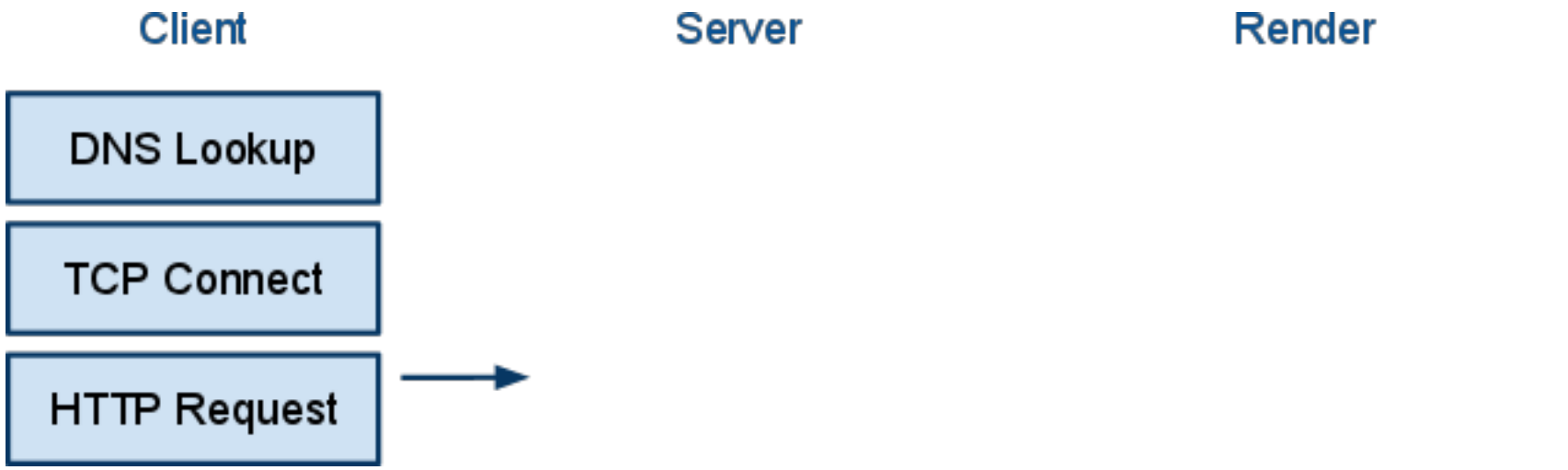

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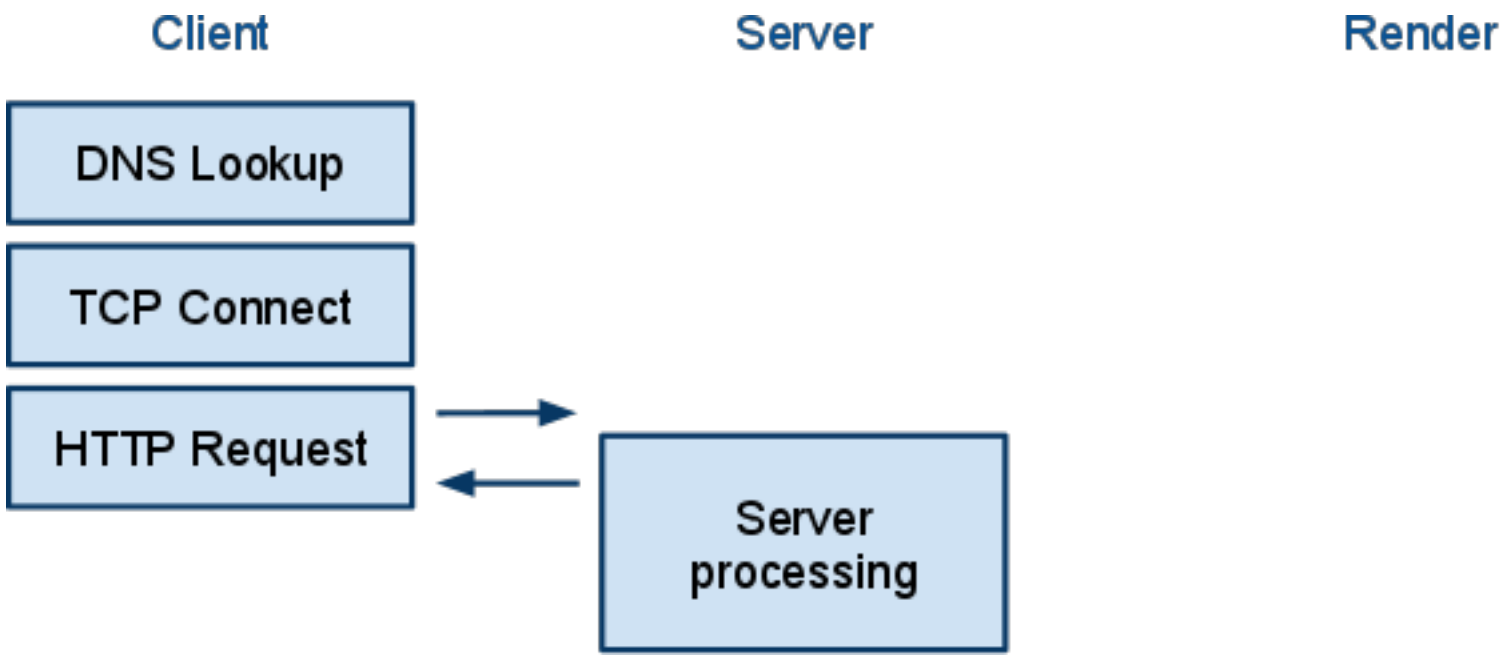

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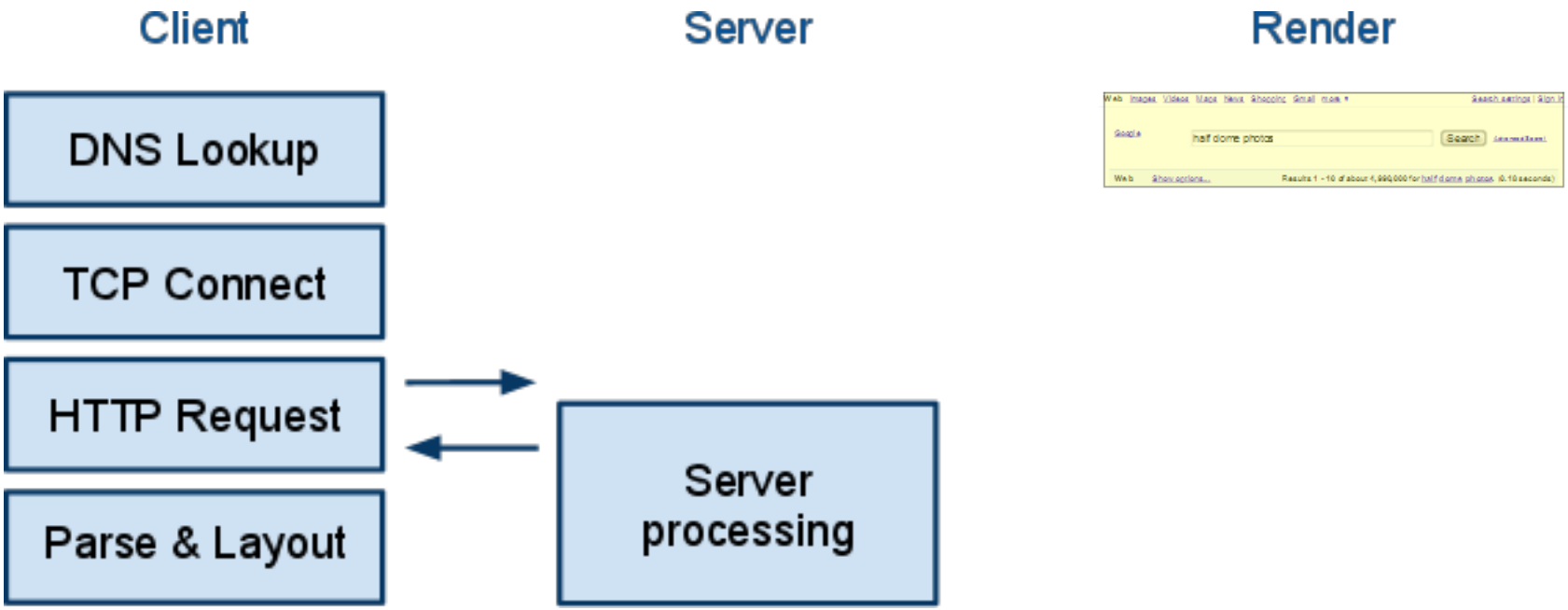

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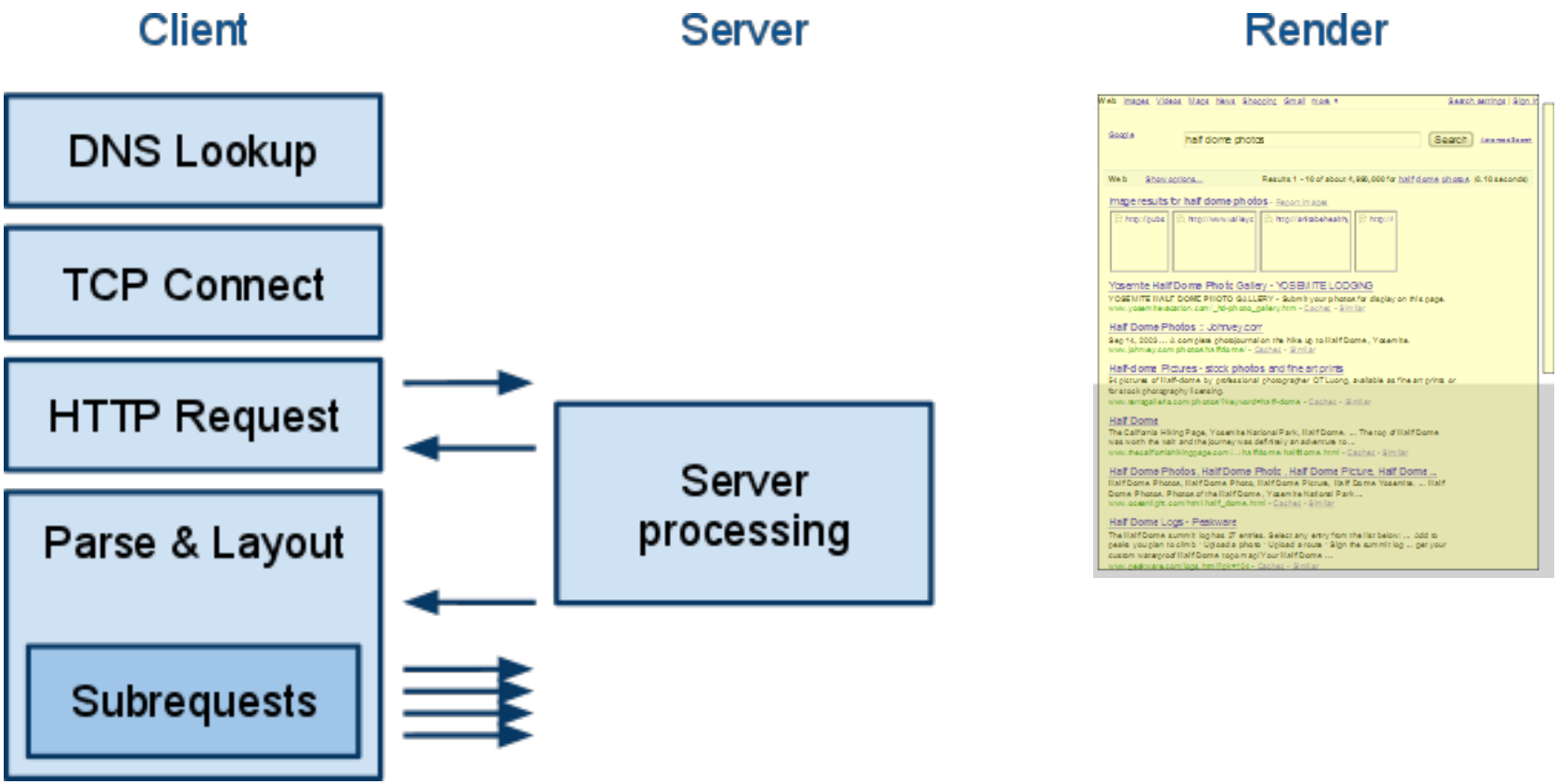

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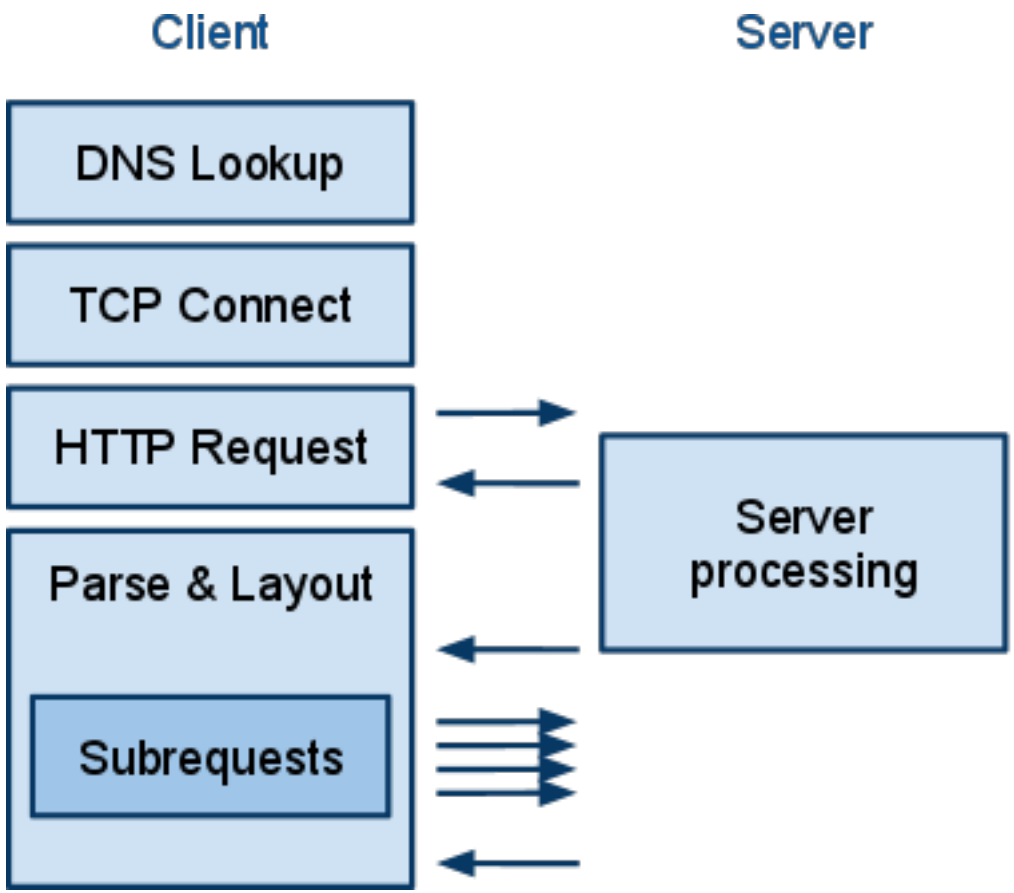

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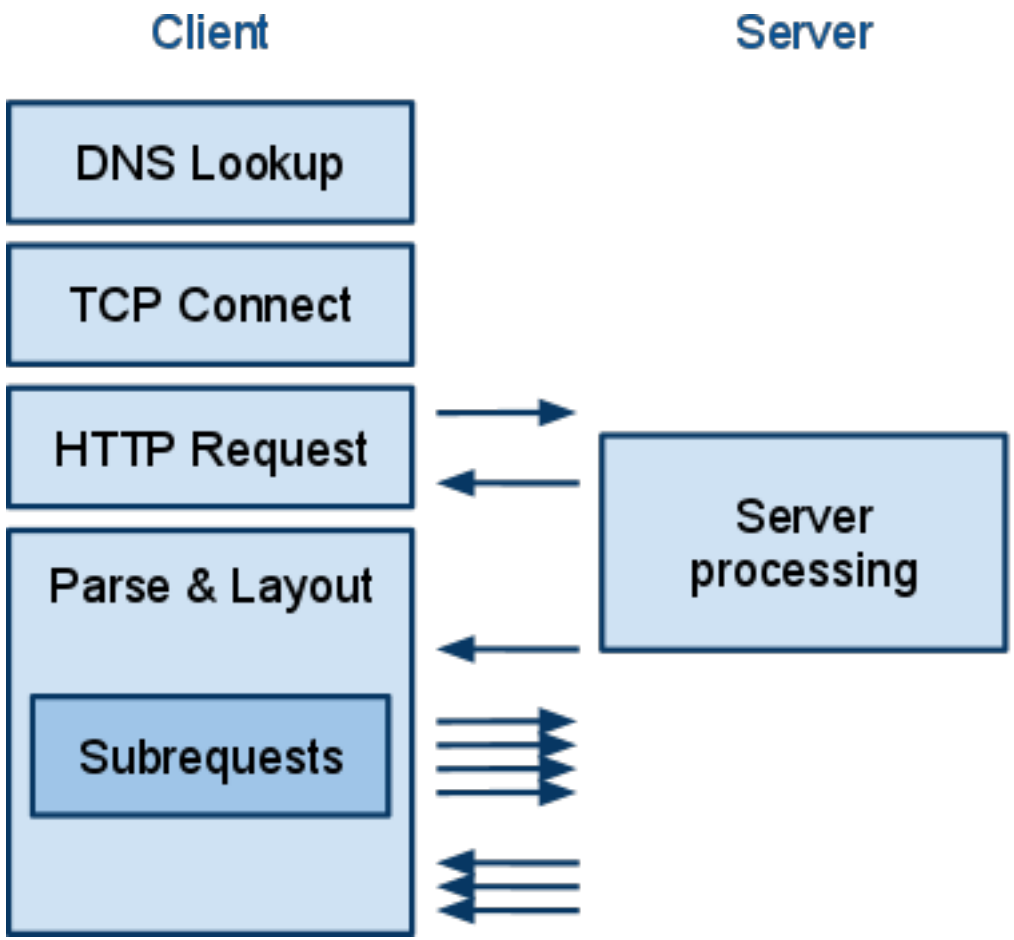
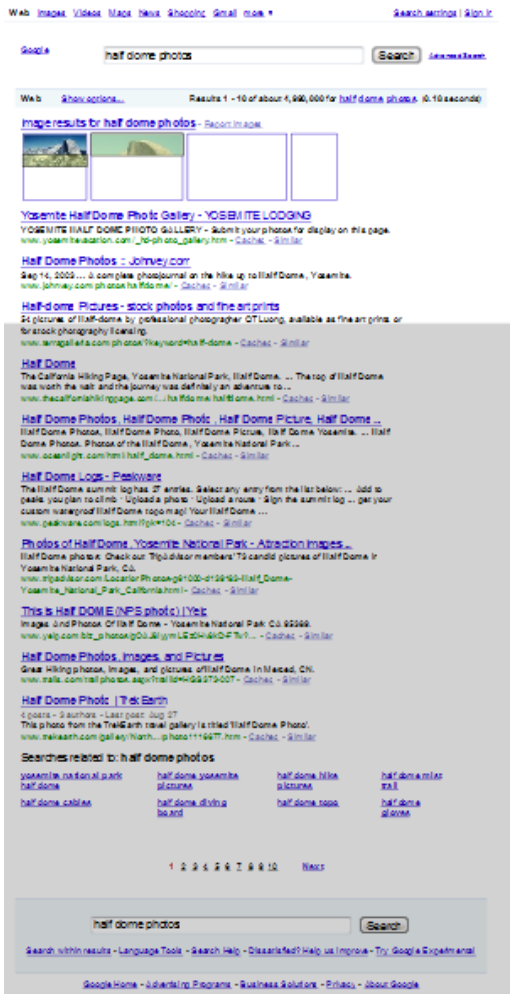


Render



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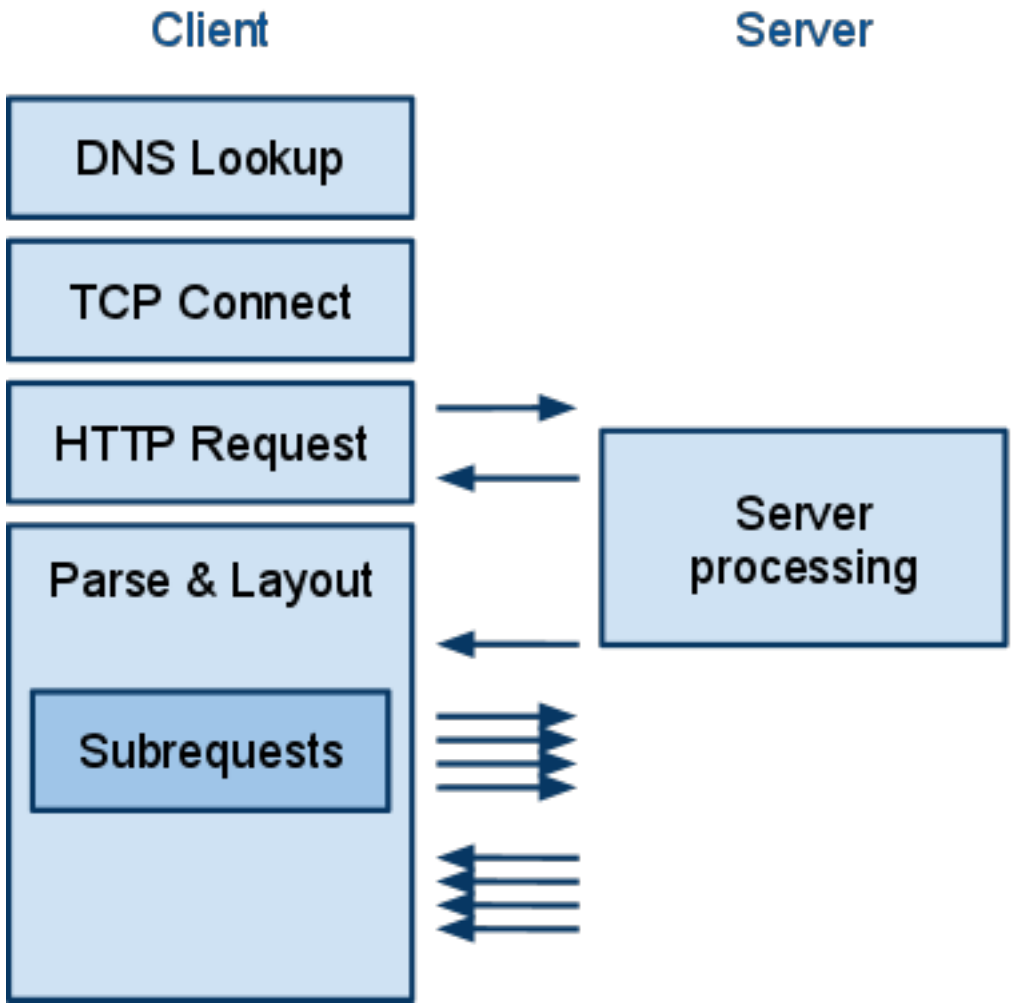

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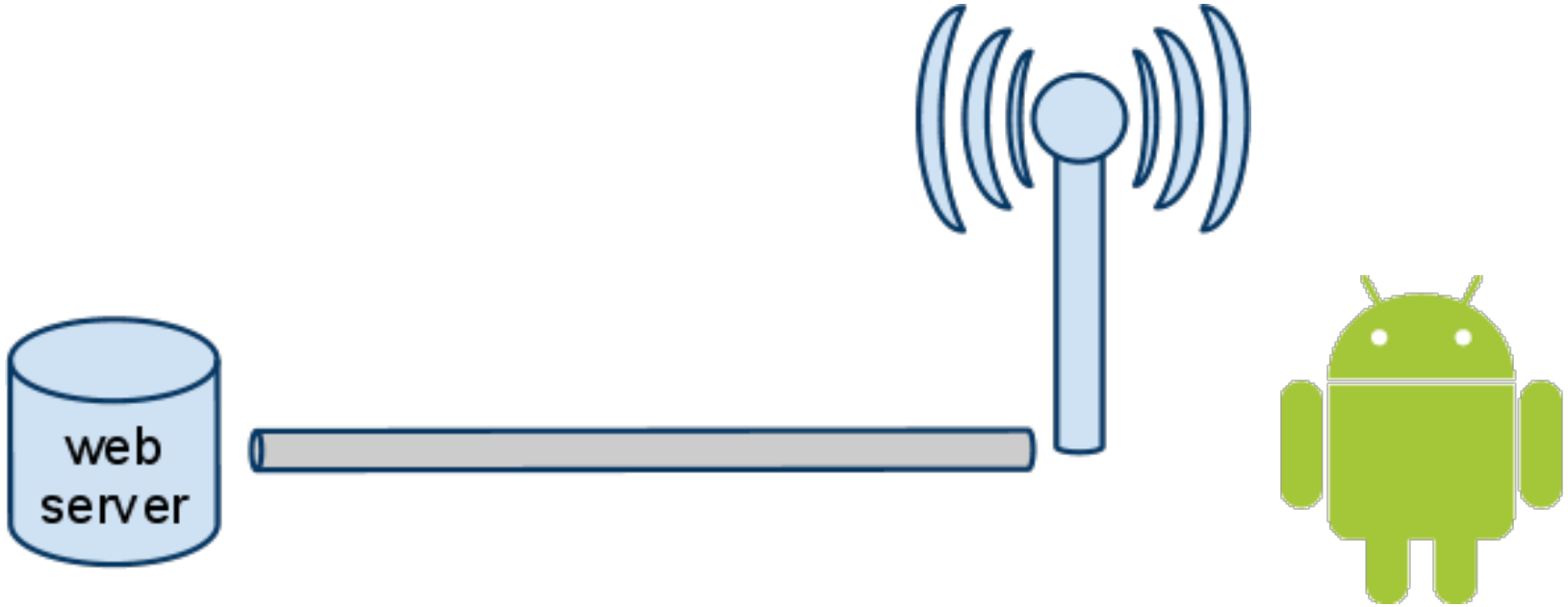
- **Key differences on mobile**
- Page Speed rules for mobile
- Tools for mobile web performance analysis

Key differences between mobile and desktop

- Networks
  - Round-trip time
  - Bandwidth
- Devices
  - CPU
  - Memory
  - Interaction model (touch vs click)

Life of a mobile web page load



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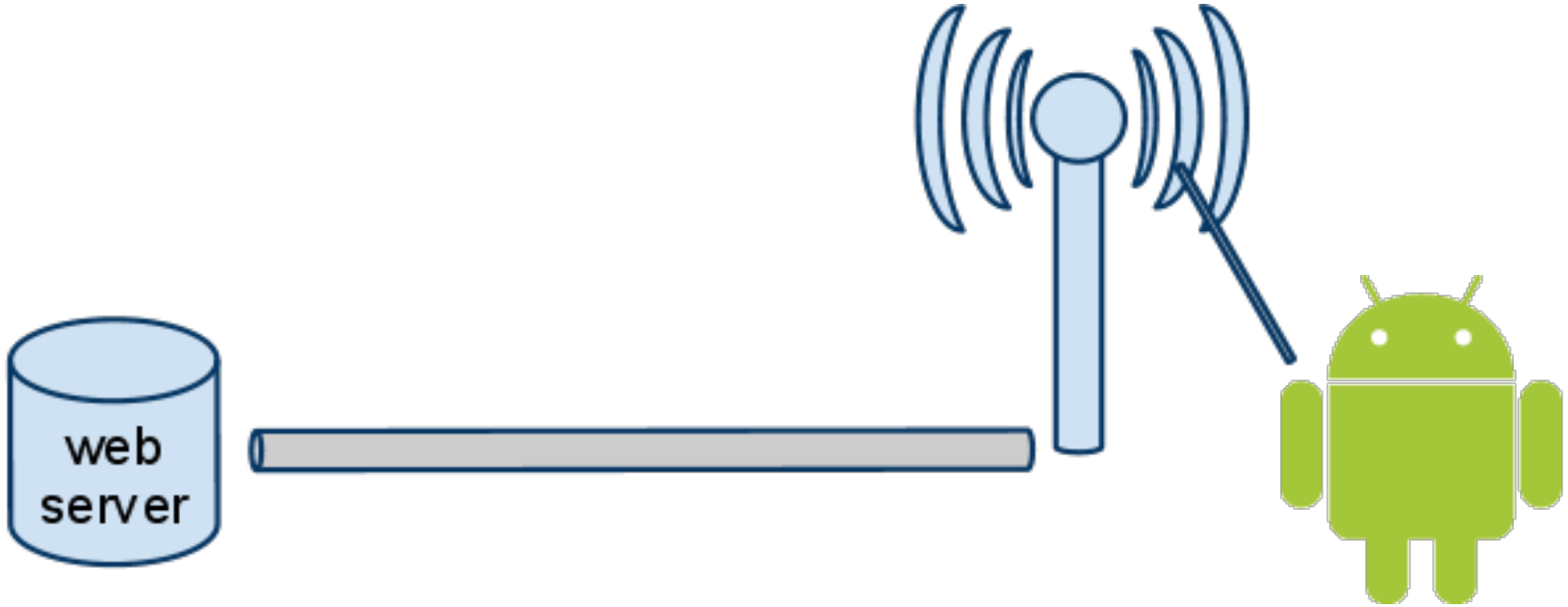
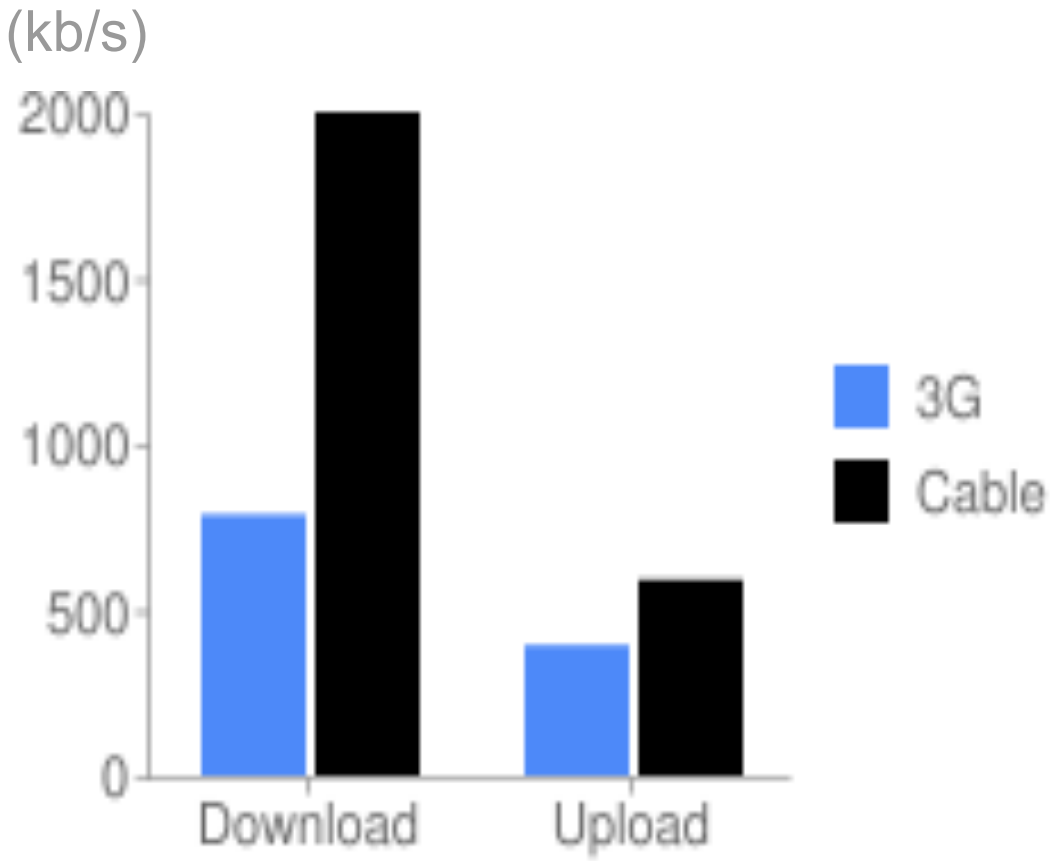


- Processing time
- **Bandwidth**
- **Round-trip time**
- **Parse**
- Resource fetches
- Layout and Render
- **JavaScript**

Mobile networks: round-trip times

- High channel establishment time
- Lower active channel RTTs
- Multi-modal distribution for a single client
- 4G may be a game changer

Mobile networks: bandwidth



Source: http://www.pcworld.com/zoom?id=167391&page=1&zoomIdx=1

Mobile devices: CPU and memory

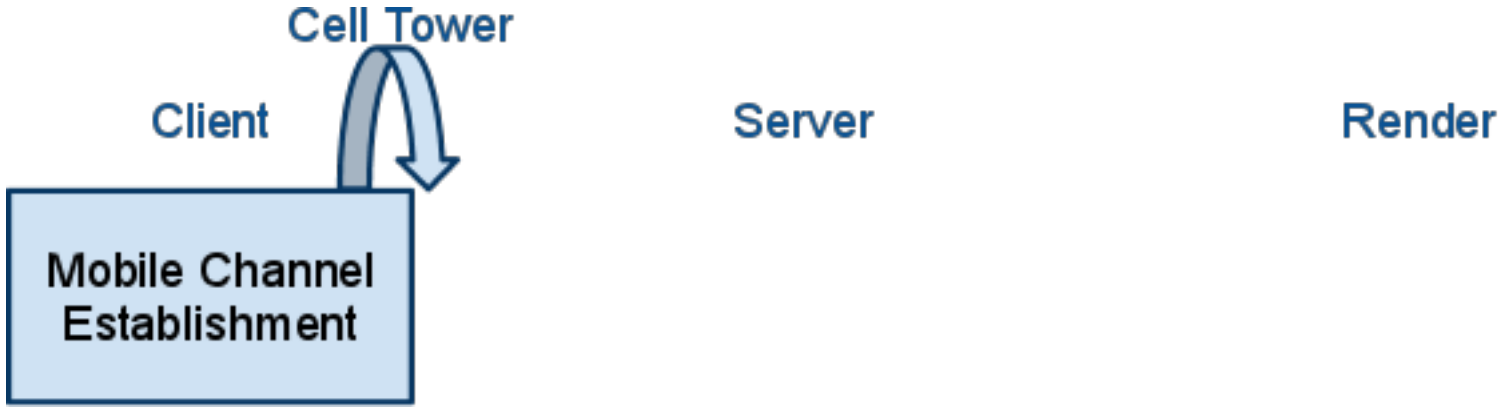
- Increased JavaScript parse and execution times
- Increased layout times
- More code and objects = more frequent GCs
- More complex DOM = greater memory usage

Device/Browser	MacBookPro (2.4GHz) Chrome 10	Nexus S Android Gingerbread	Samsung Captivate Android Eclair
Sunspider	427ms	5869ms	12606ms

Mobile devices: Interaction model

- Desktop: mouse
- Mobile: touch
- Mobile will synthesize click events, but with delays (300-500ms)

Example Mobile Page Load



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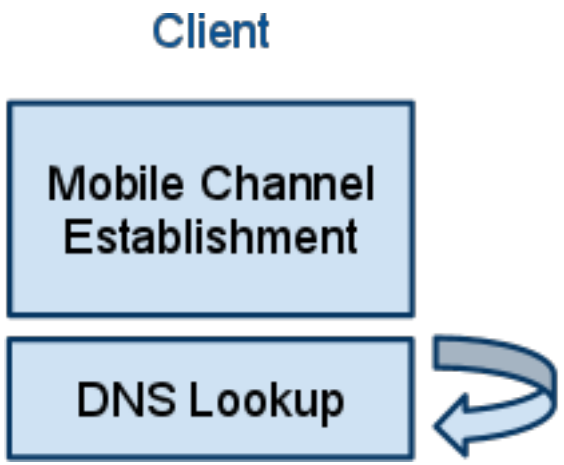

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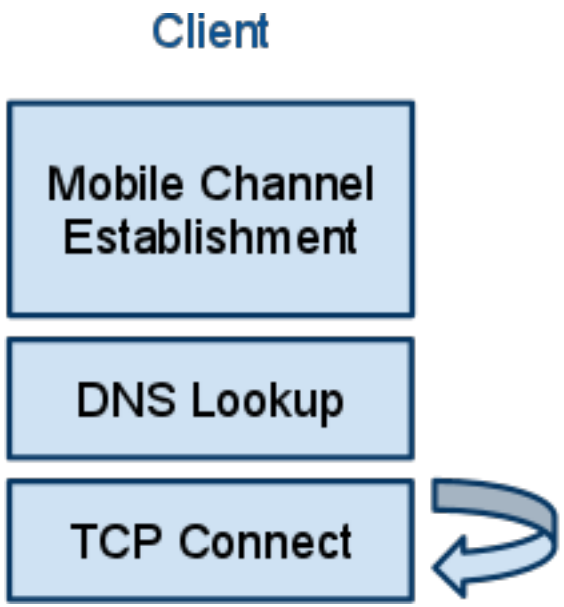

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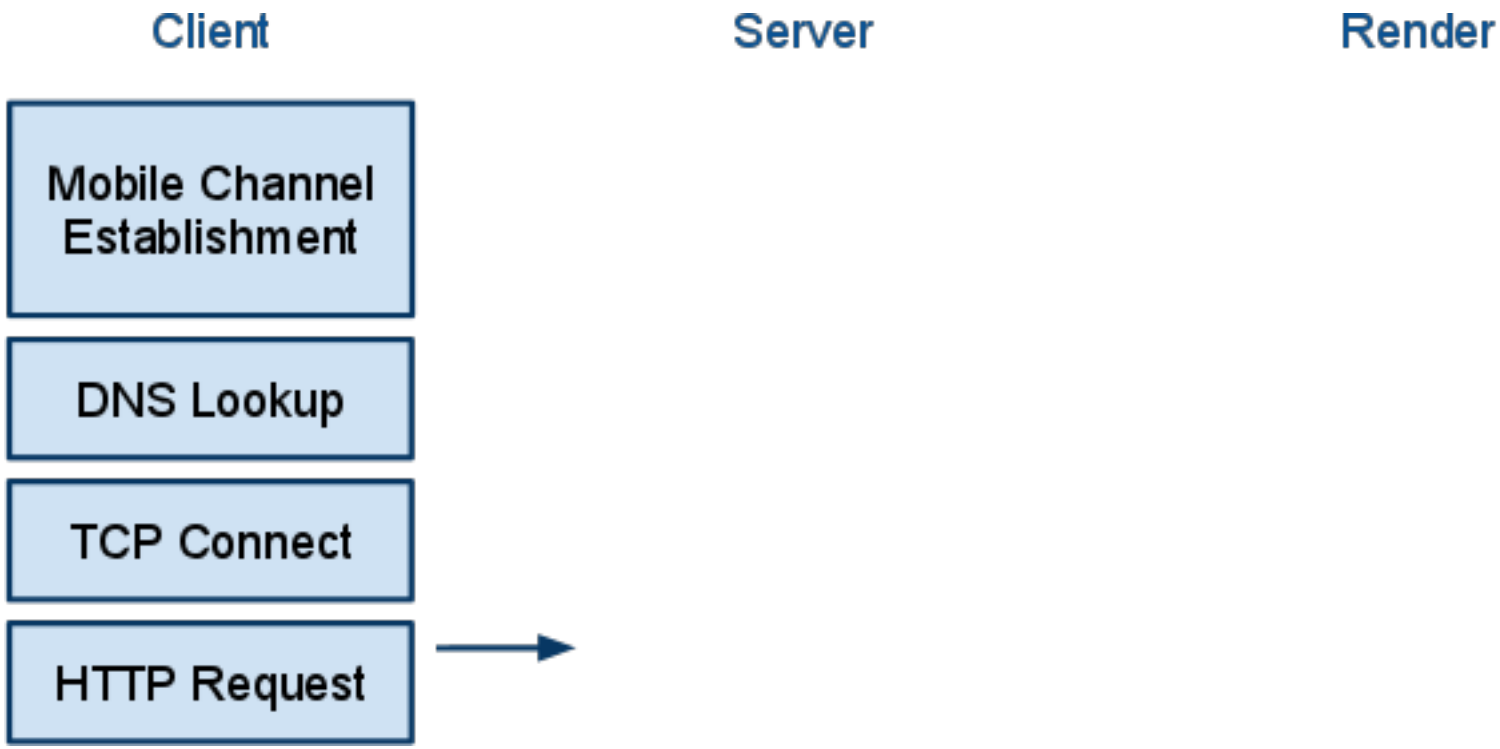

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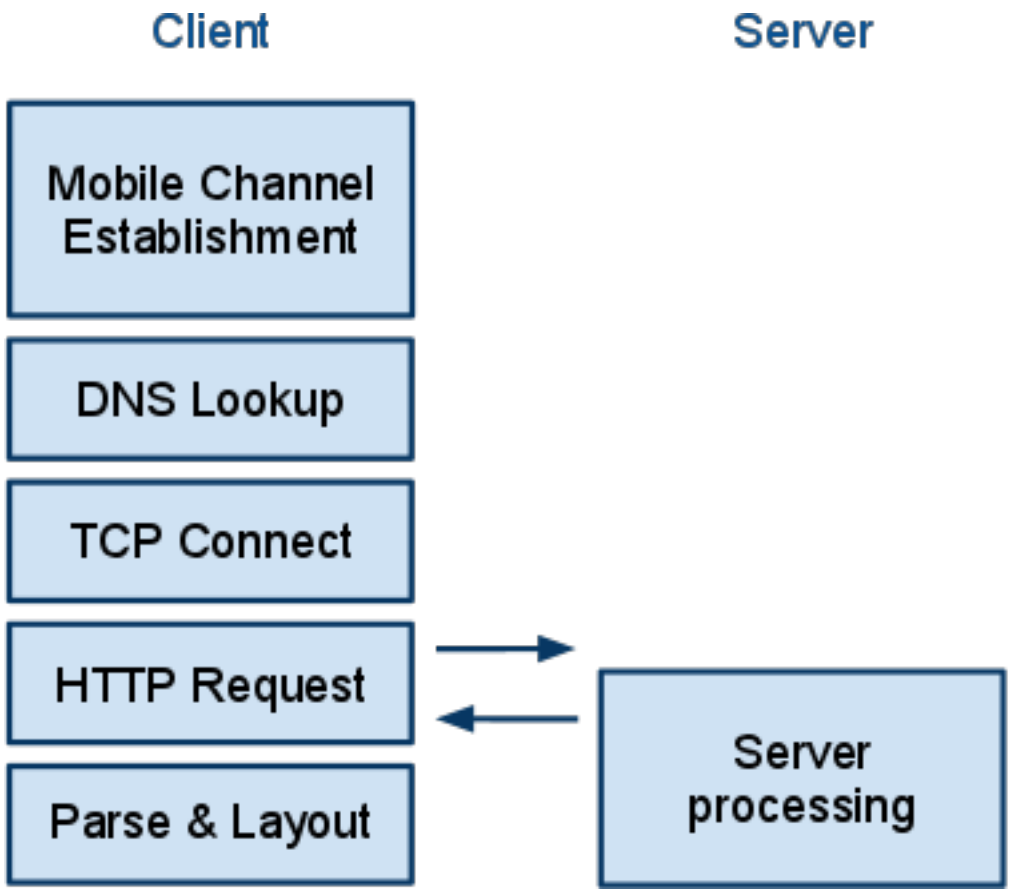

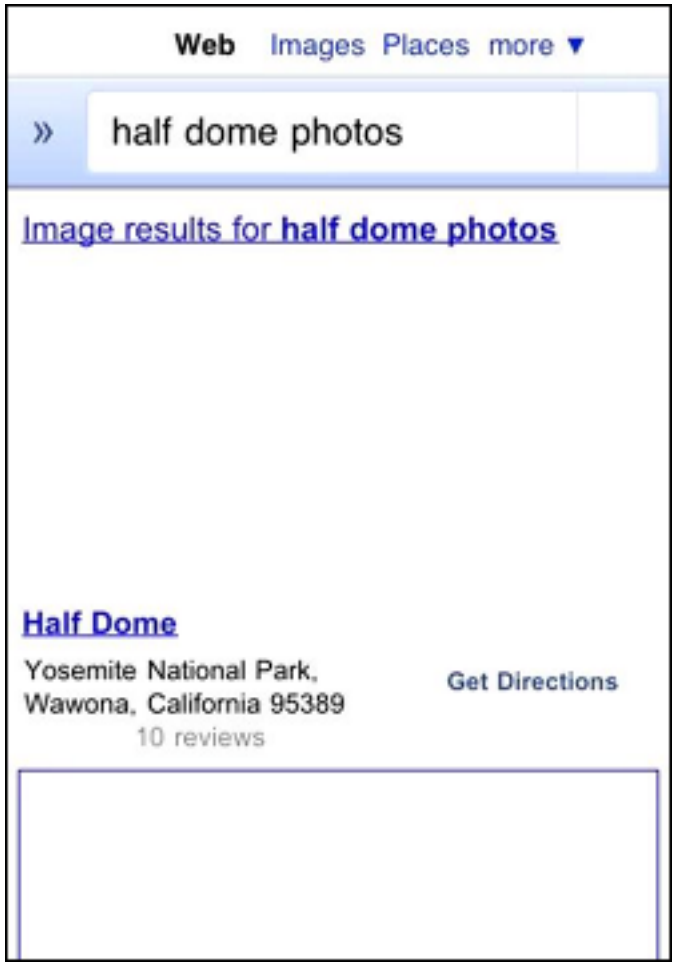

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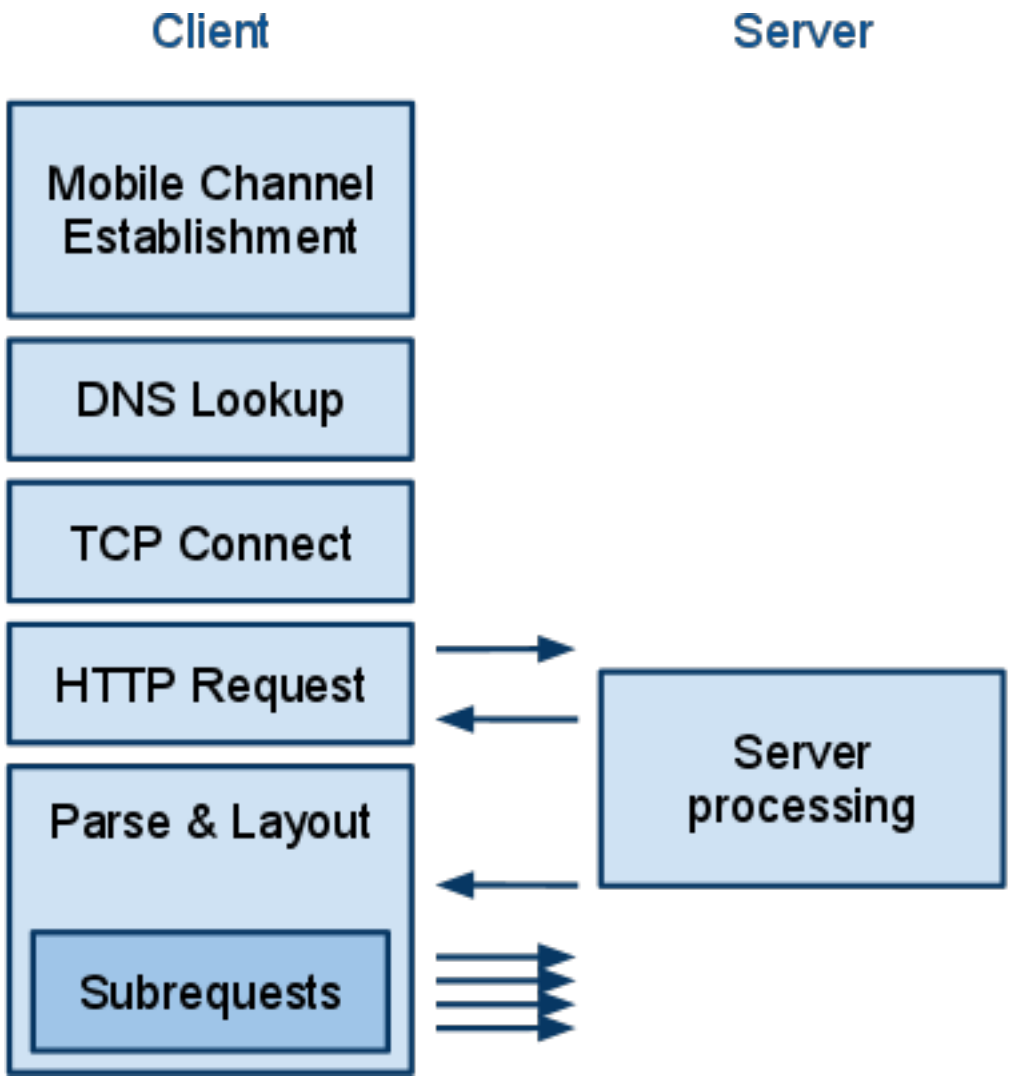

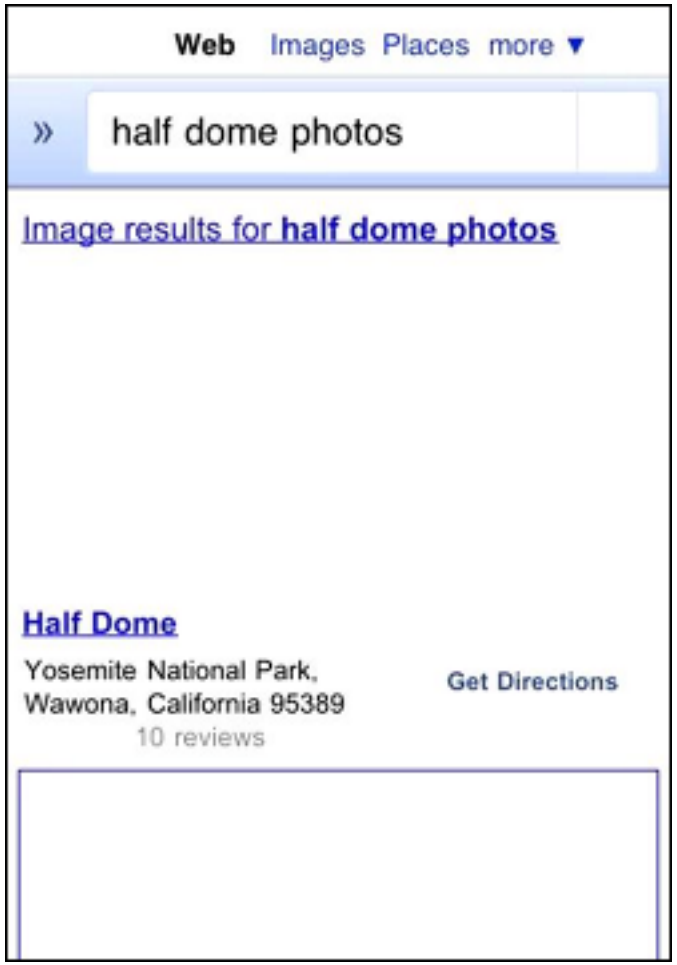

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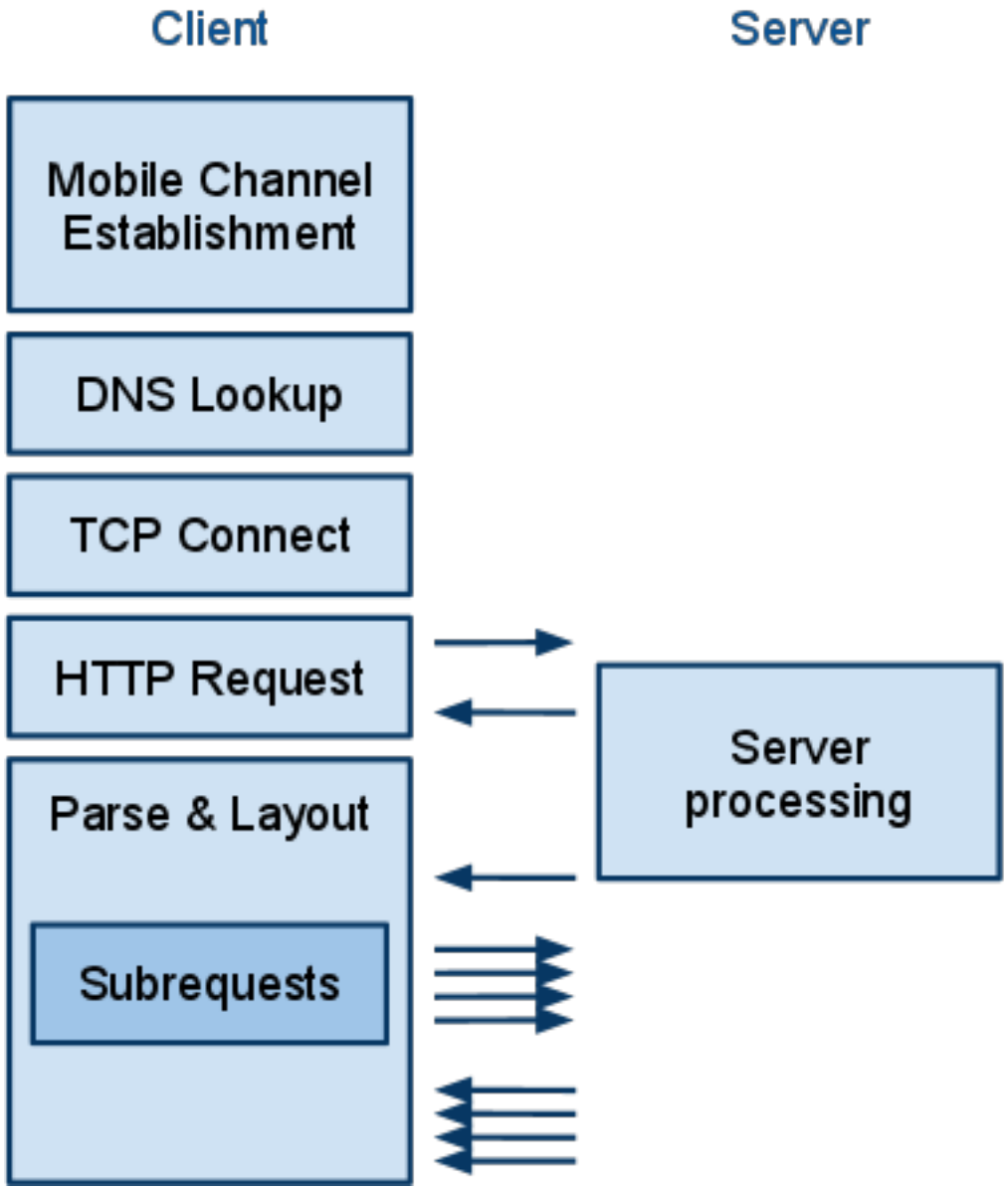

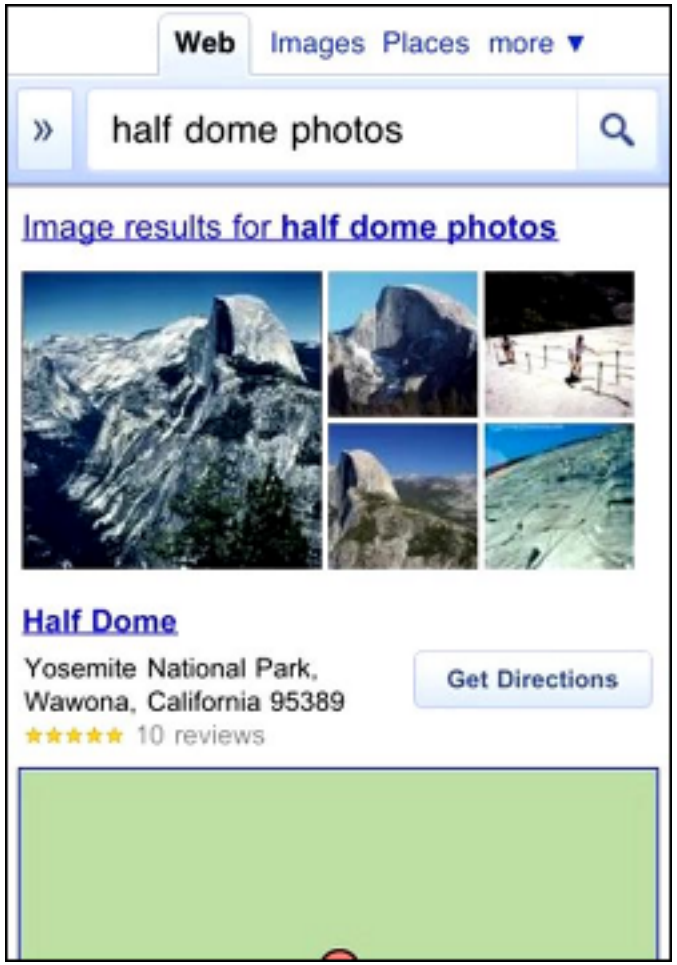

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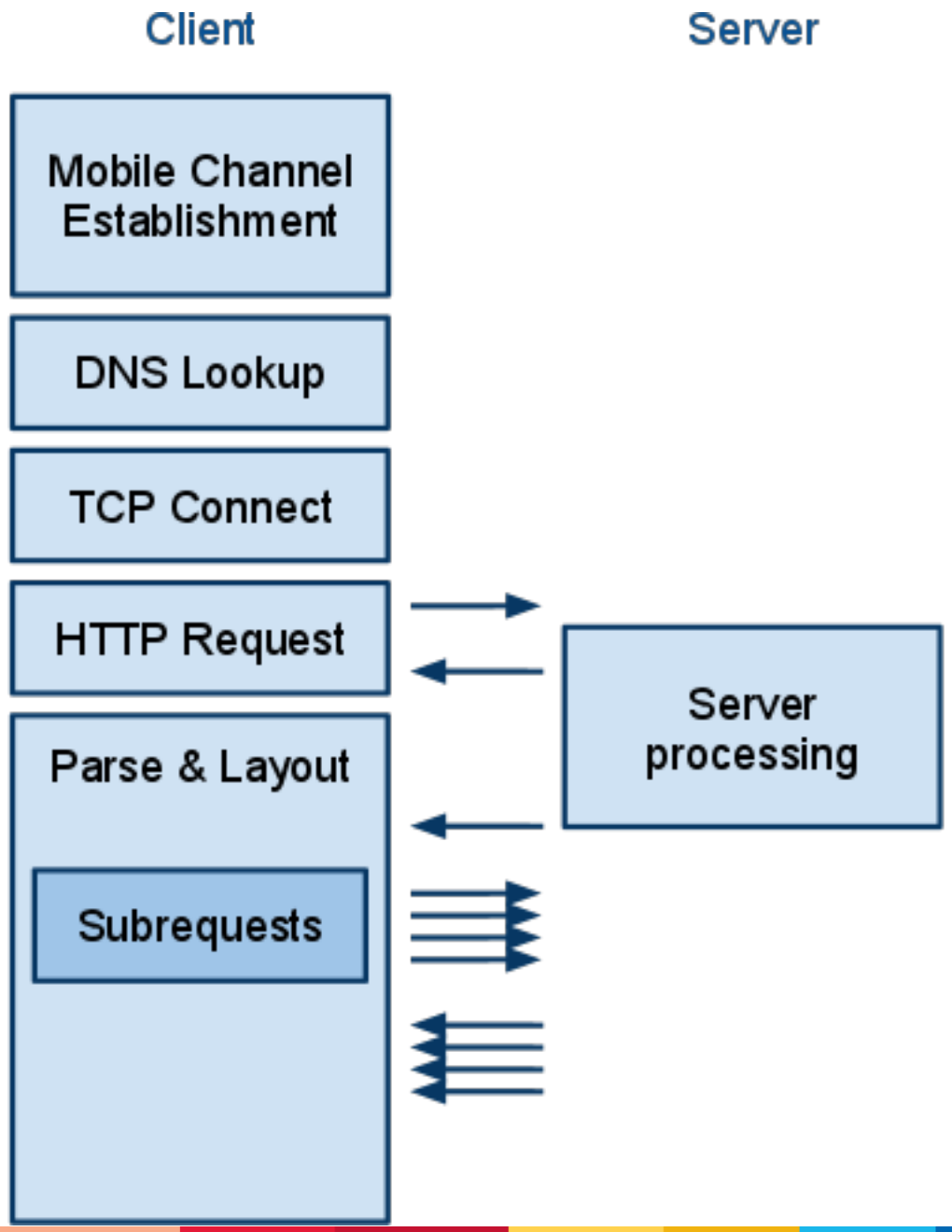

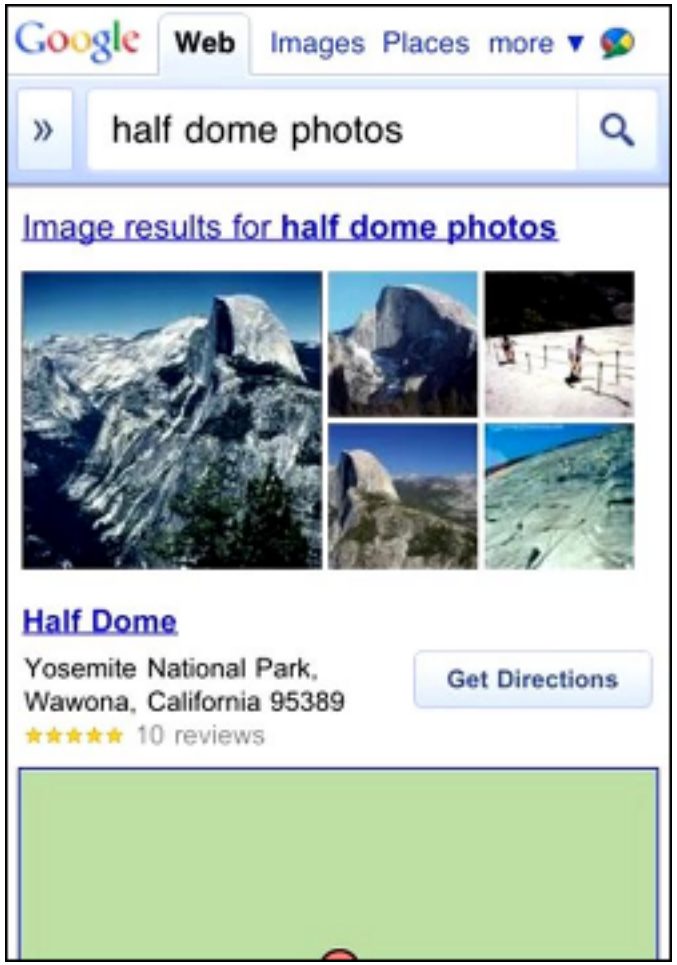

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Page Speed Rules for Mobile

1. Use an Application Cache
2. Defer parsing of JavaScript
3. Make landing page redirects cacheable
4. Prefer touch events
5. Enable Keep-Alive

1. Use an Application Cache

- Problem:
  - Very high initial connection cost
  - 2.5 seconds
- Solution:
  - HTML5 Application Cache

```
<!DOCTYPE HTML>
<html manifest="/my.manifest">...
</html>

CACHE MANIFEST
/my.js
/my.css
...
```

2. Defer Parsing of JavaScript

- Problem:
  - Cost of parsing JavaScript about 1 millisecond per kilobyte
  - Want to load JS up front to reduce round trips
- Solution:
  - Defer parsing of JavaScript until it is needed
  - Load JS in string literals, eval on demand

iPhone 4 Parsing time of popular JavaScript libraries.

Script	Size (kB)	Parsing (ms)
dojo	102	99
jquery-ui	195	181
jquery	84	76
prototype	160	119

3. Make landing page redirects cacheable

- Problem:
  - Landing page redirect chain
  - Example
    - example.com ->
    - www.example.com ->
    - m.example.com ->
    - www.example.com/m
  - User must wait multiple RTTs on every visit to the page
- Solution:
  - Make these redirects browser cacheable
  - Cache-Control: private, max-age > 0

4. Prefer touch events

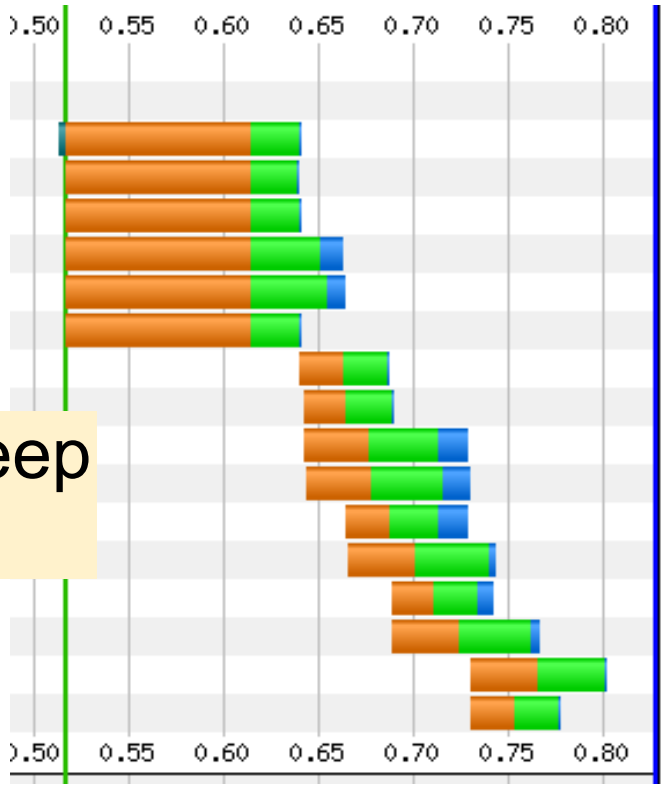
- Problem:
  - onclick event has 300-500ms delay
- Solution:
  - ontouch events have no delay
  - but be mindful about double-click, pinch-zoom

Try it yourself: pcapperf.appspot.com/fastbutton

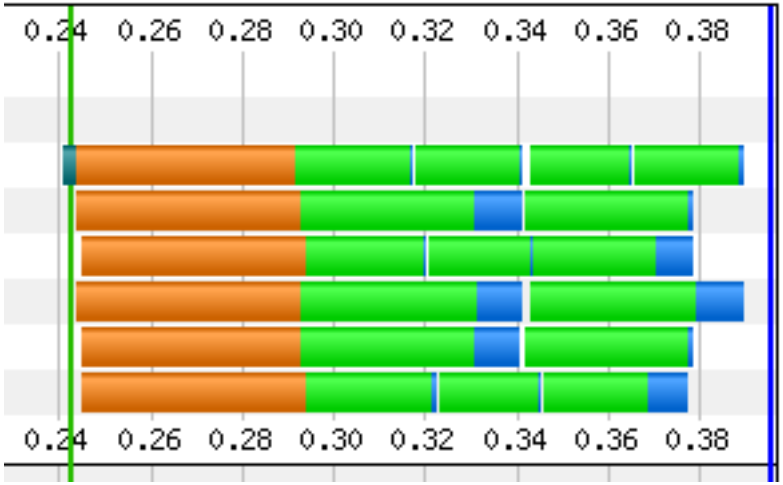
5. Enable Keep-Alive

- Problem:
  - Every connection takes a RTT
- Solution:
  - Enable Keep-Alive to save connections

not keep alive



keep alive



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Page Speed in Gomez Recorder and Mobile Products

Welcome Amir Rozenberg
Compuware

Compuware Application Performance Management

We help organizations optimize the performance of their business-critical applications

- Web, non-Web, mobile, streaming, cloud-based applications
- Across all customers, users, browsers, devices, infrastructure, and geographies
- Rapid issue notification with actionable diagnostics
- Insight into how these issues affect your business (revenue, brand, cost)

SaaS, Cloud-Based and On-Premise Offerings

- Rapid startup and payback

4,000+ Customers Worldwide

- 2,500+ enterprise customers
- 1,500+ SMB customers
- 12 of top 20 US sites

Global Reach

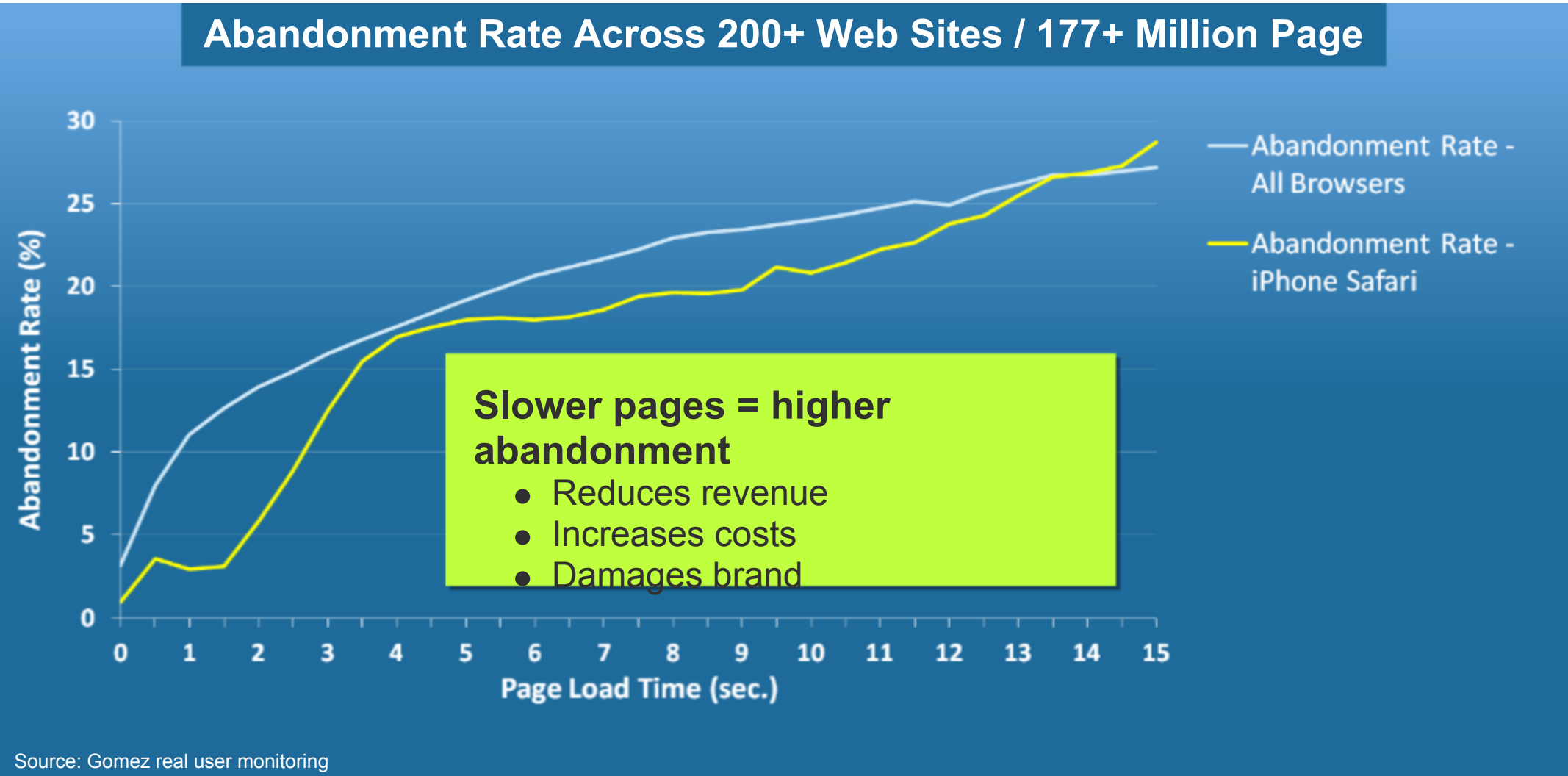
- Over 80 offices in 29 countries worldwide
- Strategic service delivery

Recognized as Industry Leader

- Gartner: *Leader in APM magic quadrant*
- Forrester: *"The leader in Web Experience Management"*

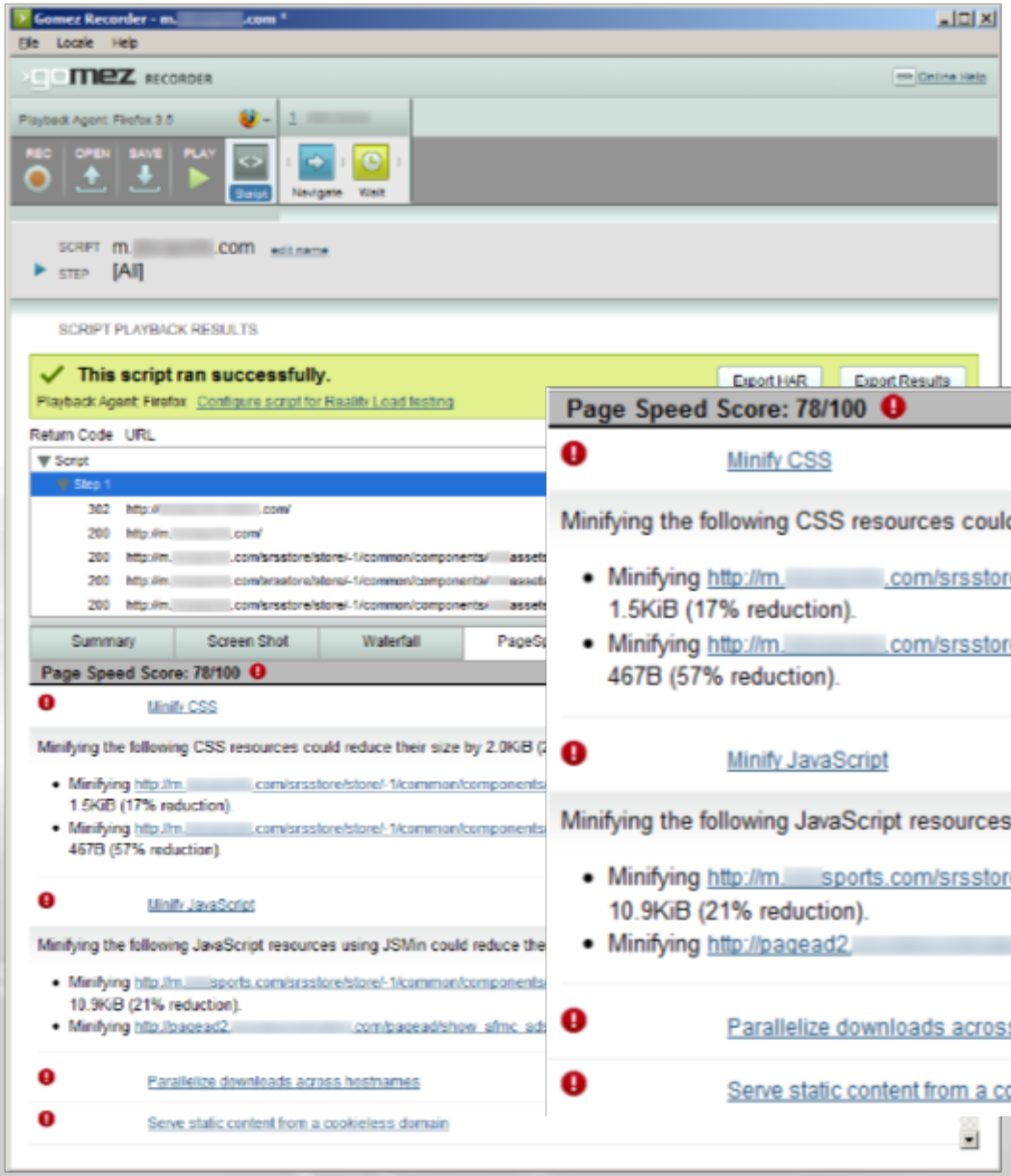
Mobile Website Performance Impacts Business Results

- **52% of consumers are unlikely to return to a website they had trouble accessing from their phone**
  - 40% said they'd likely visit a competitor's site instead
- **Clear correlation between increase in mobile site load time & abandonment**



Source: Gomez real user monitoring

Google Page Speed Integration With Compuware Application Performance Management Platform



Optimize web and mobile site speed with actionable insights & proven best practices

Page Speed Score: 78/100

Minify CSS

Minifying the following CSS resources could reduce their size by 2.0KiB (20% reduction).

- Minifying http://m. .com/srsstore/store/-1/common/components/ assets/styles/iPhone.css?myddasqfq could save 1.5KiB (17% reduction).
- Minifying http://m. .com/srsstore/store/-1/common/components/ assets/styles/orientation.css?nesd=4cX could save 467B (57% reduction).

Minify JavaScript

Minifying the following JavaScript resources using JSMin could reduce their size by 10.9KiB (20% reduction).

- Minifying http://m. sports.com/srsstore/store/-1/common/components/ assets/scripts/iPhone.js?dsaasajkl=4as... could save 10.9KiB (21% reduction).
- Minifying http://pagead2 .com/pagead/show_afmc_ads.js could save 6B (0% reduction).

Parallelize downloads across hostnames

Serve static content from a cookieless domain

Compuware

Brief survey of mobile performance tools

page speed labs

Page Speed Online Home Docs FAQ

Get suggestions to speed up your site:

news.google.com

Pcapperf

Waterfall chart

Show Statistics

page_0				
GET en.wikipedia.org	301 Moved Permar	en.wikipedia.org	20 B	1.12s
GET Main_Page	200 OK	en.wikipedia.org	15.1 KB	200ms
GET combined.min.css?2	200 OK	bits.wikimedia.org	3.8 KB	281ms
GET commonPrint.css?2	200 OK	bits.wikimedia.org	1.6 KB	242ms
GET shared.css?283z	200 OK	bits.wikimedia.org	4.3 KB	292ms
GET main-ltr.css?283z	200 OK	bits.wikimedia.org	5.1 KB	295ms
GET index.php?title=Mec	200 OK	en.wikipedia.org	6.5 KB	63ms
GET index.php?title=Mec	200 OK	en.wikipedia.org	958 B	168ms
GET index.php?title=Mec	200 OK	en.wikipedia.org	176 B	154ms
GET index.php?title=Mec	200 OK	en.wikipedia.org	1.1 KB	153ms
GET index.php?title=-&a	200 OK	en.wikipedia.org	92 B	56ms
GET Special:BannerCont	200 OK	en.wikipedia.org	1.6 KB	50ms
GET index.php?title=-&a	200 OK	en.wikipedia.org	5.3 KB	51ms
GET jquery-ui-1.7.2.css?'	200 OK	bits.wikimedia.org	4.8 KB	52ms
GET wikibits.js?283z	200 OK	bits.wikimedia.org	9.8 KB	111ms
GET jquery.min.js?283z	200 OK	bits.wikimedia.org	27.4 KB	1.18s
GET ajax.js?283z	200 OK	bits.wikimedia.org	1.9 KB	968ms
GET mwsuggest.js?283z	200 OK	bits.wikimedia.org	8.2 KB	136ms
GET MobileRedirect.js?2	200 OK	bits.wikimedia.org	724 B	52ms
GET plugins.combined.r	200 OK	bits.wikimedia.org	20.4 KB	111ms
GET Vector.combined.mi	200 OK	bits.wikimedia.org	3.6 KB	51ms
GET ::Home?wasRedirec	200 OK	en.m.wikipedia.org	3.4 KB	168ms
GET iphone.css	200 OK	en.m.wikipedia.org	1.7 KB	55ms
GET jquery.js	200 OK	en.m.wikipedia.org	16.4 KB	285ms
GET application.js	200 OK	en.m.wikipedia.org	994 B	133ms
GET w.gif	200 OK	en.m.wikipedia.org	379 B	47ms
GET s.gif	200 OK	en.m.wikipedia.org	1.7 KB	49ms
GET 100px-VOA_CHINES	200 OK	upload.wikimedia.o	4 KB	230ms
GET 100px-Mcgregor.jpg	200 OK	upload.wikimedia.o	4 KB	234ms
29 Requests			154.7 KB	4.63s

JDrop

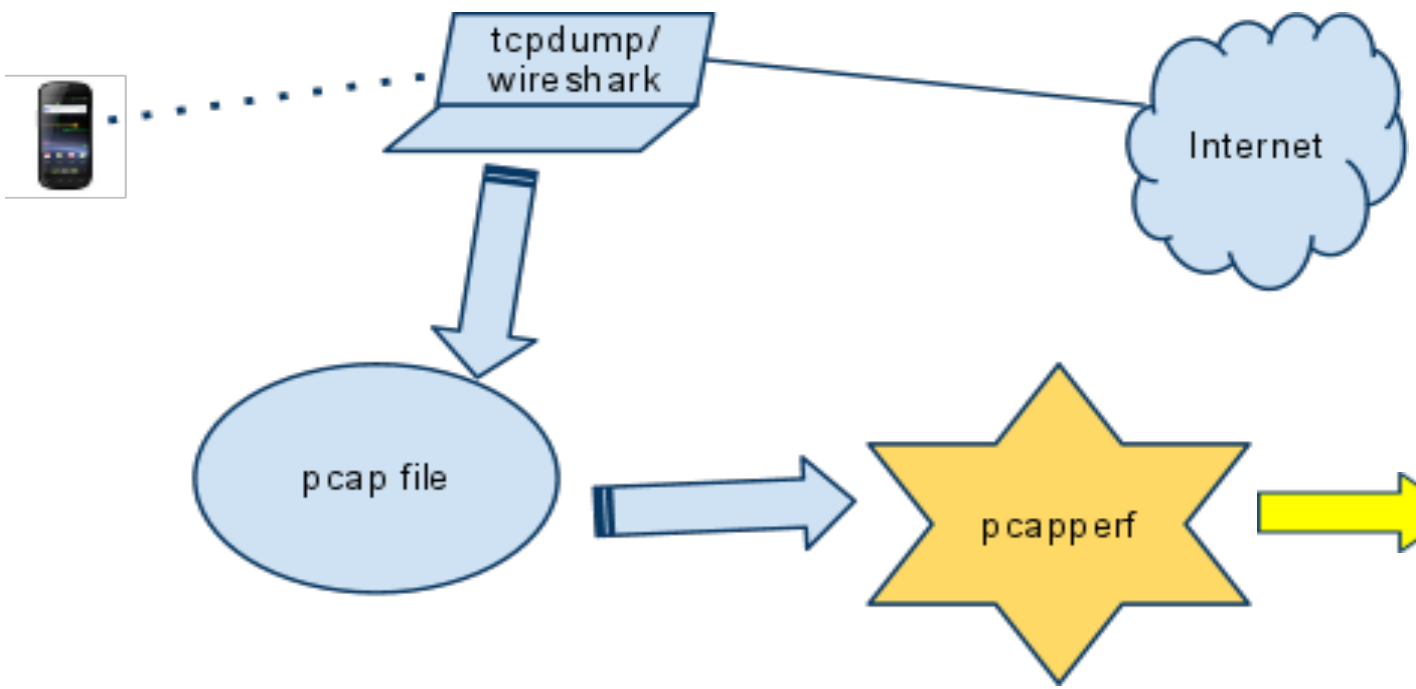
- Firebug Lite
- Page Resources
- Docsource
- DOM Monster
- SpriteMe
- CSSess
- Zoompf

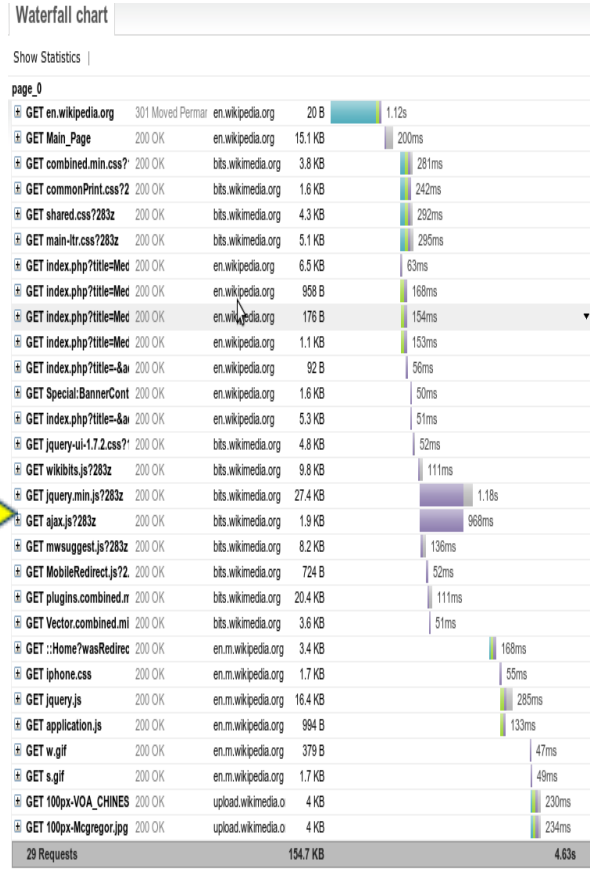
Mobile Perf home

Blaze.io

Pcapperf

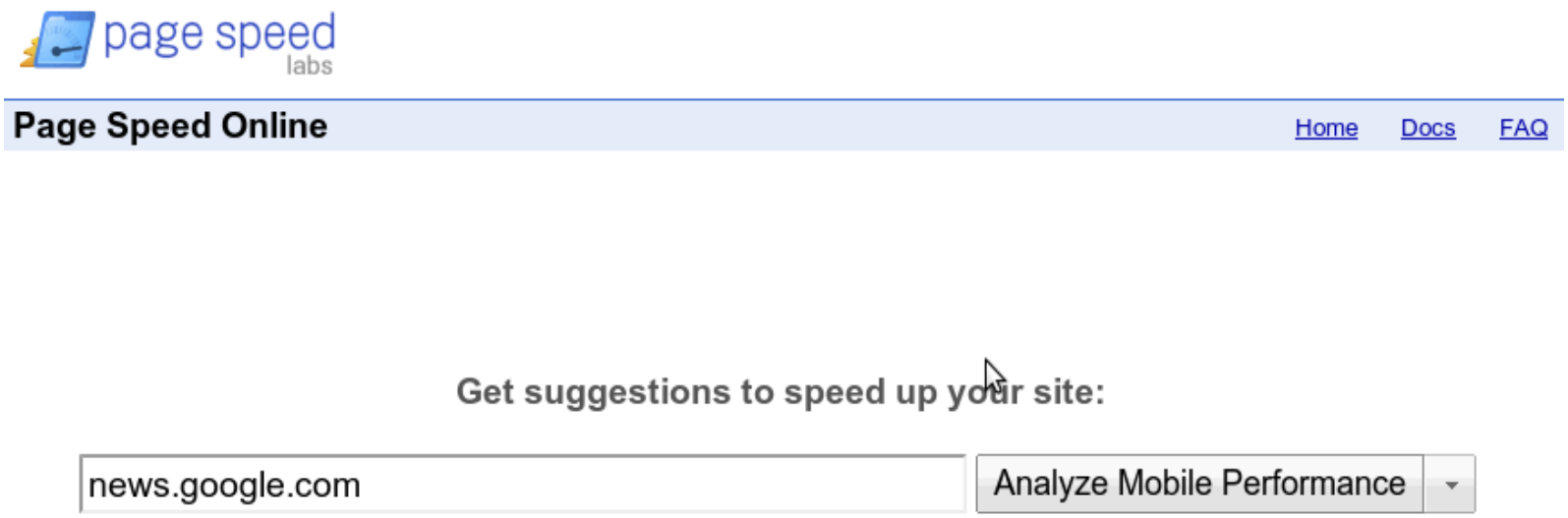
http://pcapperf.appspot.com





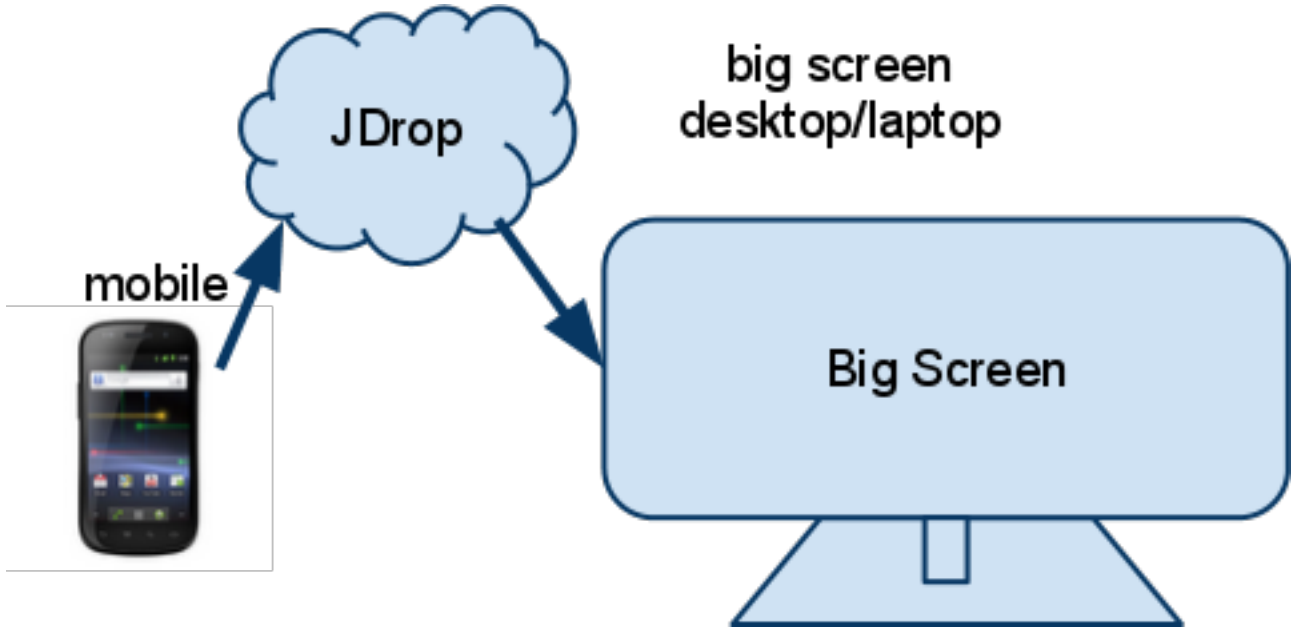
Page Speed Online

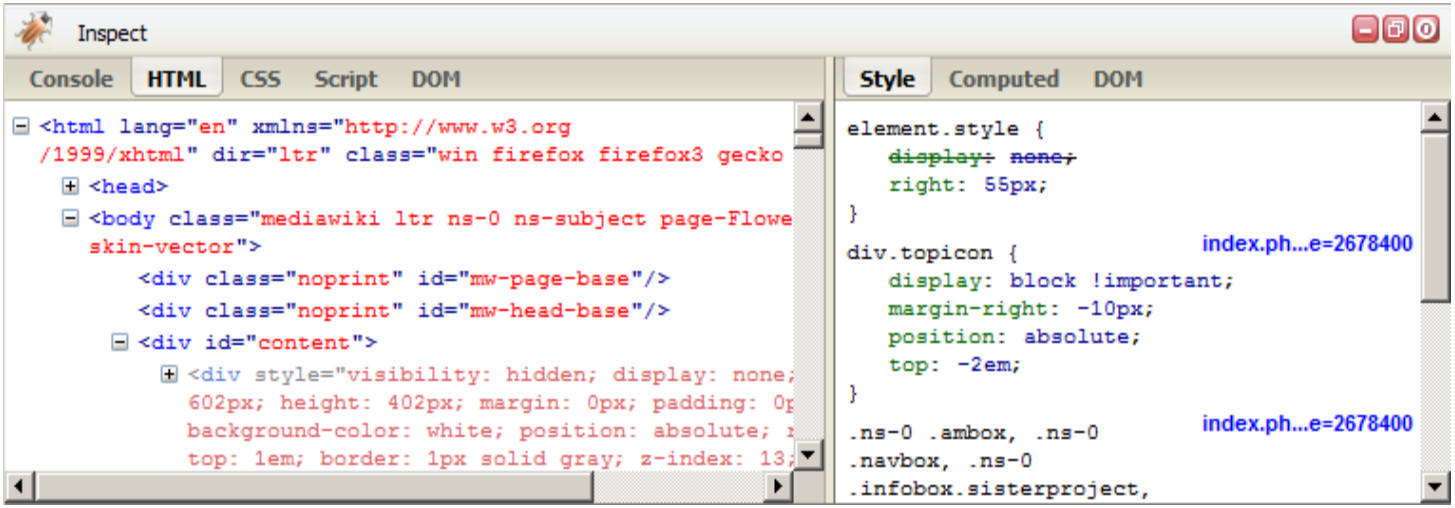
http://pagespeed.googlelabs.com



JDrop

http://jdrop.org





Blaze.io

news.google.com

Select a device | 1 Run

Select a device
iPhone 4.3
Android 2.2
Android 2.3

ure?
acts load times
ate?

Run Performance Test

Performance Result Averages for iPhone

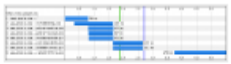
Average Load Time	Average Pagesize
2.7s	229.73kb

Your site is faster than 75% of the websites

Want to learn more about how The Mobitest Performance Tool works and the Percentile is calculated? Visit our Methodology page

View Methodology

Test 1:

Load Time	Pagesize	Waterfall Chart	Screenshot
2.7s	229.73kb		

Summary

- Mobile network and device characteristics present new optimization opportunities.
  - Mobile channel establishment
  - Limited CPU, memory
- Use Page Speed and other tools to understand your performance and optimize your site for mobile.
  - Page Speed Online
  - http://pcapperf.appspot.com/
  - JDrop.org
  - http://blaze.io for mobile

Questions?

Thanks

- Learn and use
  - http://code.google.com/speed/page-speed/
  - http://pagespeed.googlelabs.com/
- Contribute
  - http://code.google.com/p/page-speed/
- Discuss
  - http://groups.google.com/group/page-speed-discuss

Hashtags: #io2011 #DevTools
Feedback: http://goo.gl/CE1ZU

Use Page Speed to Optimize Your Web Site for Mobile

Bryan McQuade and Libo Song, May 10, 2011

Hashtags: #io2011 #DevTools
Feedback: http://goo.gl/CE1ZU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11
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