



making drupal run fast

Objectives – Improve drupal performance

- Provide Simple tips on Increasing Drupal performance
- We have some data from load testing a site in these different configs:
 - ++ plain drupal install
 - ++ plain drupal install with php accelerator
 - ++ drupal with cache
 - ++ drupal with cache and php accelerator
 - ++ mysql tweaks squid/varnish installs
- How to measure speed of site in browser using firebug and yslow/page speed
- Good practices of running common tools for monitoring like: cacti, installing slow query log, devel
- We will look at front end of site performance tuning

Outline

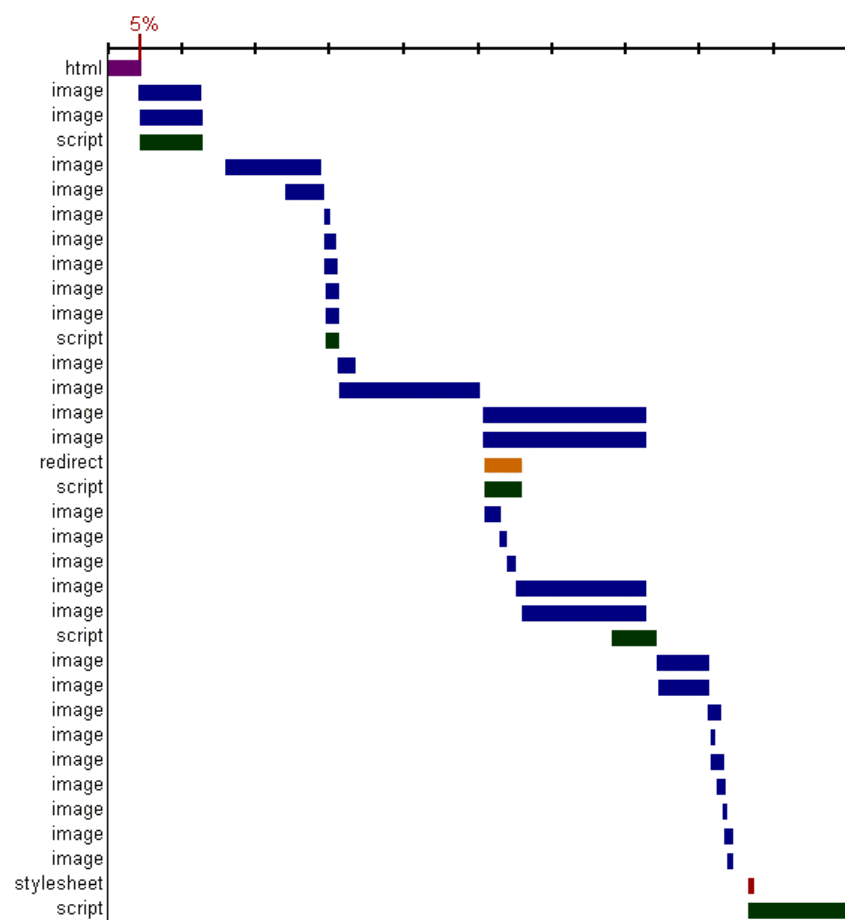
- Definitions – what are we talking about
- Performance Test – real world study
- Tools – Used in measuring and testing. Tools that tell us how fast, and what happens to how fast under some load
- Front End Improvement – What can we do to help 80% of the load
- Back End Improvement – What can we do to make the server faster
- More Tools & Modules

About promet

- Build websites – we built on LAMP stack, specializing in Drupal development
 - www.prometsource.com
- Managed hosting in our Chicago Data center
 - www.promethost.com
- History
 - Founded in 2003
 - 20+ employees, WHQ in Chicago, but mostly virtual
- Customers
 - Sprint.com
 - US Chamber of Commerce
 - Many Startups, Associations and businesses

Definitions

- Front End Performance Improvement - In sampling the top ten U.S. websites, all but one spend less than 20% of the total response time getting the HTML document. The other 80+% of the time is spent dealing with what's in the HTML document, namely, the front-end. That's why the key to faster web sites is to focus on improving front-end performance.
- Back End Performance Improvement – Server related to increase time to First Byte
- Performance – How fast does the page load
- Scalability - The ability for a distributed system to easily expand and contract its resource pool to accommodate heavier or lighter loads.
- High Availability



- In sampling the top ten U.S. websites, all but one spend less than 20% of the total response time getting the HTML document. The other 80+% of the time is spent dealing with what's in the HTML document, namely, the front-end. That's why the key to faster web sites is to focus on improving front-end performance.

Performance and Scalability



➤ ... and now when im not the only one?



➤ How fast do I get my page

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Free Enterprise


News and Views From the U.S. Chamber of Commerce December 2009

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PREPARING AMERICA'S FUTURE WORKERS

- Report Says Innovation In Education Is Lacking
- The Workforce Imperative
- Climate Change Fuels New Lawsuits
- Health Care By The Numbers
- Support Grows for Free Enterprise Campaign

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News Updates


The latest news on the issues that affect your business.

- U.S. Chamber Guide Helps Businesses Start Workplace Wellness Programs
- Chamber Recognizes Corporate Citizenship
- Survey Shows Small Business Confidence Is Up
- Senate Health Care Bill Misses the Mark, U.S. Chamber Says
- Voters Oppose Health Care Reform Legislation
- U.S. Chamber Roundtable Focuses on Job Creation
- U.S. Chamber Hosts Event to Connect Returning Veterans With Employers

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Videos

TV Ad (:60): The Race



Commentary

Health Care: It's Time for the Main Event

By Tom Donohue, President and CEO

Health care legislation passed another important hurdle recently when the Senate voted to begin debating it. So what does the U.S. Chamber think of the Senate bill, and what happens next?

The Senate bill, although an improvement over other legislation, fails to address a number of issues that are of concern to the business community. It would create a government-run health plan, force employers to offer health insurance or pay big fines, tax working Americans, and slash Medicare--all while adding hundreds of billions of dollars to the budget. What's more, the Congressional Budget Office tells us that 24 million Americans will still not have health insurance under this bill.

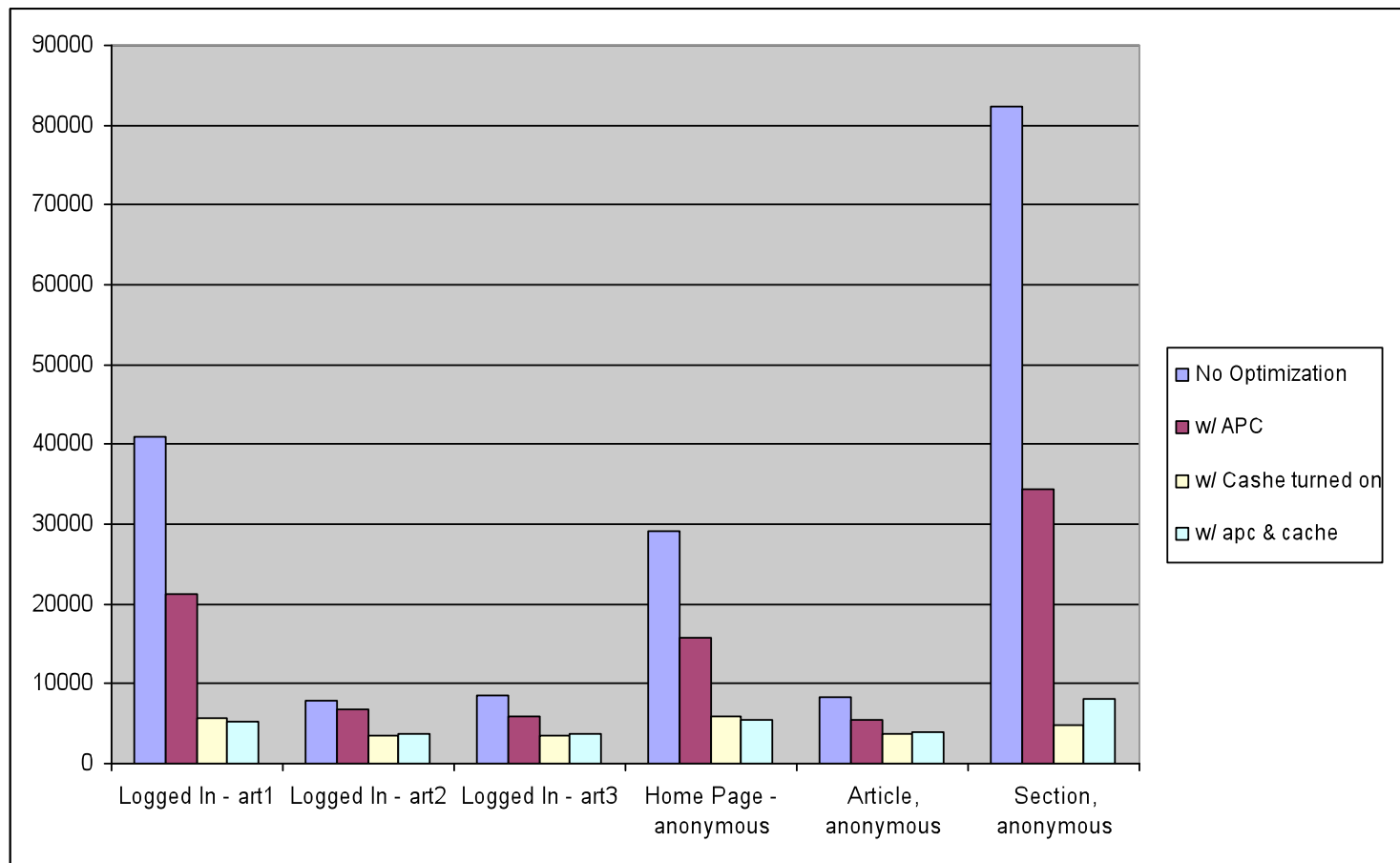
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- A Test of Leadership
- Innovation Can Save Our Schools
- Ten Reasons to Support Free Enterprise

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USChamber Magazine – APC & Drupal Cache



Test Results

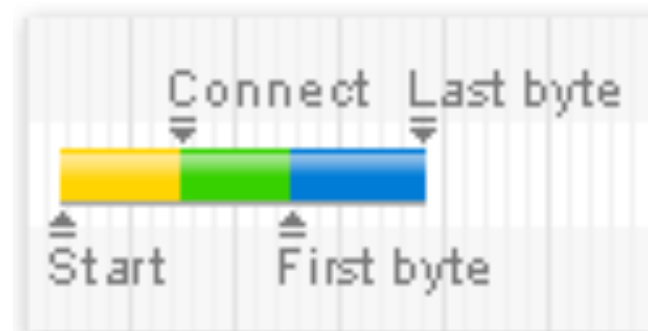
- Jmeter
 - Running 200 page loads, increasing at a second interval
 - Hitting 6 pages
 - 3 anonymous, 3 authenticated pages
- Server Load went from 20 to 5 during these tests

Tools

- Yslow for firebug
 - <http://developer.yahoo.com/yslow/>
- Page Speed- firebug
 - <http://code.google.com/speed/articles/>
- Pingdom
 - <http://tools.pingdom.com>
- Web Page Test
 - <http://www.webpagetest.org>
- Charles Web Debugging Proxy (not free)
 - <http://www.charlesproxy.com/>
- Apache Bench
 - <http://httpd.apache.org/docs/2.0/programs/ab.html>
- JMeter
 - <http://jakarta.apache.org/jmeter/>

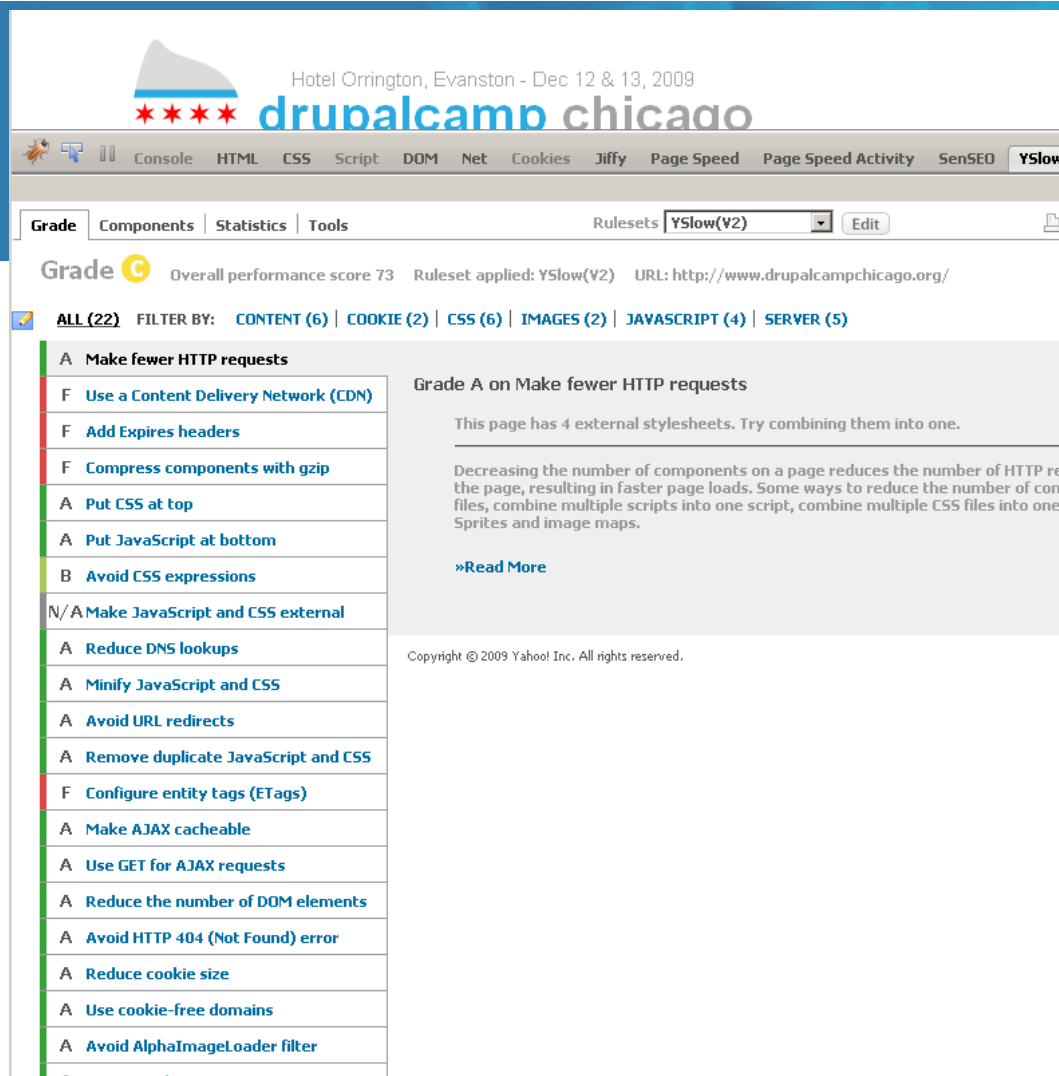
Waterfall diagrams

- Start - when browser sends request to server
- Connect – when server acknowledges the request
- First Byte – time it takes the server to render the page and send the first byte of the HTML
- Last Byte – time it takes to transform the data



Yslow

- Steve Souders, while he was Chief Performance at Yahoo! Created YSLOW and best practices
- Firefox firebug plug in
- Grades your site based on yahoo best practices
- Scores – higher is better



Hotel Orrington, Evanston - Dec 12 & 13, 2009

drupalcampchicago

Grade Components Statistics Tools Rulesets YSlow(V2) Edit

Grade C Overall performance score 73 Ruleset applied: YSlow(V2) URL: http://www.drupalcampchicago.org/

ALL (22) FILTER BY: CONTENT (6) COOKIE (2) CSS (6) IMAGES (2) JAVASCRIPT (4) SERVER (5)

Grade	Component
A	Make fewer HTTP requests
F	Use a Content Delivery Network (CDN)
F	Add Expires headers
F	Compress components with gzip
A	Put CSS at top
A	Put JavaScript at bottom
B	Avoid CSS expressions
N/A	Make JavaScript and CSS external
A	Reduce DNS lookups
A	Minify JavaScript and CSS
A	Avoid URL redirects
A	Remove duplicate JavaScript and CSS
F	Configure entity tags (ETags)
A	Make AJAX cacheable
A	Use GET for AJAX requests
A	Reduce the number of DOM elements
A	Avoid HTTP 404 (Not Found) error
A	Reduce cookie size
A	Use cookie-free domains
A	Avoid AlphaImageLoader filter
A	Preload images to HTTP

Grade A on Make fewer HTTP requests

This page has 4 external stylesheets. Try combining them into one.

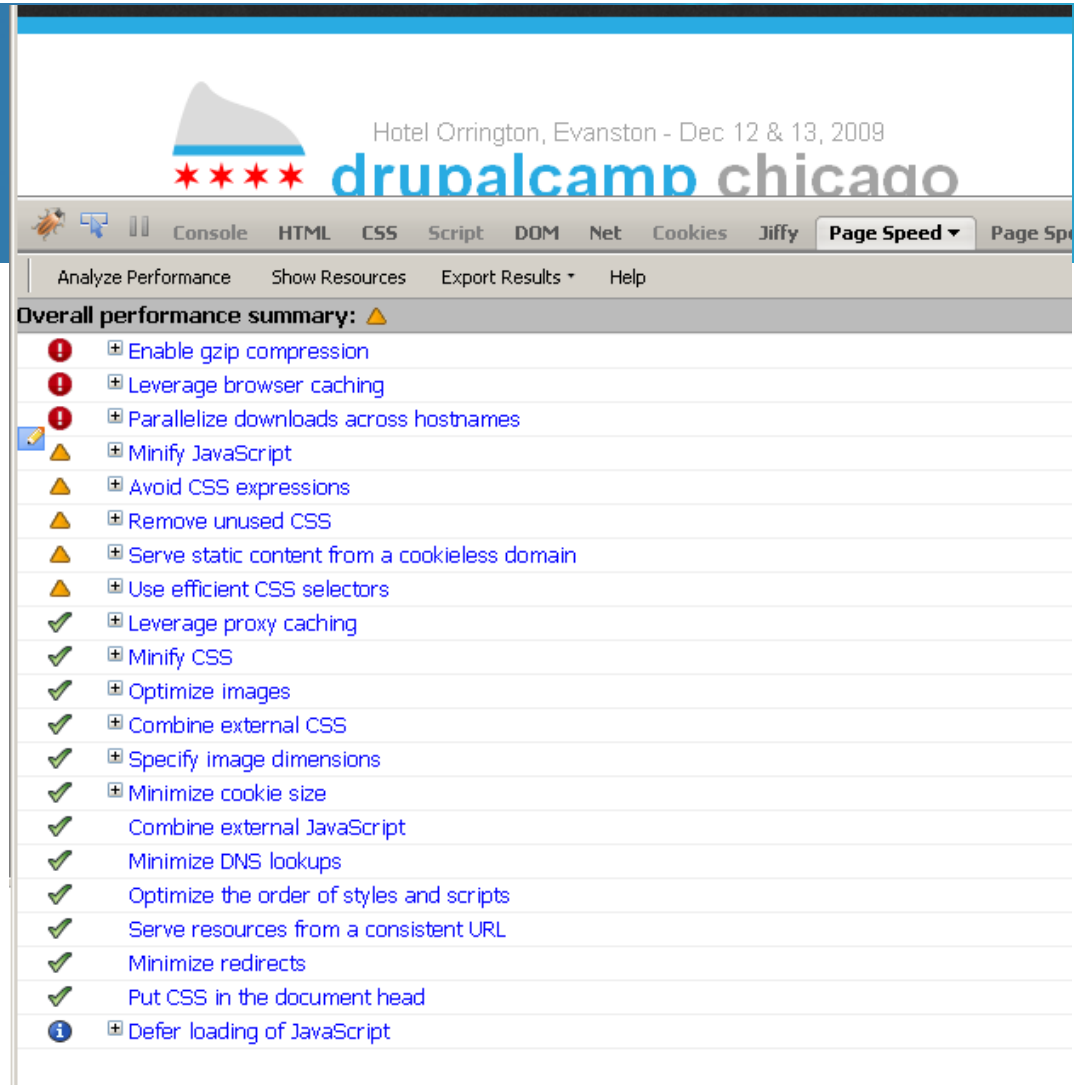
Decreasing the number of components on a page reduces the number of HTTP requests, resulting in faster page loads. Some ways to reduce the number of components are to combine multiple scripts into one script, combine multiple CSS files into one stylesheet, and use sprites and image maps.

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Page Slow

Steve Souders is now at Google ☺
Google recommendations based on
google best practices



The screenshot shows the Google PageSpeed Insights tool interface. At the top, the page title is "Hotel Orrington, Evanston - Dec 12 & 13, 2009" and the URL is "drupalcamp chicago". The tool has tabs for Console, HTML, CSS, Script, DOM, Net, Cookies, Jiffy, and Page Speed. The Page Speed tab is selected, showing an "Overall performance summary" with a yellow warning icon. The summary lists 20 recommendations, each with a status icon (red exclamation mark for errors, yellow triangle for warnings, green checkmark for good practices, and blue information icon for tips). The recommendations are:

- Enable gzip compression (Warning)
- Leverage browser caching (Warning)
- Parallelize downloads across hostnames (Warning)
- Minify JavaScript (Warning)
- Avoid CSS expressions (Warning)
- Remove unused CSS (Warning)
- Serve static content from a cookieless domain (Warning)
- Use efficient CSS selectors (Warning)
- Leverage proxy caching (Good)
- Minify CSS (Good)
- Optimize images (Good)
- Combine external CSS (Good)
- Specify image dimensions (Good)
- Minimize cookie size (Good)
- Combine external JavaScript (Good)
- Minimize DNS lookups (Good)
- Optimize the order of styles and scripts (Good)
- Serve resources from a consistent URL (Good)
- Minimize redirects (Good)
- Put CSS in the document head (Good)
- Defer loading of JavaScript (Information)



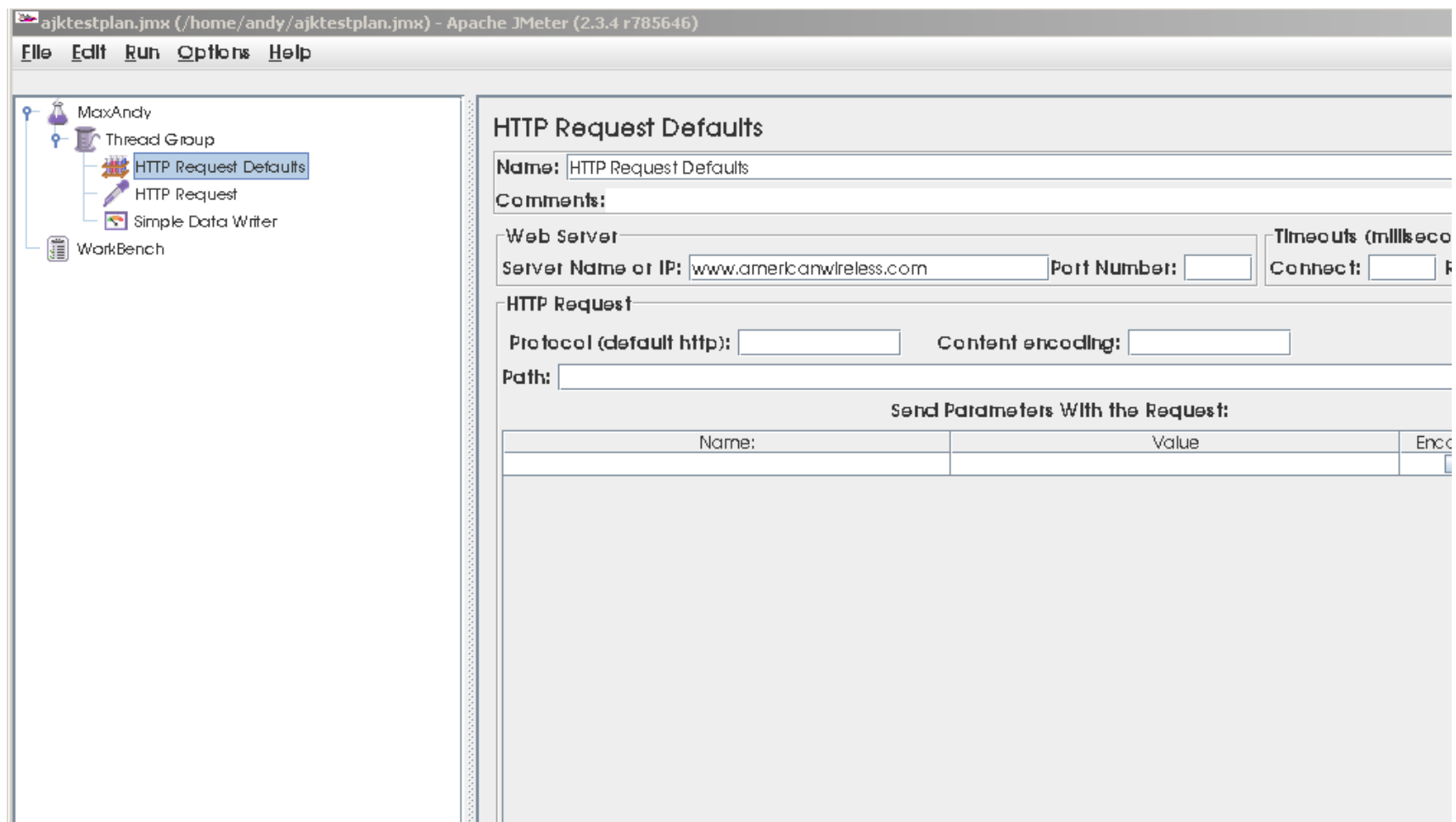
Pingdom

➤ Also an online tool

Testing finished: drupalcampchicago.org

Settings		
Show link hierarchy	Sort by: Load order	Filter URL: Containing
Load time in seconds	URL	Size(KB)
1	drupalcampchicago.org/	46.8
2	drupalcampchicago.org/sites/all/modules/codefilter/codefilter.css?k	0.1
3	drupalcampchicago.org/sites/default/modules/views/css/views.css?k	1.7
4	campchicago.org/files/css/css_dbe5a4439a5616f7ba5e1dc012159380.css	53.1
5	campchicago.org/files/css/css_6b317b192b63ae52c853c01552dbde87.css	0.7
6	palcampchicago.org/files/js/546b6c44022e09713ae753735c748446.js	123.7
7	drupalcampchicago.org/files/chitown_logo.png	1.8
8	aqo.org/files/imagecache/featured_speaker/pictures/picture-831.jpg	27.4
9	rq/files/imagecache/featured_speaker_thin/pictures/picture-831.jpg	7
10	aqo.org/files/imagecache/featured_speaker/pictures/picture-624.jpg	33.4
11	rq/files/imagecache/featured_speaker_thin/pictures/picture-624.jpg	7.4
12	aqo.org/files/imagecache/featured_speaker/pictures/picture-814.png	41.9
13	rq/files/imagecache/featured_speaker_thin/pictures/picture-814.png	8.6
14	aqo.org/files/imagecache/featured_speaker/pictures/picture-601.jpg	23.1
15	rq/files/imagecache/featured_speaker_thin/pictures/picture-601.jpg	6.9
16	aqo.org/files/imagecache/featured_speaker/pictures/picture-662.jpg	23.7
17	rq/files/imagecache/featured_speaker_thin/pictures/picture-662.jpg	8.3
18	aqo.org/files/imagecache/featured_speaker/pictures/picture-607.jpg	24.2
19	rq/files/imagecache/featured_speaker_thin/pictures/picture-607.jpg	6.4
20	aqo.org/files/imagecache/featured_speaker/pictures/picture-593.jpg	31.4
21	rq/files/imagecache/featured_speaker_thin/pictures/picture-593.jpg	7.9
22	aqo.org/files/imagecache/featured_speaker/pictures/picture-590.jpg	23.5
23	rq/files/imagecache/featured_speaker_thin/pictures/picture-590.jpg	6.8
24	aqo.org/files/imagecache/featured_speaker/pictures/picture-606.jpg	32.3
25	rq/files/imagecache/featured_speaker_thin/pictures/picture-606.jpg	8.3
26	org/files/imagecache/sponsor_feature/logos/CommerceGuysLogo_0.png	16
27	ampchicago.org/files/imagecache/medium-70/pictures/picture-805.jpg	5.9
28	ampchicago.org/files/imagecache/medium-70/pictures/picture-652.jpg	4.9
29	ampchicago.org/files/imagecache/medium-70/pictures/picture-706.jpg	5.1
30	ampchicago.org/files/imagecache/medium-70/pictures/picture-595.jpg	4.4
31	ampchicago.org/files/imagecache/medium-70/pictures/picture-594.jpg	4.6
32	ampchicago.org/files/imagecache/medium-70/pictures/picture-662.jpg	4.9
33	ampchicago.org/files/imagecache/medium-70/pictures/picture-593.jpg	5.5
34	ampchicago.org/files/imagecache/medium-70/pictures/picture-732.jpg	3.7
35	ampchicago.org/files/imagecache/medium-70/pictures/picture-700.jpg	4.9
36	chicago.org/sites/default/themes/chitown/images/get-your-badge.png	4.6
37	go.org/files/imagecache/sponsor-footer/logos/balantir_logo_400.png	3.8
38	org/files/imagecache/sponsor-footer/logos/trellon_logo_medium.png	13.8
39	o.org/files/imagecache/sponsor-footer/logos/CommerceGuysLogo_0.png	17.6
40	o.org/files/imagecache/sponsor-footer/logos/duoconsulting_logo.gif	0.9
41	g/files/imagecache/sponsor-footer/logos/dcc-cmsquickstart-logo.jpg	13.4
42	aqo.org/files/imagecache/sponsor-footer/logos/DrupalEasy_color.png	7.9
43	iles/imagecache/sponsor-footer/logos/CMSX-Logo-Drupal-300dpi_0.png	3.8
44	cago.org/files/imagecache/sponsor-footer/logos/promethost-logo.jpg	12.8

Jmeter – Java based load testing tool

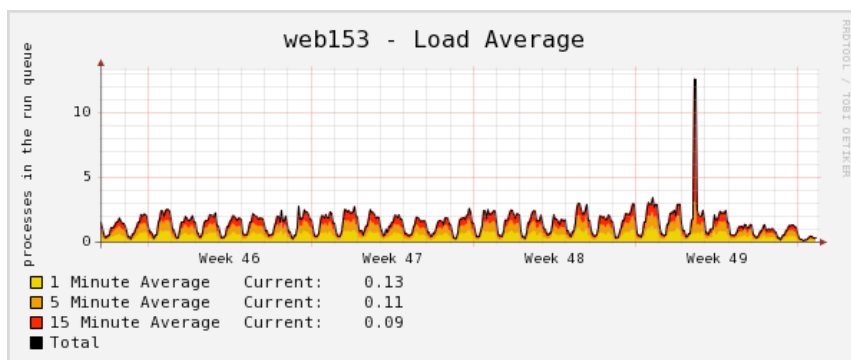


Apache Bench

- Very simple “It is designed to give you an impression of how your current Apache installation performs. This especially shows you how many requests per second your Apache installation is capable of serving.”

Monitoring Tools – Must have in server tuning

➤ Trend spotting



- You can not fix back end problems if you do not know what they are
- Capacity & Load
 - Review impact of changes
 - Analyze Trends
- Failure & Uptime
 - Nagios
 - 3rd party tools

Devel

Performance Logs: Summary

Showing all 40 paths.

Average memory per page: 17.1 MB

Average milliseconds per page: 3,532.58

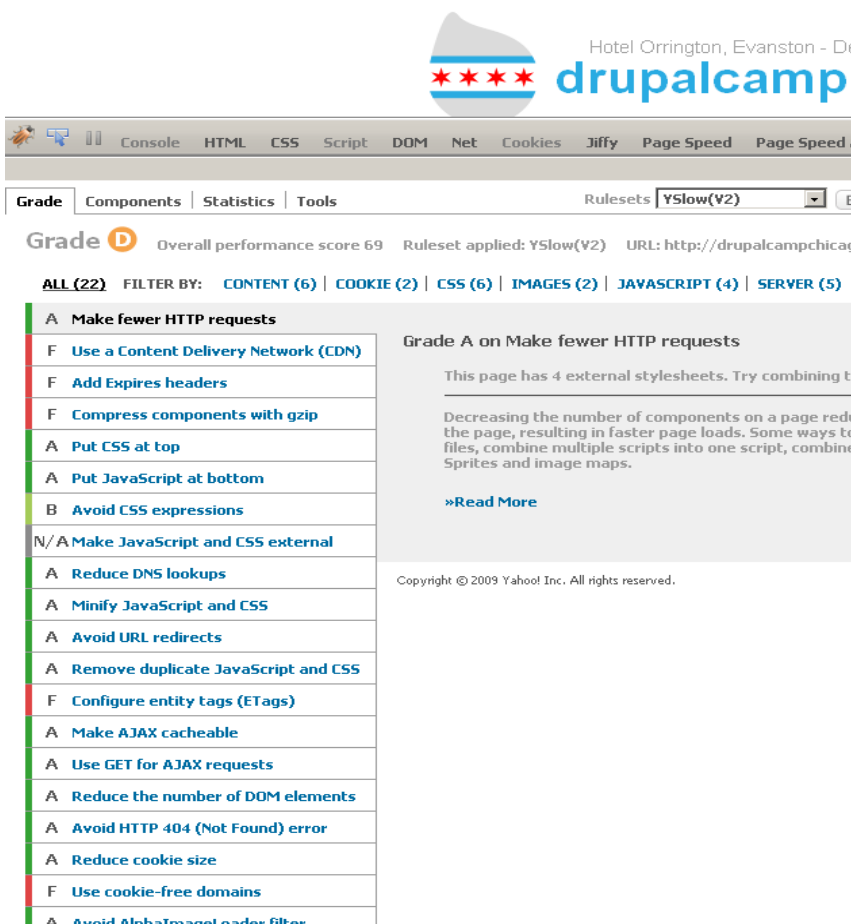
Total number of page accesses: 240

First access: 2009-12-07 00:05.

Last access: 2009-12-12 13:43.

<u>Path</u>	<u>Last access</u>	<u># accesses</u>	<u>Max Memory (MB)</u>	<u>Avg Memory (MB)</u>	<u>Milliseconds (Max)</u>	<u>Milliseconds (Avg)</u>	<u>Query Millisecs (Max)</u>	<u>Query Millisecs (Avg)</u>	<u>Query Count (Max)</u>	<u>Query Count (Avg)</u>
admin	2009-12-12 13:43	24	22.25	19.11	24,414.0	1,779.0	3,154.0	204.0	301	177
admin/build	2009-12-12 12:28	4	20.00	17.28	1,839.0	1,220.0	731.0	398.0	218	144
admin/build/block	2009-12-07 04:28	2	18.00	17.63	1,123.0	903.0	323.0	217.0	146	133
admin/build/imagecache	2009-12-12 10:39	3	20.50	18.38	7,308.0	3,808.0	2,953.0	1,421.0	257	167
admin/build/imagecache/add	2009-12-12 10:39	1	16.50	16.50	524.0	524.0	66.0	66.0	74	74
admin/build/modules	2009-12-12 13:42	7	20.25	19.91	3,702.0	1,879.0	723.0	585.0	409	394
admin/build/modules	2009-12-12	2	26.50	25.04	146,336.0	45,073.0	6,660.0	4,670.0	4634	4586

Let's solve Front End problems identified by YSlow



The screenshot shows the YSlow performance tool interface. At the top, it displays the website being analyzed: "Hotel Orrington, Evanston - Drupalcamp". The overall performance score is 69, and the ruleset applied is YSlow(V2). The URL is http://drupalcampchicago.org. The tool lists 22 items, categorized by filter: CONTENT (6), COOKIE (2), CSS (6), IMAGES (2), JAVASCRIPT (4), and SERVER (5). The items are listed in a table with a grade (A, F, B, N/A) and a description. The first item is "A Make fewer HTTP requests". The second item is "F Use a Content Delivery Network (CDN)". The third item is "F Add Expires headers". The fourth item is "F Compress components with gzip". The fifth item is "A Put CSS at top". The sixth item is "A Put JavaScript at bottom". The seventh item is "B Avoid CSS expressions". The eighth item is "N/A Make JavaScript and CSS external". The ninth item is "A Reduce DNS lookups". The tenth item is "A Minify JavaScript and CSS". The eleventh item is "A Avoid URL redirects". The twelfth item is "A Remove duplicate JavaScript and CSS". The thirteenth item is "F Configure entity tags (ETags)". The fourteenth item is "A Make AJAX cacheable". The fifteenth item is "A Use GET for AJAX requests". The sixteenth item is "A Reduce the number of DOM elements". The seventeenth item is "A Avoid HTTP 404 (Not Found) error". The eighteenth item is "A Reduce cookie size". The nineteenth item is "F Use cookie-free domains". The twentieth item is "A Avoid AlphaImageLoader filter".

Grade	Item
A	Make fewer HTTP requests
F	Use a Content Delivery Network (CDN)
F	Add Expires headers
F	Compress components with gzip
A	Put CSS at top
A	Put JavaScript at bottom
B	Avoid CSS expressions
N/A	Make JavaScript and CSS external
A	Reduce DNS lookups
A	Minify JavaScript and CSS
A	Avoid URL redirects
A	Remove duplicate JavaScript and CSS
F	Configure entity tags (ETags)
A	Make AJAX cacheable
A	Use GET for AJAX requests
A	Reduce the number of DOM elements
A	Avoid HTTP 404 (Not Found) error
A	Reduce cookie size
F	Use cookie-free domains
A	Avoid AlphaImageLoader filter

- Make Fewer HTTP requests
- Use a CDN
- Add Expires headers – Not Covered today
- Compress components with gzip deflate
- Put CSS at top
- Put JavaScript at Bottom
- Configure entity tags (ETags)
- Use cookie-free domains

Yslow -

- Problem: Make fewer HTTP requests
 - 80% of the end-user response time is spent on the front-end. Most of this time is tied up in downloading all the components in the page: images, stylesheets, scripts, Flash, etc. Reducing the number of components in turn reduces the number of HTTP requests required to render the page. This is the key to faster pages.
- Drupal Solution
 - Performance module – turn on Bandwidth optimizations for CSS and Javascript files
 - Manual CSS sprite generator

ETag

- Problem -
- Configured on webserver – Apache
- Entity tags (ETags) are a mechanism that web servers and browsers use to determine whether the component (stylesheet, image, etc) in the browser's cache matches the one on the origin server
- Problem on multiple server configurations, or not as helpful
- If turned off, reduces header size, etc
- Just Add this to the bottom of your .htaccess file

```
FileETag none
```

Gzip/deflate

- Problem – compressing files will reduce size and hence transfer time
- Solution for apache
 - Performance Module, enable compression
 - Apache deflate_module

```
<IfModule mod_deflate.c>  
    <FilesMatch ".(js|css)$">  
        SetOutputFilter DEFLATE  
        DeflateCompressionLevel 9  
    </FilesMatch>  
</IfModule>
```

- Solution nginx – gzip module

With lots of objects – serve objects from multiple domains

- Serve objects from multiple domains
- *One pages on which there will always be a lot of objects, you can sometimes see a performance gain by serving the content from multiple domains. (For example, server1.sample.com, server2.sample.com, server3.sample.com, even if all are served from the same physical server with the same IP address). Web browsers limit the number of active connections allowed from a single domain, thus by serving content from multiple domains you can cause web browsers to download more objects on a given page at the same time. Note that on the first visit to your page, the client web browser has to do a DNS lookup for each domain that you use, so serving objects from too many domains can actually cause a slowdown. It is generally recommended to use anywhere from two to four domains, depending on how many objects you are serving per page. (Tag1 Consulting)*

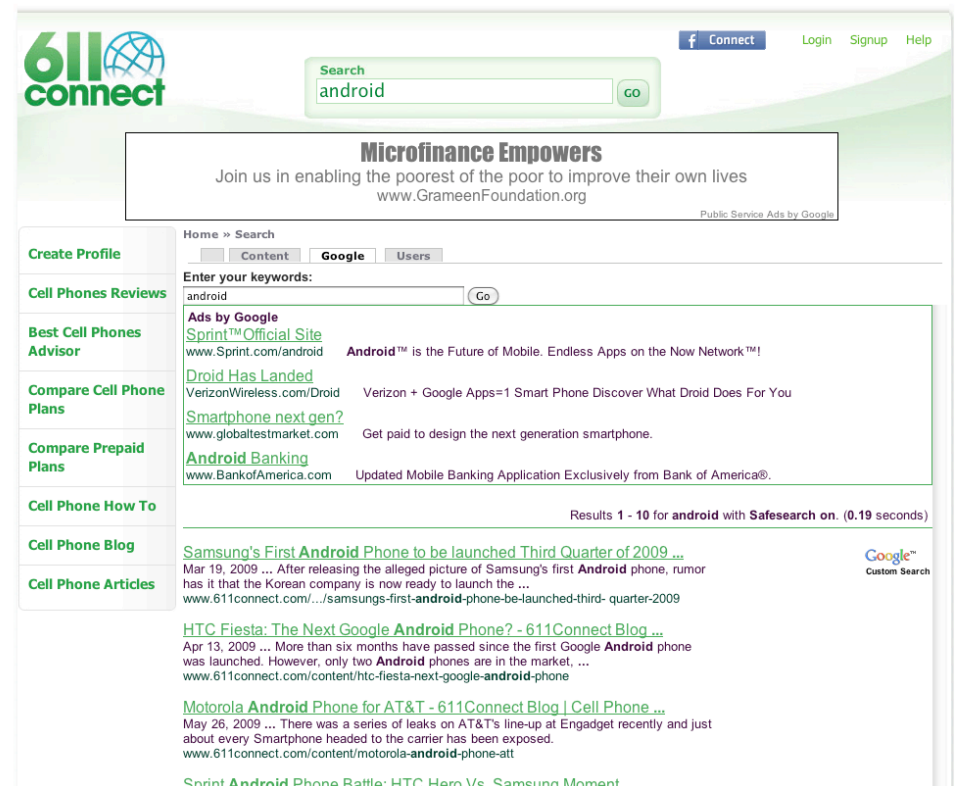
Use a CDN

- CDN brings your content closer to the edge of the network, much faster response and download time
- Drupal Modules:
- <http://drupal.org/project/simplecdn>
- <http://drupal.org/project/cdn> by Wim Leers, needs a cron to run a fileconveyor



search

- Search is resource intensive
- Consider moving to Apache Solr or using Google Search free or Google Custom Search Engine
 - Especially if converting tables to innoDB



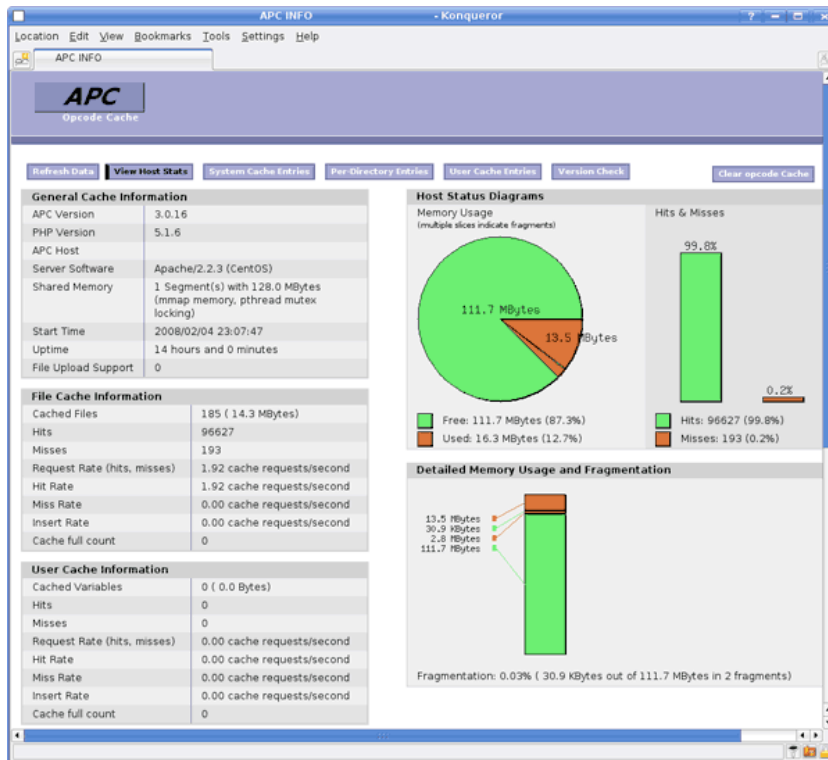
The screenshot shows the 611connect website with a search bar at the top containing the word "android". Below the search bar, there is a banner for "Microfinance Empowers" with the text "Join us in enabling the poorest of the poor to improve their own lives" and the website "www.GrameenFoundation.org".

On the left side, there is a sidebar with links: "Create Profile", "Cell Phones Reviews", "Best Cell Phones Advisor", "Compare Cell Phone Plans", "Compare Prepaid Plans", "Cell Phone How To", "Cell Phone Blog", and "Cell Phone Articles".

The main content area shows search results for "android". It includes a "Google" search bar and a "Go" button. Below the search bar, there are several search results:

- Ads by Google**
 - [Sprint™ Official Site](#) - www.Sprint.com/android - Android™ is the Future of Mobile. Endless Apps on the Now Network™!
 - [Droid Has Landed](#) - VerizonWireless.com/Droid - Verizon + Google Apps=1 Smart Phone Discover What Droid Does For You
 - [Smartphone next gen?](#) - www.globaltestmarket.com - Get paid to design the next generation smartphone.
 - [Android Banking](#) - www.BankofAmerica.com - Updated Mobile Banking Application Exclusively from Bank of America®.
- Results 1 - 10 for android with Safesearch on. (0.19 seconds)**
- [Samsung's First Android Phone to be launched Third Quarter of 2009 ...](#) - Mar 19, 2009 ... After releasing the alleged picture of Samsung's first **Android** phone, rumor has it that the Korean company is now ready to launch the ...
- [HTC Fiesta: The Next Google Android Phone? - 611Connect Blog ...](#) - Apr 13, 2009 ... More than six months have passed since the first Google **Android** phone was launched. However, only two **Android** phones are in the market, ...
- [Motorola Android Phone for AT&T - 611Connect Blog | Cell Phone ...](#) - May 26, 2009 ... There was a series of leaks on AT&T's line-up at Engadget recently and just about every Smartphone headed to the carrier has been exposed.
- [Sprint Android Phone Battle: HTC Hero Vs. Samsung Moment ...](#)

Back End – PHP Accelerator



- APC is the Alternative PHP Cache, which is a free, open, and robust framework for caching and optimizing PHP intermediate code.
- APC caching PHP code in a compiled state
- Needs to be looked at after installation for proper configuration, but generally a big performance boost
- Xcache and eaccelerator are other options

Back End

- MySQL is core of Drupal
- MySQL tuning is important but may performance gain may not be as great as that of caching or front end
- Always run and check slow query log often /Prune Drupal cache tables on busy sites
- Database Performance/MySQL
- Convert Tables to InnoDB
 - Row level locking, less problematic on inserts than MyISAM
 - Advantages debated, but Drupal 7 install will be on InnoDB

MySQL tuning

- Enable MySQL Query Cache
- Index Slow queries that run often
 - Log-slow-queries
 - Use explain
 - Index indices used
- Some configuration considerations
 - InnoDB Buffer Pool ++
 - Key_buffer is important for temp tables
 - Core Search Runs Better on MyISAM (but don't use core search)

Best Practices for back end performance improvements

➤ Caching

- Very high performance gain
 - Some caching configurations may delay display of dynamic content and may not work for logged in users
- Always turn on standard Drupal cache (performance module)
 - Next step: Memcache (<http://drupal.org/project/memcache>)
 - should increase memory on servers
 - Should consider multiple memcache servers
 - Boost Module – file caching, bypasses PHP and MySQL
 - Advanced Step: Squid/Varnish (<http://drupal.org/node/91813>)
 - Very high performance gain
 - Sidesteps web servers, may be implemented on separate servers

Caching using Boost

- Extension of Performance module
- Instead of caching results in tables, stores them in files bypassing PHP and MySQL
- Limited to anonymous visitors – so good for slashdot but not for sites with high number of authenticated visitors
- How it works:
 - Uses apache mod_rewrite directives in .htaccess to check if GET
 - Logged in cookie does not exist
 - HTML file cached on filesystem?

Performance out of the Box?

- Press Flow by Four Kitchens
- Mercurey Project
- Drupal 7?



Question Time

Who is running reverse proxies?

Drupal High Performance Resources

- Groups.drupal.org High Performance
 - <http://dev.mysql.com/doc/refman/5.1/en/query-cache.html>
- Varnish
 - <http://groups.drupal.org/node/24130>
- Press Flow
 - www.pressflow.org

Caching

- <http://drupal.org/project/cacherouter>
- <http://groups.drupal.org/node/21897>
- <http://drupal.org/project/memcache>