



Site Auditor: Content Issues

Site Auditor: Content Issues

2/1/2015 - 2/28/2015

Last Crawled on Mar 18, 2015

URL	Title	Canonical URL	Internal	External	Total	Word Count	Duplicate Content
http://g2ops.studiocenter.com/home/news/asis-international-security-forum-exhibition-guest-speaker/	G2 Ops :: ASIS International Security Forum & Exhibition guest speaker!	--	11	6	17	124	No
http://g2ops.studiocenter.com/home/careers/	G2 Ops :: Careers	--	11	4	15	253	No
http://g2ops.studiocenter.com/home/who-we-are/contact-and-locations/	G2 Ops :: Contact and Locations	--	11	3	14	111	No
http://g2ops.studiocenter.com/home/contract-vehicle/	G2 Ops :: Contract Vehicles	--	12	3	15	127	No
http://g2ops.studiocenter.com/home/what-we-do/cyber-security-architectural-analysis/	G2 Ops :: Cybersecurity Architectural Analysis	--	11	3	14	229	No
http://g2ops.studiocenter.com/home/news/g2-ops-hub-inc-founded-march-7th-2014/	G2 Ops :: G2 Ops Hub Inc. Founded March 7th, 2014	--	11	5	16	107	No
http://g2ops.studiocenter.com/home/news/g2-ops-now-offering-navsea-cableway-training-certification-c...	G2 Ops :: G2 Ops is now offering a NAVSEA Cableway Training & Certification Course	--	11	5	16	222	No
http://g2ops.studiocenter.com/home/	G2 Ops :: Home	--	14	10	24	128	No
http://g2ops.studiocenter.com/home/news/june-13-2014-g2-ops-establishes-operational-partnership-cybe...	G2 Ops :: June 13, 2014 – G2 Ops establishes an operational partnership with the Cyber Security...	--	11	8	19	601	No
http://g2ops.studiocenter.com/home/who-we-are/leadership-team/	G2 Ops :: Leadership Team	--	11	3	14	344	No
http://g2ops.studiocenter.com/home/news/	G2 Ops :: News	--	17	3	20	404	Yes



Site Auditor: Content Issues

URL	Title	Canonical URL	Internal	External	Total	Word Count	Duplicate Content
http://g2ops.studiocenter.com/home/news/?ccm_paging_p_b173=2	G2 Ops :: News	--	13	3	16	124	No
http://g2ops.studiocenter.com/home/news/?ccm_paging_p_b173=1	G2 Ops :: News	--	17	3	20	404	Yes
http://g2ops.studiocenter.com/home/news/odu-selects-g2-ops-team-public-health-assessment-1-aug-2013..	G2 Ops :: ODU Selects G2 Ops Team for Public Health Assessment (1 Aug 2013)	--	11	6	17	148	No
http://g2ops.studiocenter.com/	G2 Ops :: Portal	--	1	0	1	85	No
http://g2ops.studiocenter.com/home/contract-vehicle/seaport-e/	G2 Ops :: Seaport-e	--	12	3	15	501	No
http://g2ops.studiocenter.com/home/what-we-do/159/	G2 Ops :: Strategic Consulting	--	11	3	14	290	No
http://g2ops.studiocenter.com/home/what-we-do/systems-and-data-flow-modeling/	G2 Ops :: Systems and Data Flow Modeling	--	11	3	14	268	No
http://g2ops.studiocenter.com/home/news/vedp-selects-g2-ops-valet/	G2 Ops :: VEDP selects G2 Ops for VALET	--	11	5	16	168	No
http://g2ops.studiocenter.com/home/who-we-are/	G2 Ops :: Who We Are	--	11	3	14	231	No
http://g2ops.studiocenter.com/home/who-we-serve/	G2 Ops :: Who We Serve	--	11	10	21	181	No

Site Auditor: Image Issues

Site Auditor: Image Issues

2/1/2015 - 2/28/2015

Last Crawled on Mar 18, 2015

Page	URL	Filename	ALT Text	Title Text	Pages	Broken	Size
G2 Ops :: Seaport-e	http://g2ops.studiocenter.com/home/contract-vehicle/seaport-e/	PCI.jpg	No Text	No Text	1	No	7KB
G2 Ops :: Contract Vehicles	http://g2ops.studiocenter.com/home/contract-vehicle/	abd60b79af01d15e9edf343212dcae2a_f15.png	cecm.png	No Text	1	No	17KE
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	ddd0f23a550e6bbd2b793526c9c297bf_f51.png	wid.png	No Text	1	No	16KE
G2 Ops :: Contract Vehicles	http://g2ops.studiocenter.com/home/contract-vehicle/	6a0471c61f1107a8b1ed5ee962b6cbe6_f20.png	seaport.png	No Text	1	No	5KB
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	g2ops_logo_copy.png	No Text	No Text	20	No	49KE
G2 Ops :: ODU Selects G2 Ops Team for Public Health Assessment (1 Aug 2013)	http://g2ops.studiocenter.com/home/news/odu-selects-g2-ops-team-public-health-assessment-1-aug-2013..	icon_twitter.png	Share on Twitter	No Text	6	No	3KB
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	fb.jpg	fb.jpg	No Text	20	No	1KB
G2 Ops :: Leadership Team	http://g2ops.studiocenter.com/home/who-we-are/leadership-team/	dan.png	dan.png	No Text	1	No	107K
G2 Ops :: Seaport-e	http://g2ops.studiocenter.com/home/contract-vehicle/seaport-e/	MDA.jpg	No Text	No Text	1	No	7KB
G2 Ops :: Leadership Team	http://g2ops.studiocenter.com/home/who-we-are/leadership-team/	kev.png	kev.png	No Text	1	No	66KE
G2 Ops :: Seaport-e	http://g2ops.studiocenter.com/home/contract-vehicle/seaport-e/	0abcc99a4fe8fd5a28933610d898e93e_f37.jpg	Seaport_e_Zonemap.jpg	No Text	1	No	16KE
G2 Ops :: Leadership Team	http://g2ops.studiocenter.com/home/who-we-are/leadership-team/	bob.png	bob.png	No Text	1	No	66KE

Site Auditor: Image Issues							
Page	URL	Filename	ALT Text	Title Text	Pages	Broken	Size
G2 Ops :: Contract Vehicles	http://g2ops.studiocenter.com/home/contract-vehicle/	b6dd5b8aec8eba190b6b756b9976bf25_f18.png	optarss.png	No Text	1	No	22KE
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	twit.jpg	twit.jpg	No Text	20	No	1KB
G2 Ops :: Leadership Team	http://g2ops.studiocenter.com/home/who-we-are/leadership-team/	tracy.png	tracy.png	No Text	1	No	85KE
G2 Ops :: Seaport-e	http://g2ops.studiocenter.com/home/contract-vehicle/seaport-e/	AMSEC.jpg	No Text	No Text	1	No	4KB
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	143f5b5aa82ba6d4660cc5fa2df4714d_f48.png	CSFI-logo.png	No Text	1	No	22KE
G2 Ops :: Who We Are	http://g2ops.studiocenter.com/home/who-we-are/	about_img.jpg	about_img.jpg	No Text	1	No	138K
G2 Ops :: ODU Selects G2 Ops Team for Public Health Assessment (1 Aug 2013)	http://g2ops.studiocenter.com/home/news/odu-selects-g2-ops-team-public-health-assessment-1-aug-2013..	icon_facebook.png	Share on Facebook	No Text	6	No	3KB
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	CYBER.jpg	No Text	No Text	1	No	442K
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	854aCqCM_normal.jpeg	G2Ops	No Text	1	No	1KB
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	edwosp.jpg	edwosp.jpg	No Text	20	No	5KB
G2 Ops :: ODU Selects G2 Ops Team for Public Health Assessment (1 Aug 2013)	http://g2ops.studiocenter.com/home/news/odu-selects-g2-ops-team-public-health-assessment-1-aug-2013..	icon_email.png	Email	No Text	6	No	0KB
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	24ab23cc5c7d786760d1b244de485963_f50.png	virginia.png	No Text	1	No	22KE
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	3fd5c4d879b3d0be174c6a8c686a0780_f49.png	va-ship-repair-association.png	No Text	1	No	19KE
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	edu_con_slider.jpg	No Text	No Text	1	No	278K
G2 Ops :: Contract Vehicles	http://g2ops.studiocenter.com/home/contract-vehicle/	9fcc3536a1c8ae6079435331c0323078_f17.png	mscoe.png	No Text	1	No	23KE
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	slide1.jpg	No Text	No Text	1	No	223K



Site Auditor: Image Issues							
Page	URL	Filename	ALT Text	Title Text	Pages	Broken	Size
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	linkedin.jpg	linkedin.jpg	No Text	20	No	2KB
G2 Ops :: Contract Vehicles	http://g2ops.studiocenter.com/home/contract-vehicle/	897bef8825525e270dcd191f14cc57ce_f19.png	pii.png	No Text	1	No	5KB

Site Auditor: Link Issues

Site Auditor: Link Issues

2/1/2015 - 2/28/2015

Last Crawled on Mar 18, 2015

URL	Type	Text	Pages	Broken	Nofollow
http://g2ops.studiocenter.com/home/news/g2-ops-now-offering-navsea-cableway-training-certification-course/	Text	July 16, 2014	3	No	No
http://g2ops.studiocenter.com/home/who-we-are/	Text	Who We Are	20	No	No
http://g2ops.studiocenter.com/home/news/odu-selects-g2-ops-team-public-health-assessment-1-aug-2013/	Text	ODU Selects G2 Ops Team for Public Health Assessment (1 Aug 2013)	2	No	No
http://www.forwardslope.com/	Text	Forward Slope, Inc.	1	No	No
http://www.facebook.com/share.php?u=http://g2ops.studiocenter.com/home/news/june-13-2014-g2-ops-establishes-operational-partnership-cyber-security-forum-initiative-csfi/	Image	Share on Facebook	1	No	No
http://g2ops.studiocenter.com/home/news/	Text	News	20	No	No
https://www.facebook.com/pages/G2-Ops-Inc/643633165663582	Image	fb.jpg	20	No	No
http://www.facebook.com/share.php?u=http://g2ops.studiocenter.com/home/news/odu-selects-g2-ops-team-public-health-assessment-1-aug-2013/	Image	Share on Facebook	1	No	No
http://www.facebook.com/share.php?u=http://g2ops.studiocenter.com/home/news/g2-ops-now-offering-navsea-cableway-training-certification-course/	Image	Share on Facebook	1	No	No
http://g2ops.studiocenter.com/home/news/?ccm_paging_p_b173=2	Text	Older Posts	2	No	No
http://g2ops.studiocenter.com/home/who-we-are/contact-and-locations/	Text	Contact and Locations	20	No	No
http://www.facebook.com/share.php?u=http://g2ops.studiocenter.com/home/news/asis-international-security-forum-exhibition-guest-speaker/	Image	Share on Facebook	1	No	No
http://g2ops.studiocenter.com/home/careers/	Text	Careers	20	No	No
https://twitter.com/share	Image	Share on Twitter	6	No	No
https://twitter.com/G2Ops	Image	twit.jpg	20	No	No
https://www.linkedin.com/company/g2-ops-inc.?trk=top_nav_home	Image	linkedin.jpg	20	No	No

Site Auditor: Link Issues					
URL	Type	Text	Pages	Broken	Nofollow
https://www.asisonline.org/Education-Events/Global-Conferences/asia-pacific/Pages/Bios-and-Abstracts.aspx	Text	https://www.asisonline.org/Education-Events/Global-Conferences/asia-pacific/Pages/Bios-and-Abstracts.aspx#Bernat	1	No	No
http://g2ops.studiocenter.com/home/who-we-are/leadership-team/	Text	Leadership Team	20	No	No
http://g2ops.studiocenter.com/home/news/asis-international-security-forum-exhibition-guest-speaker/	Text	ASIS International Security Forum & Exhibition guest speaker!	2	No	No
http://www.lockheedmartin.com/	Text	Lockheed Martin	1	No	No
http://g2ops.studiocenter.com/home/what-we-do/159/	Text	Strategic Consulting	20	No	No
http://straightpathmanagement.wordpress.com/	Text	http://straightpathmanagement.wordpress.com	1	No	No
http://www.boozallen.com/	Text	Booz Allen Hamilton	1	No	No
http://wid.ndia.org/chapters/DC/Pages/default.aspx	Image	wid.png	1	No	No
http://www.facebook.com/share.php?u=http://g2ops.studiocenter.com/home/news/vedp-selects-g2-ops-valet/	Image	Share on Facebook	1	No	No
http://t.co/gaYFPwF7Oq	Text	http://t.co/gaYFPwF7Oq	1	No	No
http://twitter.com/TheNextWeb	Text	@TheNextWeb	1	No	No
http://g2ops.studiocenter.com/home/who-we-serve/	Text	Who We Serve	20	No	No
http://g2-ops.atsondemand.com/	Text	We're hiring! Click here to see what positions are available!	1	No	No
http://g2ops.studiocenter.com/index.php/download_file/view/37/161/	Text	View Zone Map	1	No	No
http://www.facebook.com/share.php?u=http://g2ops.studiocenter.com/home/news/g2-ops-hub-inc-founded-march-7th-2014/	Image	Share on Facebook	1	No	No
http://g2ops.studiocenter.com/home/news/vedp-selects-g2-ops-valet/	Text	VEDP selects G2 Ops for VALET	1	No	No
http://g2ops.studiocenter.com/home/contract-vehicle/	Text	Contract Vehicles	20	No	No
http://g2ops.studiocenter.com/home/contract-vehicle/seaport-e/	Image	seaport.png	1	No	No
http://g2ops.studiocenter.com/home/news/?ccm_paging_p_b173=1	Text	Newer Posts	1	No	No
http://www.G2-Ops.com/	Text	www.G2-Ops.com	1	No	No
http://www.csfi.us/	Image	CSFI-logo.png	2	No	No
http://www.progeny.net/	Text	Progeny Systems Corp.	1	No	No
http://www.tocquigny.com/	Text	Tocquigny	1	No	No



Site Auditor: Link Issues					
URL	Type	Text	Pages	Broken	Nofollow
http://twitter.com/G2Ops	Text	follow me	1	No	No
http://g2ops.studiocenter.com/home/news/june-13-2014-g2-ops-establishes-operational-partnership-cyber-security-forum-initiative-csfi/	Text	June 16, 2014	3	No	No
http://www.g2-ops.com/	Text	http://www.g2-ops.com	1	No	No
http://exportvirginia.org/	Image	virginia.png	1	No	No
http://g2ops.studiocenter.com/home/what-we-do/cyber-security-architectural-analysis/	Text	Cybersecurity Architectural Analysis	20	No	No
http://g2ops.studiocenter.com/home/	Image	g2ops-circ.png	21	No	No
http://g2ops.studiocenter.com/home/what-we-do/systems-and-data-flow-modeling/	Text	Systems and Data Flow Modeling	20	No	No
http://www.amsec.com/	Text	AMSEC	1	No	No
http://www.merdan.com/	Text	The Merdan Group	1	No	No
http://www.virginiashiprepair.org/	Image	va-ship-repair-association.png	1	No	No
http://g2ops.studiocenter.com/home/news/g2-ops-hub-inc-founded-march-7th-2014/	Text	March 14, 2014	3	No	No



Site Auditor: Meta Issues

Site Auditor: Meta Issues

2/1/2015 - 2/28/2015

Last Crawled on Mar 18, 2015

Page Title	URL	Title Length	Duplicate Title	Meta Description	Meta Length	Duplicate Meta	GA
G2 Ops :: Portal	http://g2ops.studiocenter.com/	16	No	Missing Meta Description	0	No	No
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	14	No	Missing Meta Description	0	No	No
G2 Ops :: Strategic Consulting	http://g2ops.studiocenter.com/home/what-we-do/159/	30	No	Missing Meta Description	0	No	No
G2 Ops :: Cybersecurity Architectural Analysis	http://g2ops.studiocenter.com/home/what-we-do/cyber-security-architectural-analysis/	46	No	Missing Meta Description	0	No	No
G2 Ops :: Who We Are	http://g2ops.studiocenter.com/home/who-we-are/	20	No	Missing Meta Description	0	No	No
G2 Ops :: Contact and Locations	http://g2ops.studiocenter.com/home/who-we-are/contact-and-locations/	31	No	Missing Meta Description	0	No	No
G2 Ops :: Leadership Team	http://g2ops.studiocenter.com/home/who-we-are/leadership-team/	25	No	Missing Meta Description	0	No	No
G2 Ops :: News	http://g2ops.studiocenter.com/home/news/	14	Yes	Missing Meta Description	0	No	No
G2 Ops :: ODU Selects G2 Ops Team for Public Health Assessment (1 Aug 2013)	http://g2ops.studiocenter.com/home/news/odu-selects-g2-ops-team-public-health-assessment-1-aug-2013..	75	No	Missing Meta Description	0	No	No
G2 Ops :: June 13, 2014 – G2 Ops establishes an operational partnership with the Cyber Security...	http://g2ops.studiocenter.com/home/news/june-13-2014-g2-ops-establishes-operational-partnership-cybe...	120	No	Missing Meta Description	0	No	No
G2 Ops :: Systems and Data Flow Modeling	http://g2ops.studiocenter.com/home/what-we-do/systems-and-data-flow-modeling/	40	No	Missing Meta Description	0	No	No
G2 Ops :: ASIS International	http://g2ops.studiocenter.com/home/news/asis-international-	71	No	Missing Meta Description	0	No	No

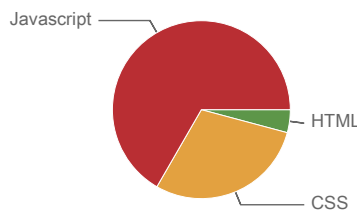


Site Auditor: Meta Issues							
Page Title	URL	Title Length	Duplicate Title	Meta Description	Meta Length	Duplicate Meta	GA
Security Forum & Exhibition guest speaker!	security-forum-exhibition-guest-speaker/						
G2 Ops :: News	http://g2ops.studiocenter.com/home/news/?ccm_paging_p_b173=2	14	Yes	Missing Meta Description	0	No	No
G2 Ops :: VEDP selects G2 Ops for VALET	http://g2ops.studiocenter.com/home/news/vedp-selects-g2-ops-valet/	39	No	Missing Meta Description	0	No	No
G2 Ops :: News	http://g2ops.studiocenter.com/home/news/?ccm_paging_p_b173=1	14	Yes	Missing Meta Description	0	No	No
G2 Ops :: Contract Vehicles	http://g2ops.studiocenter.com/home/contract-vehicle/	27	No	Missing Meta Description	0	No	No
G2 Ops :: Seaport-e	http://g2ops.studiocenter.com/home/contract-vehicle/seaport-e/	19	No	Missing Meta Description	0	No	No
G2 Ops :: G2 Ops is now offering a NAVSEA Cableway Training & Certification Course	http://g2ops.studiocenter.com/home/news/g2-ops-now-offering-navsea-cableway-training-certification-c...	82	No	Missing Meta Description	0	No	No
G2 Ops :: Careers	http://g2ops.studiocenter.com/home/careers/	17	No	Missing Meta Description	0	No	No
G2 Ops :: G2 Ops Hub Inc. Founded March 7th, 2014	http://g2ops.studiocenter.com/home/news/g2-ops-hub-inc-founded-march-7th-2014/	49	No	Missing Meta Description	0	No	No
G2 Ops :: Who We Serve	http://g2ops.studiocenter.com/home/who-we-serve/	22	No	Missing Meta Description	0	No	No

Site Auditor: Page Speed

YSlow Report for g2ops.studiocenter.com

Overall Score	Total Page Size	Total Requests	Load Time
72	475.57KB	24	3.7 Seconds



Minimize 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.

One way to reduce the number of components in the page is to simplify the page's design. But is there a way to build pages with richer content while also achieving fast response times? Here are some techniques for reducing the number of HTTP requests, while still supporting rich page designs.

Combined files are a way to reduce the number of HTTP requests by combining all scripts into a single script, and similarly combining all CSS into a single stylesheet. Combining files is more challenging when the scripts and stylesheets vary from page to page, but making this part of your release process improves response times.

[CSS Sprites](#) are the preferred method for reducing the number of image requests. Combine your background images into a single image and use the CSS background-image and background-position properties to display the desired image segment.

[Image maps](#) combine multiple images into a single image. The overall size is about the same, but reducing the number of HTTP requests speeds up the page. Image maps only work if the images are contiguous in the page, such as a navigation bar. Defining the coordinates of image maps can be tedious and error prone. Using image maps for navigation is not accessible too, so it's not recommended.

Inline images use the [data: URL scheme](#) to embed the image data in the actual page. This can increase the size of your HTML document. Combining inline images into your (cached) stylesheets is a way to reduce HTTP requests and avoid increasing the size of your pages. Inline images are not yet supported across all major browsers.

Reducing the number of HTTP requests in your page is the place to start. This is the most important guideline for improving performance for first time visitors. As described in Tenni Theurer's blog post [Browser Cache Usage - Exposed!](#), 40-60% of daily visitors to your site come in with an empty cache. Making your page fast for these first time visitors is key to a better user experience.

Site Auditor: Page Speed

Use a Content Delivery Network

The user's proximity to your web server has an impact on response times. Deploying your content across multiple, geographically dispersed servers will make your pages load faster from the user's perspective. But where should you start?

As a first step to implementing geographically dispersed content, don't attempt to redesign your web application to work in a distributed architecture. Depending on the application, changing the architecture could include daunting tasks such as synchronizing session state and replicating database transactions across server locations. Attempts to reduce the distance between users and your content could be delayed by, or never pass, this application architecture step.

Remember that 80-90% of the end-user response time is spent downloading all the components in the page: images, stylesheets, scripts, Flash, etc. This is the Performance Golden Rule. Rather than starting with the difficult task of redesigning your application architecture, it's better to first disperse your static content. This not only achieves a bigger reduction in response times, but it's easier thanks to content delivery networks.

A content delivery network (CDN) is a collection of web servers distributed across multiple locations to deliver content more efficiently to users. The server selected for delivering content to a specific user is typically based on a measure of network proximity. For example, the server with the fewest network hops or the server with the quickest response time is chosen.

Some large Internet companies own their own CDN, but it's cost-effective to use a CDN service provider, such as [Akamai Technologies](#), [EdgeCast](#), or [level3](#). For start-up companies and private web sites, the cost of a CDN service can be prohibitive, but as your target audience grows larger and becomes more global, a CDN is necessary to achieve fast response times. At Yahoo!, properties that moved static content off their application web servers to a CDN (both 3rd party as mentioned above as well as Yahoo's own [CDN](#)) improved end-user response times by 20% or more. Switching to a CDN is a relatively easy code change that will dramatically improve the speed of your web site.

- item
 - g2ops.studiocenter.com: 22 components, 458.6K
 - use.typekit.net: 1 component, 20.5K

Avoid Empty Image src

Image with empty string src attribute occurs more than one will expect. It appears in two form:

1. Straight HTML
``
2. JavaScript
`var img = new Image();
img.src = "";`

Both forms cause the same effect: browser makes another request to your server.

- **Internet Explorer** makes a request to the directory in which the page is located.
- **Safari and Chrome** make a request to the actual page itself.
- **Firefox 3** and earlier versions behave the same as Safari and Chrome, but version 3.5 addressed this issue[\[bug 444931\]](#) and no longer sends a request.
- **Opera** does not do anything when an empty image src is encountered.

Site Auditor: Page Speed

Why is this behavior bad?

1. Cripple your servers by sending a large amount of unexpected traffic, especially for pages that get millions of page views per day.
2. Waste server computing cycles generating a page that will never be viewed.
3. Possibly corrupt user data. If you are tracking state in the request, either by cookies or in another way, you have the possibility of destroying data. Even though the image request does not return an image, all of the headers are read and accepted by the browser, including all cookies. While the rest of the response is thrown away, the damage may already be done.

The root cause of this behavior is the way that URI resolution is performed in browsers. This behavior is defined in RFC 3986 - Uniform Resource Identifiers. When an empty string is encountered as a URI, it is considered a relative URI and is resolved according to the algorithm defined in section 5.2. This specific example, an empty string, is listed in section 5.4. Firefox, Safari, and Chrome are all resolving an empty string correctly per the specification, while Internet Explorer is resolving it incorrectly, apparently in line with an earlier version of the specification, RFC 2396 - Uniform Resource Identifiers (this was obsoleted by RFC 3986). So technically, the browsers are doing what they are supposed to do to resolve relative URIs. The problem is that in this context, the empty string is clearly unintentional.

HTML5 adds to the description of the `img` tag's `src` attribute to instruct browsers not to make an additional request in section 4.8.2:

The `src` attribute must be present, and must contain a valid URL referencing a non-interactive, optionally animated, image resource that is neither paged nor scripted. If the base URI of the element is the same as the document's address, then the `src` attribute's value must not be the empty string.

Hopefully, browsers will not have this problem in the future. Unfortunately, there is no such clause for `<script src="">` and `<link href="">`. Maybe there is still time to make that adjustment to ensure browsers don't accidentally implement this behavior.

This rule was inspired by Yahoo!'s JavaScript guru Nicolas C. Zakas. For more information check out his article "[Empty image src can destroy your site](#)".

Add an Expires or a Cache-Control Header

There are two aspects to this rule:

- For static components: implement "Never expire" policy by setting far future Expires header
- For dynamic components: use an appropriate Cache-Control header to help the browser with conditional requests

Web page designs are getting richer and richer, which means more scripts, stylesheets, images, and Flash in the page. A first-time visitor to your page may have to make several HTTP requests, but by using the Expires header you make those components cacheable. This avoids unnecessary HTTP requests on subsequent page views. Expires headers are most often used with images, but they should be used on all components including scripts, stylesheets, and Flash components.

Site Auditor: Page Speed

Browsers (and proxies) use a cache to reduce the number and size of HTTP requests, making web pages load faster. A web server uses the Expires header in the HTTP response to tell the client how long a component can be cached. This is a far future Expires header, telling the browser that this response won't be stale until April 15, 2010.

Expires: Thu, 15 Apr 2010 20:00:00 GMT

If your server is Apache, use the ExpiresDefault directive to set an expiration date relative to the current date. This example of the ExpiresDefault directive sets the Expires date 10 years out from the time of the request.

ExpiresDefault "access plus 10 years"

Keep in mind, if you use a far future Expires header you have to change the component's filename whenever the component changes. At Yahoo! we often make this step part of the build process: a version number is embedded in the component's filename, for example, yahoo_2.0.6.js.

Using a far future Expires header affects page views only after a user has already visited your site. It has no effect on the number of HTTP requests when a user visits your site for the first time and the browser's cache is empty. Therefore the impact of this performance improvement depends on how often users hit your pages with a primed cache. (A "primed cache" already contains all of the components in the page.) We [measured this at Yahoo!](#) and found the number of page views with a primed cache is 75-85%. By using a far future Expires header, you increase the number of components that are cached by the browser and re-used on subsequent page views without sending a single byte over the user's Internet connection.

- item
 - http://g2ops.studiocenter.com/concrete/css/ccm.base.css
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/css/buttons.css
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/css/bootstrap.min.css
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/css/bootstrap-responsive.min.css
 - http://g2ops.studiocenter.com/files/cache/css/long_story_short_parallax/main.css?v1.3.3
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/css/responsive-typography.css?v1.3.3
 - http://g2ops.studiocenter.com/files/cache/css/long_story_short_parallax/typography.css?v1.3.3
 - http://g2ops.studiocenter.com/concrete/js/jquery.js
 - http://g2ops.studiocenter.com/concrete/js/ccm.base.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/bootstrap-transition.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/bootstrap-collapse.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/bootstrap-scrollspy-custom.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/jquery.scrollTo-1.4.3.1.min.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/jquery.superscrollorama.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/TweenMax.min.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/jquery.easing.1.3.js

Site Auditor: Page Speed

- http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/jquery.stellar.js
- http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/jquery.parallax-1.1.3.custom.js
- http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/modernizr.custom.js?v1.1.1
- http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/iscroll.js
- http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/polyfill.requestAnimationFrame.js
- http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/custom.js?v1.3.3
- <http://use.typekit.net/qmd6wzk.js>

Gzip Components

The time it takes to transfer an HTTP request and response across the network can be significantly reduced by decisions made by front-end engineers. It's true that the end-user's bandwidth speed, Internet service provider, proximity to peering exchange points, etc. are beyond the control of the development team. But there are other variables that affect response times. Compression reduces response times by reducing the size of the HTTP response.

Starting with HTTP/1.1, web clients indicate support for compression with the Accept-Encoding header in the HTTP request.

Accept-Encoding: gzip, deflate

If the web server sees this header in the request, it may compress the response using one of the methods listed by the client. The web server notifies the web client of this via the Content-Encoding header in the response.

Content-Encoding: gzip

Gzip is the most popular and effective compression method at this time. It was developed by the GNU project and standardized by [RFC 1952](#). The only other compression format you're likely to see is deflate, but it's less effective and less popular.

Gzipping generally reduces the response size by about 70%. Approximately 90% of today's Internet traffic travels through browsers that claim to support gzip. If you use Apache, the module configuring gzip depends on your version: Apache 1.3 uses [mod_gzip](#) while Apache 2.x uses [mod_deflate](#).

There are known issues with browsers and proxies that may cause a mismatch in what the browser expects and what it receives with regard to compressed content. Fortunately, these edge cases are dwindling as the use of older browsers drops off. The Apache modules help out by adding appropriate Vary response headers automatically.

Servers choose what to gzip based on file type, but are typically too limited in what they decide to compress. Most web sites gzip their HTML documents. It's also worthwhile to gzip your scripts and stylesheets, but many

Site Auditor: Page Speed

web sites miss this opportunity. In fact, it's worthwhile to compress any text response including XML and JSON. Image and PDF files should not be gzipped because they are already compressed. Trying to gzip them not only wastes CPU but can potentially increase file sizes.

Gzipping as many file types as possible is an easy way to reduce page weight and accelerate the user experience.

- item
 - <http://g2ops.studiocenter.com/>
 - <http://g2ops.studiocenter.com/concrete/css/ccm.base.css>
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/css/buttons.css
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/css/bootstrap.min.css
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/css/bootstrap-responsive.min.css
 - http://g2ops.studiocenter.com/files/cache/css/long_story_short_parallax/main.css?v1.3.3
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/css/responsive-typography.css?v1.3.3
 - http://g2ops.studiocenter.com/files/cache/css/long_story_short_parallax/typography.css?v1.3.3
 - <http://g2ops.studiocenter.com/concrete/js/jquery.js>
 - <http://g2ops.studiocenter.com/concrete/js/ccm.base.js>
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/bootstrap-transition.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/bootstrap-collapse.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/bootstrap-scrollspy-custom.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/jquery.scrollTo-1.4.3.1.min.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/jquery.superscrollorama.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/TweenMax.min.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/jquery.easing.1.3.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/jquery.stellar.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/jquery.parallax-1.1.3.custom.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/modernizr.custom.js?v1.1.1
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/iscroll.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/polyfill.requestAnimationFrame.js
 - http://g2ops.studiocenter.com/packages/theme_long_story_short_parallax/themes/long_story_short_parallax/js/custom.js?v1.3.3
 - <http://use.typekit.net/qmd6wzk.js>

Put Stylesheets at the Top

While researching performance at Yahoo!, we discovered that moving stylesheets to the document HEAD makes pages appear to be loading faster. This is because putting stylesheets in the HEAD allows the page to render progressively.

Front-end engineers that care about performance want a page to load progressively; that is, we want the browser to display whatever content it has as soon as possible. This is especially important for pages with a lot of content and for users on slower Internet connections. The importance of giving users visual feedback, such as progress indicators, has been well researched and [documented](#). In our case the HTML page is the progress indicator! When the browser loads the page progressively the header, the navigation bar, the logo at the top, etc. all serve as visual feedback for the user who is waiting for the page. This improves the overall user experience.

The problem with putting stylesheets near the bottom of the document is that it prohibits progressive rendering in many browsers, including Internet Explorer. These browsers block rendering to avoid having to redraw elements of the page if their styles change. The user is stuck viewing a blank white page.

The [HTML specification](#) clearly states that stylesheets are to be included in the HEAD of the page: "Unlike A, [LINK] may only appear in the HEAD section of a document, although it may appear any number of times." Neither of the alternatives, the blank white screen or flash of unstyled content, are worth the risk. The optimal solution is to follow the HTML specification and load your stylesheets in the document HEAD.

Put Scripts at the Bottom

The problem caused by scripts is that they block parallel downloads. The [HTTP/1.1 specification](#) suggests that browsers download no more than two components in parallel per hostname. If you serve your images from multiple hostnames, you can get more than two downloads to occur in parallel. While a script is downloading, however, the browser won't start any other downloads, even on different hostnames.

In some situations it's not easy to move scripts to the bottom. If, for example, the script uses document.write to insert part of the page's content, it can't be moved lower in the page. There might also be scoping issues. In many cases, there are ways to workaround these situations.

An alternative suggestion that often comes up is to use deferred scripts. The DEFER attribute indicates that the script does not contain document.write, and is a clue to browsers that they can continue rendering. Unfortunately, Firefox doesn't support the DEFER attribute. In Internet Explorer, the script may be deferred, but not as much as desired. If a script can be deferred, it can also be moved to the bottom of the page. That will make your web pages load faster.

Make JavaScript and CSS External

Many of these performance rules deal with how external components are managed. However, before these considerations arise you should ask a more basic question: Should JavaScript and CSS be contained in external files, or inlined in the page itself?

Using external files in the real world generally produces faster pages because the JavaScript and CSS files are cached by the browser. JavaScript and CSS that are inlined in HTML documents get downloaded every time the HTML document is requested. This reduces the number of HTTP requests that are needed, but

Site Auditor: Page Speed

increases the size of the HTML document. On the other hand, if the JavaScript and CSS are in external files cached by the browser, the size of the HTML document is reduced without increasing the number of HTTP requests.

The key factor, then, is the frequency with which external JavaScript and CSS components are cached relative to the number of HTML documents requested. This factor, although difficult to quantify, can be gauged using various metrics. If users on your site have multiple page views per session and many of your pages re-use the same scripts and stylesheets, there is a greater potential benefit from cached external files.

Many web sites fall in the middle of these metrics. For these sites, the best solution generally is to deploy the JavaScript and CSS as external files. The only exception where inlining is preferable is with home pages, such as [Yahoo!'s front page](#) and [My Yahoo!](#). Home pages that have few (perhaps only one) page view per session may find that inlining JavaScript and CSS results in faster end-user response times.

For front pages that are typically the first of many page views, there are techniques that leverage the reduction of HTTP requests that inlining provides, as well as the caching benefits achieved through using external files. One such technique is to inline JavaScript and CSS in the front page, but dynamically download the external files after the page has finished loading. Subsequent pages would reference the external files that should already be in the browser's cache.

Reduce DNS Lookups

The Domain Name System (DNS) maps hostnames to IP addresses, just as phonebooks map people's names to their phone numbers. When you type [www.yahoo.com](#) into your browser, a DNS resolver contacted by the browser returns that server's IP address. DNS has a cost. It typically takes 20-120 milliseconds for DNS to lookup the IP address for a given hostname. The browser can't download anything from this hostname until the DNS lookup is completed.

DNS lookups are cached for better performance. This caching can occur on a special caching server, maintained by the user's ISP or local area network, but there is also caching that occurs on the individual user's computer. The DNS information remains in the operating system's DNS cache (the "DNS Client service" on Microsoft Windows). Most browsers have their own caches, separate from the operating system's cache. As long as the browser keeps a DNS record in its own cache, it doesn't bother the operating system with a request for the record.

Internet Explorer caches DNS lookups for 30 minutes by default, as specified by the >DnsCacheTimeout registry setting. Firefox caches DNS lookups for 1 minute, controlled by the `network.dnsCacheExpiration` configuration setting. (Fasterfox changes this to 1 hour.)

When the client's DNS cache is empty (for both the browser and the operating system), the number of DNS lookups is equal to the number of unique hostnames in the web page. This includes the hostnames used in the page's URL, images, script files, stylesheets, Flash objects, etc. Reducing the number of unique hostnames reduces the number of DNS lookups.

Reducing the number of unique hostnames has the potential to reduce the amount of parallel downloading that takes place in the page. Avoiding DNS lookups cuts response times, but reducing parallel downloads may increase response times. My guideline is to split these components across at least two but no more than four hostnames. This results in a good compromise between reducing DNS lookups and allowing a high degree of parallel downloads.

- item
 - g2ops.studiocenter.com: 23 components, 466.3K

Site Auditor: Page Speed

◦ use.typekit.net: 1 component, 20.5K

Avoid Redirects

Redirects are accomplished using the 301 and 302 status codes. Here's an example of the HTTP headers in a 301 response:

```
HTTP/1.1 301 Moved Permanently Location: http://example.com/newuri Content-Type: text/html
```

The browser automatically takes the user to the URL specified in the Location field. All the information necessary for a redirect is in the headers. The body of the response is typically empty. Despite their names, neither a 301 nor a 302 response is cached in practice unless additional headers, such as Expires or Cache-Control, indicate it should be. The meta refresh tag and JavaScript are other ways to direct users to a different URL, but if you must do a redirect, the preferred technique is to use the standard 3xx HTTP status codes, primarily to ensure the back button works correctly.

The main thing to remember is that redirects slow down the user experience. Inserting a redirect between the user and the HTML document delays everything in the page since nothing in the page can be rendered and no components can start being downloaded until the HTML document has arrived.

One of the most wasteful redirects happens frequently and web developers are generally not aware of it. It occurs when a trailing slash (/) is missing from a URL that should otherwise have one. For example, going to <http://astrology.yahoo.com/astrology> results in a 301 response containing a redirect to <http://astrology.yahoo.com/astrology/> (notice the added trailing slash). This is fixed in Apache by using Alias or mod_rewrite, or the DirectorySlash directive if you're using Apache handlers.

Connecting an old web site to a new one is another common use for redirects. Others include connecting different parts of a website and directing the user based on certain conditions (type of browser, type of user account, etc.). Using a redirect to connect two web sites is simple and requires little additional coding. Although using redirects in these situations reduces the complexity for developers, it degrades the user experience. Alternatives for this use of redirects include using Alias and mod_rewrite if the two code paths are hosted on the same server. If a domain name change is the cause of using redirects, an alternative is to create a CNAME (a DNS record that creates an alias pointing from one domain name to another) in combination with Alias or mod_rewrite.

Remove Duplicate Scripts

It hurts performance to include the same JavaScript file twice in one page. This isn't as unusual as you might think. A review of the ten top U.S. web sites shows that two of them contain a duplicated script. Two main factors increase the odds of a script being duplicated in a single web page: team size and number of scripts. When it does happen, duplicate scripts hurt performance by creating unnecessary HTTP requests and wasted JavaScript execution.

Unnecessary HTTP requests happen in Internet Explorer, but not in Firefox. In Internet Explorer, if an external script is included twice and is not cacheable, it generates two HTTP requests during page loading. Even if the script is cacheable, extra HTTP requests occur when the user reloads the page.

Site Auditor: Page Speed

In addition to generating wasteful HTTP requests, time is wasted evaluating the script multiple times. This redundant JavaScript execution happens in both Firefox and Internet Explorer, regardless of whether the script is cacheable.

One way to avoid accidentally including the same script twice is to implement a script management module in your templating system. The typical way to include a script is to use the SCRIPT tag in your HTML page.

```
<script type="text/javascript" src="menu_1.0.17.js"></script>
```

An alternative in PHP would be to create a function called insertScript.

```
<?php insertScript("menu.js") ?>
```

In addition to preventing the same script from being inserted multiple times, this function could handle other issues with scripts, such as dependency checking and adding version numbers to script filenames to support far future Expires headers.

Configure ETags

Entity tags (ETags) are a mechanism that web servers and browsers use to determine whether the component in the browser's cache matches the one on the origin server. (An "entity" is another word a "component": images, scripts, stylesheets, etc.) ETags were added to provide a mechanism for validating entities that is more flexible than the last-modified date. An ETag is a string that uniquely identifies a specific version of a component. The only format constraints are that the string be quoted. The origin server specifies the component's ETag using the ETag response header.

```
HTTP/1.1 200 OK Last-Modified: Tue, 12 Dec 2006 03:03:59 GMT ETag: "10c24bc-4ab-457e1c1f" Content-Length: 12195
```

Later, if the browser has to validate a component, it uses the If-None-Match header to pass the ETag back to the origin server. If the ETags match, a 304 status code is returned reducing the response by 12195 bytes for this example.

```
GET /i/yahoo.gif HTTP/1.1 Host: us.yimg.com If-Modified-Since: Tue, 12 Dec 2006 03:03:59 GMT If-None-Match: "10c24bc-4ab-457e1c1f" HTTP/1.1 304 Not Modified
```

The problem with ETags is that they typically are constructed using attributes that make them unique to a specific server hosting a site. ETags won't match when a browser gets the original component from one server and later tries to validate that component on a different server, a situation that is all too common on Web sites that use a cluster of servers to handle requests. By default, both Apache and IIS embed data in the ETag that dramatically reduces the odds of the validity test succeeding on web sites with multiple servers.

Site Auditor: Page Speed

The ETag format for Apache 1.3 and 2.x is inode-size-timestamp. Although a given file may reside in the same directory across multiple servers, and have the same file size, permissions, timestamp, etc., its inode is different from one server to the next.

IIS 5.0 and 6.0 have a similar issue with ETags. The format for ETags on IIS is Filetimestamp:ChangeNumber. A ChangeNumber is a counter used to track configuration changes to IIS. It's unlikely that the ChangeNumber is the same across all IIS servers behind a web site.

The end result is ETags generated by Apache and IIS for the exact same component won't match from one server to another. If the ETags don't match, the user doesn't receive the small, fast 304 response that ETags were designed for; instead, they'll get a normal 200 response along with all the data for the component. If you host your web site on just one server, this isn't a problem. But if you have multiple servers hosting your web site, and you're using Apache or IIS with the default ETag configuration, your users are getting slower pages, your servers have a higher load, you're consuming greater bandwidth, and proxies aren't caching your content efficiently. Even if your components have a far future Expires header, a conditional GET request is still made whenever the user hits Reload or Refresh.

If you're not taking advantage of the flexible validation model that ETags provide, it's better to just remove the ETag altogether. The Last-Modified header validates based on the component's timestamp. And removing the ETag reduces the size of the HTTP headers in both the response and subsequent requests. This [Microsoft Support article](#) describes how to remove ETags. In Apache, this is done by simply adding the following line to your Apache configuration file:

```
FileETag none
```

Make Ajax Cacheable

One of the cited benefits of Ajax is that it provides instantaneous feedback to the user because it requests information asynchronously from the backend web server. However, using Ajax is no guarantee that the user won't be twiddling his thumbs waiting for those asynchronous JavaScript and XML responses to return. In many applications, whether or not the user is kept waiting depends on how Ajax is used. For example, in a web-based email client the user will be kept waiting for the results of an Ajax request to find all the email messages that match their search criteria. It's important to remember that "asynchronous" does not imply "instantaneous".

To improve performance, it's important to optimize these Ajax responses. The most important way to improve the performance of Ajax is to make the responses cacheable, as discussed in Add an Expires or a Cache-Control Header. Some of the other rules also apply to Ajax:

- Gzip Components
- Reduce DNS Lookups
- Minify JavaScript
- Avoid Redirects
- Configure ETags

Let's look at an example. A Web 2.0 email client might use Ajax to download the user's address book for autocompletion. If the user hasn't modified her address book since the last time she used the email web app, the previous address book response could be read from cache if that Ajax response was made cacheable

Site Auditor: Page Speed

with a future Expires or Cache-Control header. The browser must be informed when to use a previously cached address book response versus requesting a new one. This could be done by adding a timestamp to the address book Ajax URL indicating the last time the user modified her address book, for example, &t=1190241612. If the address book hasn't been modified since the last download, the timestamp will be the same and the address book will be read from the browser's cache eliminating an extra HTTP roundtrip. If the user has modified her address book, the timestamp ensures the new URL doesn't match the cached response, and the browser will request the updated address book entries.

Even though your Ajax responses are created dynamically, and might only be applicable to a single user, they can still be cached. Doing so will make your Web 2.0 apps faster.

Use GET for AJAX Requests

The [Yahoo! Mail](#) team found that when using XMLHttpRequest, POST is implemented in the browsers as a two-step process: sending the headers first, then sending data. So it's best to use GET, which only takes one TCP packet to send (unless you have a lot of cookies). The maximum URL length in IE is 2K, so if you send more than 2K data you might not be able to use GET.

An interesting side affect is that POST without actually posting any data behaves like GET. Based on the [HTTP specs](#), GET is meant for retrieving information, so it makes sense (semantically) to use GET when you're only requesting data, as opposed to sending data to be stored server-side.

Reduce the Number of DOM Elements

A complex page means more bytes to download and it also means slower DOM access in JavaScript. It makes a difference if you loop through 500 or 5000 DOM elements on the page when you want to add an event handler for example.

A high number of DOM elements can be a symptom that there's something that should be improved with the markup of the page without necessarily removing content. Are you using nested tables for layout purposes? Are you throwing in more <div>s only to fix layout issues? Maybe there's a better and more semantically correct way to do your markup.

A great help with layouts are the [YUI CSS utilities](#): grids.css can help you with the overall layout, fonts.css and reset.css can help you strip away the browser's defaults formatting. This is a chance to start fresh and think about your markup, for example use <div>s only when it makes sense semantically, and not because it renders a new line.

The number of DOM elements is easy to test, just type in Firebug's console:
`document.getElementsByTagName('*').length`

And how many DOM elements are too many? Check other similar pages that have good markup. For example the [Yahoo! Home Page](#) is a pretty busy page and still under 700 elements (HTML tags).

No 404s

HTTP requests are expensive so making an HTTP request and getting a useless response (i.e. 404 Not Found) is totally unnecessary and will slow down the user experience without any benefit.

Site Auditor: Page Speed

Some sites have helpful 404s "Did you mean X?", which is great for the user experience but also wastes server resources (like database, etc). Particularly bad is when the link to an external JavaScript is wrong and the result is a 404. First, this download will block parallel downloads. Next the browser may try to parse the 404 response body as if it were JavaScript code, trying to find something usable in it.

Reduce Cookie Size

HTTP cookies are used for a variety of reasons such as authentication and personalization. Information about cookies is exchanged in the HTTP headers between web servers and browsers. It's important to keep the size of cookies as low as possible to minimize the impact on the user's response time.

For more information check ["When the Cookie Crumbles"](#) by Tenni Theurer and Patty Chi. The take-home of this research:

- Eliminate unnecessary cookies
- Keep cookie sizes as low as possible to minimize the impact on the user response time
- Be mindful of setting cookies at the appropriate domain level so other sub-domains are not affected
- Set an Expires date appropriately. An earlier Expires date or none removes the cookie sooner, improving the user response time

Use Cookie-free Domains for Components

When the browser makes a request for a static image and sends cookies together with the request, the server doesn't have any use for those cookies. So they only create network traffic for no good reason. You should make sure static components are requested with cookie-free requests. Create a subdomain and host all your static components there.

If your domain is `www.example.org`, you can host your static components on `static.example.org`. However, if you've already set cookies on the top-level domain `example.org` as opposed to `www.example.org`, then all the requests to `static.example.org` will include those cookies. In this case, you can buy a whole new domain, host your static components there, and keep this domain cookie-free. Yahoo! uses `yimg.com`, YouTube uses `yimg.com`, Amazon uses `images-amazon.com` and so on.

Another benefit of hosting static components on a cookie-free domain is that some proxies might refuse to cache the components that are requested with cookies. On a related note, if you wonder if you should use `example.org` or `www.example.org` for your home page, consider the cookie impact. Omitting `www` leaves you no choice but to write cookies to `*.example.org`, so for performance reasons it's best to use the `www` subdomain and write the cookies to that subdomain.

Don't Scale Images in HTML

Don't use a bigger image than you need just because you can set the width and height in HTML. If you need `` then your image (`mycat.jpg`) should be 100x100px rather than a scaled down 500x500px image.

Make favicon.ico Small and Cacheable

The favicon.ico is an image that stays in the root of your server. It's a necessary evil because even if you don't care about it the browser will still request it, so it's better not to respond with a 404 Not Found. Also since it's on the same server, cookies are sent every time it's requested. This image also interferes with the download sequence, for example in IE when you request extra components in the onload, the favicon will be downloaded before these extra components.

So to mitigate the drawbacks of having a favicon.ico make sure:

- It's small, preferably under 1K.
- Set Expires header with what you feel comfortable (since you cannot rename it if you decide to change it). You can probably safely set the Expires header a few months in the future. You can check the last modified date of your current favicon.ico to make an informed decision.

[Imagemagick](#) can help you create small favicons



Site Auditor: Semantic Issues

2/1/2015 - 2/28/2015

Last Crawled on Mar 18, 2015

URL	Page Title	H1	H2	H3	Items	Types
http://g2ops.studiocenter.com/home/news/asis-international-security-forum-exhibition-guest-speaker/	G2 Ops :: ASIS International Security Forum & Exhibition guest speaker!	1	0	0	0	--
http://g2ops.studiocenter.com/home/careers/	G2 Ops :: Careers	1	1	3	0	--
http://g2ops.studiocenter.com/home/who-we-are/contact-and-locations/	G2 Ops :: Contact and Locations	1	0	3	0	--
http://g2ops.studiocenter.com/home/contract-vehicle/	G2 Ops :: Contract Vehicles	1	1	0	0	--
http://g2ops.studiocenter.com/home/what-we-do/cyber-security-architectural-analysis/	G2 Ops :: Cybersecurity Architectural Analysis	1	1	2	0	--
http://g2ops.studiocenter.com/home/news/g2-ops-hub-inc-founded-march-7th-2014/	G2 Ops :: G2 Ops Hub Inc. Founded March 7th, 2014	1	0	0	0	--
http://g2ops.studiocenter.com/home/news/g2-ops-now-offering-navsea-cableway-training-certification-c...	G2 Ops :: G2 Ops is now offering a NAVSEA Cableway Training & Certification Course	1	0	0	0	--
http://g2ops.studiocenter.com/home/	G2 Ops :: Home	1	4	0	0	--
http://g2ops.studiocenter.com/home/news/june-13-2014-g2-ops-establishes-operational-partnership-cybe...	G2 Ops :: June 13, 2014 – G2 Ops establishes an operational partnership with the Cyber Security...	1	0	0	0	--
http://g2ops.studiocenter.com/home/who-we-are/leadership-team/	G2 Ops :: Leadership Team	1	0	0	0	--



Site Auditor: Semantic Issues						
URL	Page Title	H1	H2	H3	Items	Types
http://g2ops.studiocenter.com/home/news/	G2 Ops :: News	1	0	5	0	--
http://g2ops.studiocenter.com/home/news/?ccm_paging_p_b173=2	G2 Ops :: News	1	0	1	0	--
http://g2ops.studiocenter.com/home/news/?ccm_paging_p_b173=1	G2 Ops :: News	1	0	5	0	--
http://g2ops.studiocenter.com/home/news/odu-selects-g2-ops-team-public-health-assessment-1-aug-2013..	G2 Ops :: ODU Selects G2 Ops Team for Public Health Assessment (1 Aug 2013)	1	0	0	0	--
http://g2ops.studiocenter.com/	G2 Ops :: Portal	0	0	0	0	--
http://g2ops.studiocenter.com/home/contract-vehicle/seaport-e/	G2 Ops :: Seaport-e	1	7	1	0	--
http://g2ops.studiocenter.com/home/what-we-do/159/	G2 Ops :: Strategic Consulting	1	1	1	0	--
http://g2ops.studiocenter.com/home/what-we-do/systems-and-data-flow-modeling/	G2 Ops :: Systems and Data Flow Modeling	1	1	1	0	--
http://g2ops.studiocenter.com/home/news/vedp-selects-g2-ops-valet/	G2 Ops :: VEDP selects G2 Ops for VALET	1	0	0	0	--
http://g2ops.studiocenter.com/home/who-we-are/	G2 Ops :: Who We Are	1	1	1	0	--
http://g2ops.studiocenter.com/home/who-we-serve/	G2 Ops :: Who We Serve	1	2	0	0	--



Site Auditor: Summary

Site Auditor: Summary

2/1/2015 - 2/28/2015

Total Issues: 124

22 Pages Crawled - March 18, 2015

Visibility Issues	META Issues	Content Issues	Link Issues	Image Issues	Semantic Issues
1	70	15	1	37	0

Visibility Issues	# of Issues
1 page has a redirect Redirects are used for pages, folders and domains that have moved. Search engines recommend using 301 redirects for content that has been permanently moved. However, other types of redirects may be appropriate for the changes you're making to your site.	1
0 pages were blocked by robots.txt A robots.txt file permits or restricts access to your website by search engine robots that crawl the web. These bots are automated, and before they access your website, they check to see if the robots.txt file blocks them from accessing certain pages.	0
0 page errors were detected A page server error indicates a problem with your website's hosting provider delivering a page to a search engine robot. This can be caused by problems with the code on the page or problems with the hosting server.	0
No malware found Kinds of malware include (but are not limited to) viruses, worms, spyware, and Trojan horses. Once a site or computer has been compromised, it can be used to host malicious content such as phishing sites (sites designed to trick users into parting with personal and credit card information).	0

Site Auditor: Summary	
META Issues	# of Issues
3 pages have a duplicate page title Search engines prefer it when your website has a unique page title for each page. Identical page titles could confuse website visitors trying to navigate your site, as well as the algorithm trying to understand the page. Search engines may ignore any pages with the same titles.	3
21 pages are missing a meta description The description attribute (a.k.a. meta description) is a short, helpful summary of your page's content. It is a primary piece of information searchers use to decide which result to click on. Having a description attribute doesn't guarantee that a search engine will use it in its search results, but in most cases it will.	21
21 pages are missing Google Analytics Any website can use Google Analytics code to track site usage and visitor behavior. Pages that are missing Google Analytics tracking code don't record that activity.	21
4 pages have a page title that is too short or too long Search results limit the number of characters they display for page titles. It's considered best practice to keep page titles to a length between 10 and 70 characters.	4
21 pages have a meta description that is too short or too long Search results limit the number of characters they display for meta descriptions. It's considered best practice to keep meta descriptions to a minimum of 50 characters and a maximum 156 characters.	21
0 pages are missing a page title Page titles are critical to giving searchers quick insight into the content of a result. It is a primary piece of information they use to decide which result to click on, so it's important to use high-quality, descriptive titles on your pages.	0
0 pages have a meta description that is considered a duplicate Search engines prefer it when your website has unique meta descriptions for each page. Unique meta descriptions help their algorithms interpret your content and its quality. Search engines may ignore any pages with duplicate meta descriptions.	0



Site Auditor: Summary	
Content Issues	# of Issues
13 pages have content with a low word count Pages that have 250 words or less may not perform well in search results. More words give search engine algorithms more context to understand the content and its quality. Best practices suggest publishing content with more than 250 words.	13
2 pages have duplicate content issues Duplicate content generally refers to substantive blocks of content within your website (or on another domain) that completely match other content or are appreciably similar. While search engines do a good job of choosing a version of the content to show in their search results, it's best practice to reduce or eliminate duplicate content as much as possible.	2

Site Auditor: Summary	
Link Issues	# of Issues
1 external link is missing anchor or ALT text Including text for links helps search engines better understand the context of the page you're linking to. If a text links doesn't have any text, it probably means the link is invisible to the user. If a link wraps around an image that doesn't have ALT text, it's the same as excluding text from a text link.	1
0 internal links are broken When internal links are broken, it means that links that point to other pages on your site cannot find the destination page. If search engine bots find too many broken internal links, they may trigger a "low quality" site signal to a search engine's algorithm, resulting in poor search result performance. Broken links also create a poor user experience.	0
0 external links are broken When external links are broken, it means that links that point to other websites cannot find the destination page (they receive a 404 page error or server error). If search engine bots find too many broken external links, they may trigger a "low quality" site signal to a search engine's algorithm, resulting in poor search result performance. Broken links also create a poor user experience.	0
0 internal links use rel="nofollow" The nofollow attribute is used to annotate a link in order to tell search engines "I can't or don't want to vouch for this link." In Google, links using the nofollow attribute also don't pass PageRank and don't pass anchor text. It's considered best practice to not use the nofollow attribute for internal links, because you're essentially telling search engines to not trust parts of your site.	0
0 external links use rel="nofollow" The nofollow attribute is used to annotate a link in order to tell search engines "I can't or don't want to vouch for this link." In Google, links using the nofollow attribute also don't pass PageRank and don't pass anchor text.	0
0 internal links are missing anchor or ALT text Including text for links helps search engines better understand the context of the page you're linking to. If a text links doesn't have any text, it probably means the link is invisible to the user. If a link wraps around an image that doesn't have ALT text, it's the same as excluding text from a text link.	0



Site Auditor: Summary	
Image Issues	# of Issues
7 images are missing ALT text The ALT attribute provides search engines with useful information about the subject matter of the image. They use this information to help determine the best image to return for a searcher's query.	7
30 images are missing title text The title attribute provides search engines with useful information about the subject matter of the image. They use this information to help determine the best image to return for a searcher's query.	30
0 images are broken When images are broken, it means that they are corrupted or no longer exist. If search engine bots find too many broken images, they may trigger a "low quality" site signal to a search engine's algorithm, resulting in poor search result performance. Broken images also create a poor user experience.	0



Site Auditor: Summary	
Semantic Issues	# of Issues
0 pages use Schema.org microdata Schema.org microdata – a special way of formatting content in HTML – can help search engines better understand page content. For example, you can use structured data to correctly communicate the details of a product review or a recipe. Search engines may also use structured data to enhance the appearance of your search results – known as rich snippets.	0
0 pages without headers were detected Headings help communicate and emphasize content themes to search engine algorithms. Not using headings may make it more difficult for those algorithms to comprehend the meaning of the page content.	0



Site Auditor: Visibility Issues

Site Auditor: Visibility Issues

2/1/2015 - 2/28/2015

Last Crawled on Mar 18, 2015

Page	URL	Blocked by Robots.txt	Blocked by Noindex	Status	Pages	Redirects
G2 Ops :: Portal	http://g2ops.studiocenter.com/	No	No	200 - OK	0	0
G2 Ops :: Home	http://g2ops.studiocenter.com/home/	No	No	200 - OK	21	0
G2 Ops :: Strategic Consulting	http://g2ops.studiocenter.com/home/what-we-do/159/	No	No	200 - OK	20	0
G2 Ops :: Cybersecurity Architectural Analysis	http://g2ops.studiocenter.com/home/what-we-do/cyber-security-architectural-analysis/	No	No	200 - OK	20	0
G2 Ops :: Who We Are	http://g2ops.studiocenter.com/home/who-we-are/	No	No	200 - OK	20	0
G2 Ops :: Contact and Locations	http://g2ops.studiocenter.com/home/who-we-are/contact-and-locations/	No	No	200 - OK	20	0
G2 Ops :: Leadership Team	http://g2ops.studiocenter.com/home/who-we-are/leadership-team/	No	No	200 - OK	20	0
G2 Ops :: News	http://g2ops.studiocenter.com/home/news/	No	No	200 - OK	20	0
G2 Ops :: ODU Selects G2 Ops Team for Public Health Assessment (1 Aug 2013)	http://g2ops.studiocenter.com/home/news/odu-selects-g2-ops-team-public-health-assessment-1-aug-2013/	No	No	200 - OK	2	0
G2 Ops :: June 13, 2014 – G2 Ops establishes an operational partnership with the Cyber Security Forum Initiative (CSFI).	http://g2ops.studiocenter.com/home/news/june-13-2014-g2-ops-establishes-operational-partnership-cyber-security-forum-initiative-csfi/	No	No	200 - OK	3	0
G2 Ops :: Systems and Data Flow Modeling	http://g2ops.studiocenter.com/home/what-we-do/systems-and-data-flow-modeling/	No	No	200 - OK	20	0



Site Auditor: Visibility Issues

Page	URL	Blocked by Robots.txt	Blocked by Noindex	Status	Pages	Redirects
G2 Ops :: ASIS International Security Forum & Exhibition guest speaker!	http://g2ops.studiocenter.com/home/news/asis-international-security-forum-exhibition-guest-speaker/	No	No	200 - OK	2	0
G2 Ops :: News	http://g2ops.studiocenter.com/home/news/?ccm_paging_p_b173=2	No	No	200 - OK	2	0
G2 Ops :: VEDP selects G2 Ops for VALET	http://g2ops.studiocenter.com/home/news/vedp-selects-g2-ops-valet/	No	No	200 - OK	1	0
G2 Ops :: News	http://g2ops.studiocenter.com/home/news/?ccm_paging_p_b173=1	No	No	200 - OK	1	0
G2 Ops :: Contract Vehicles	http://g2ops.studiocenter.com/home/contract-vehicle/	No	No	200 - OK	20	0
G2 Ops :: Seaport-e	http://g2ops.studiocenter.com/home/contract-vehicle/seaport-e/	No	No	200 - OK	1	0
--	http://g2ops.studiocenter.com/index.php/download_file/view/37/161/	No	No	302 - Found	1	0
G2 Ops :: G2 Ops is now offering a NAVSEA Cableway Training & Certification Course	http://g2ops.studiocenter.com/home/news/g2-ops-now-offering-navsea-cableway-training-certification-course/	No	No	200 - OK	3	0
G2 Ops :: Careers	http://g2ops.studiocenter.com/home/careers/	No	No	200 - OK	20	0
G2 Ops :: G2 Ops Hub Inc. Founded March 7th, 2014	http://g2ops.studiocenter.com/home/news/g2-ops-hub-inc-founded-march-7th-2014/	No	No	200 - OK	3	0
G2 Ops :: Who We Serve	http://g2ops.studiocenter.com/home/who-we-serve/	No	No	200 - OK	20	0