

# High Performance Widgets



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# Exceptional Performance



# Exceptional Performance

quantify and improve the performance of  
all Yahoo! products worldwide



# Exceptional Performance

quantify and improve the performance of  
all Yahoo! products worldwide

center of expertise

# Exceptional Performance

quantify and improve the performance of  
all Yahoo! products worldwide

center of expertise

build tools, analyze data

# Exceptional Performance

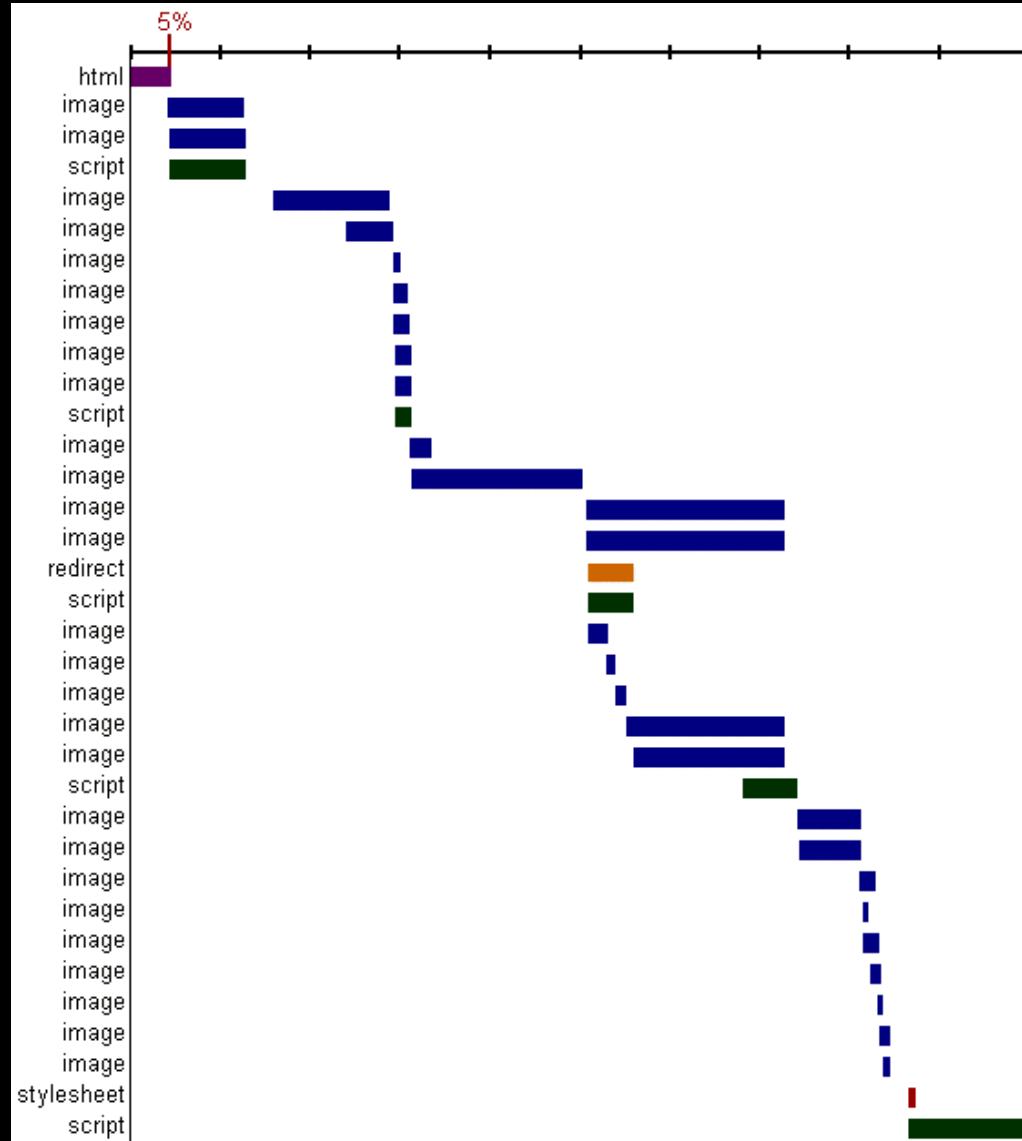
quantify and improve the performance of  
all Yahoo! products worldwide

center of expertise

build tools, analyze data

gather, research, and evangelize best  
practices

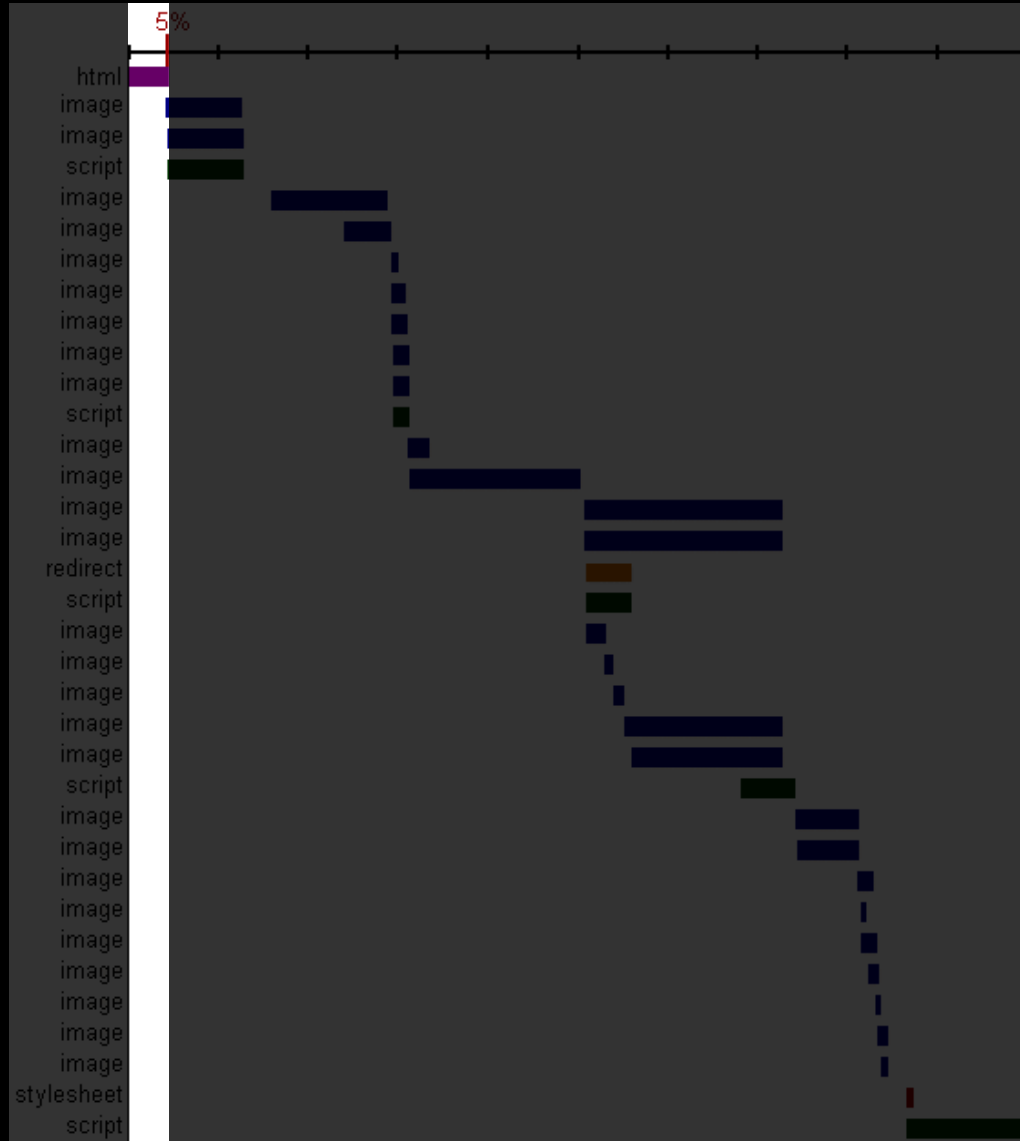
# The Importance of Frontend Performance



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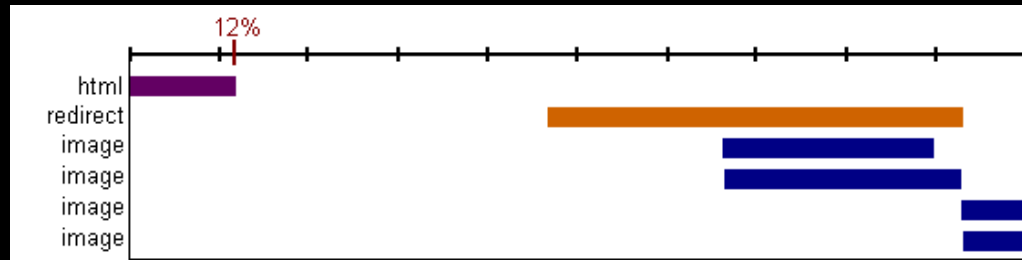
Backend =

5%





# The Importance of Frontend Performance



Even primed cache, frontend = **88%**

# Time Spent on the Frontend

	Empty Cache	Primed Cache
amazon.com	82%	86%
aol.com	94%	86%
cnn.com	81%	92%
ebay.com	98%	92%
google.com	86%	64%
msn.com	97%	95%
myspace.com	96%	86%
wikipedia.org	80%	88%
yahoo.com	95%	88%
youtube.com	97%	95%

# Time Spent on the Frontend

	Empty Cache	Primed Cache
amazon.com	82%	86%
aol.com	94%	86%
cnn.com	81%	92%
ebay.com	98%	92%
google.com	86%	64%
msn.com	97%	95%
myspace.com	96%	86%
wikipedia.org	80%	88%
yahoo.com	95%	88%
youtube.com	97%	95%

# The Performance Golden Rule

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*80-90% of the end-user response time is spent on the frontend. Start there.*

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# The Performance Golden Rule

*80-90% of the end-user response time is spent on the frontend. Start there.*

- Greater potential for improvement
- Simpler
- Proven to work



# Performance Research

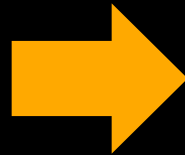
# Browser Cache Experiment

Add an image to the page:

Expires: Thu, 15 Apr 2004 20:00:00 GMT

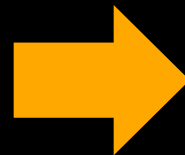
Last-Modified: Wed, 28 Sep 2006 23:49:57 GMT

Percentage of users with  
an empty cache?



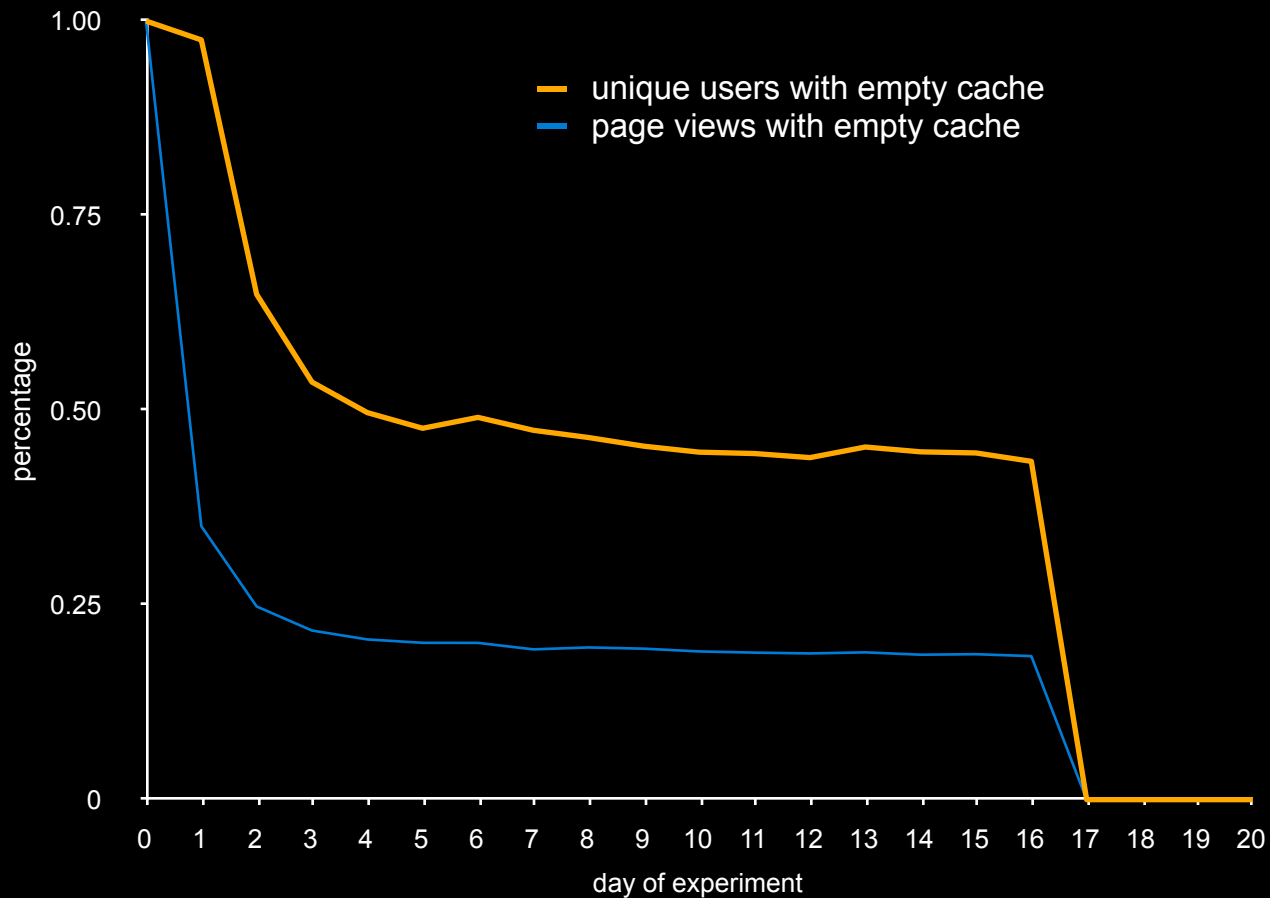
$$\frac{\# \text{ users with at least one } 200 \text{ response}}{\text{total } \# \text{ unique users}}$$

Percentage of page  
views with an empty  
cache?



$$\frac{\# \text{ of } 200 \text{ responses}}{\text{total } \# \text{ responses}}$$

# Browser Cache Expt Results



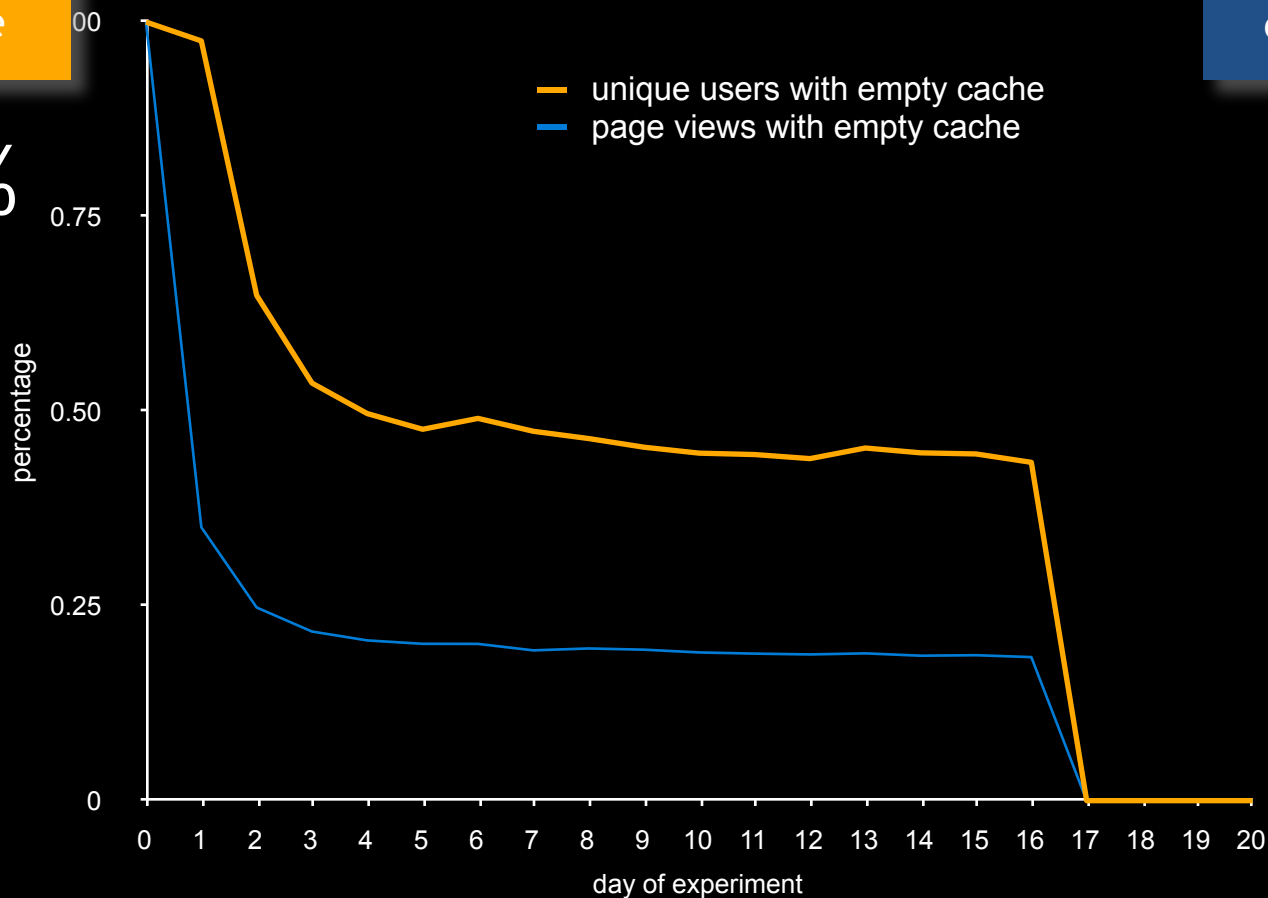
# Browser Cache Expt Results

users with  
empty cache

40-60%

page views with  
empty cache

~20%



# Experiment Takeaways



# Experiment Takeaways

**The empty cache user experience is more prevalent than you think!**



# Experiment Takeaways

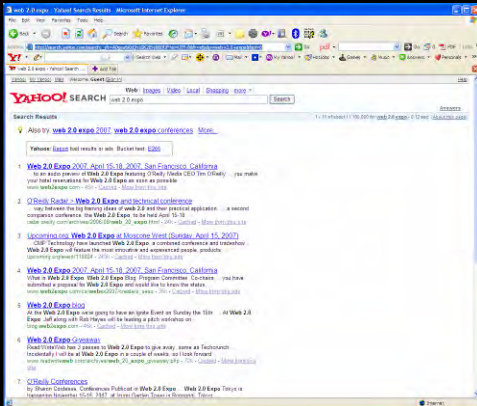
The empty cache user experience is more prevalent than you think!

Optimize for both primed cache *and* empty cache experience.

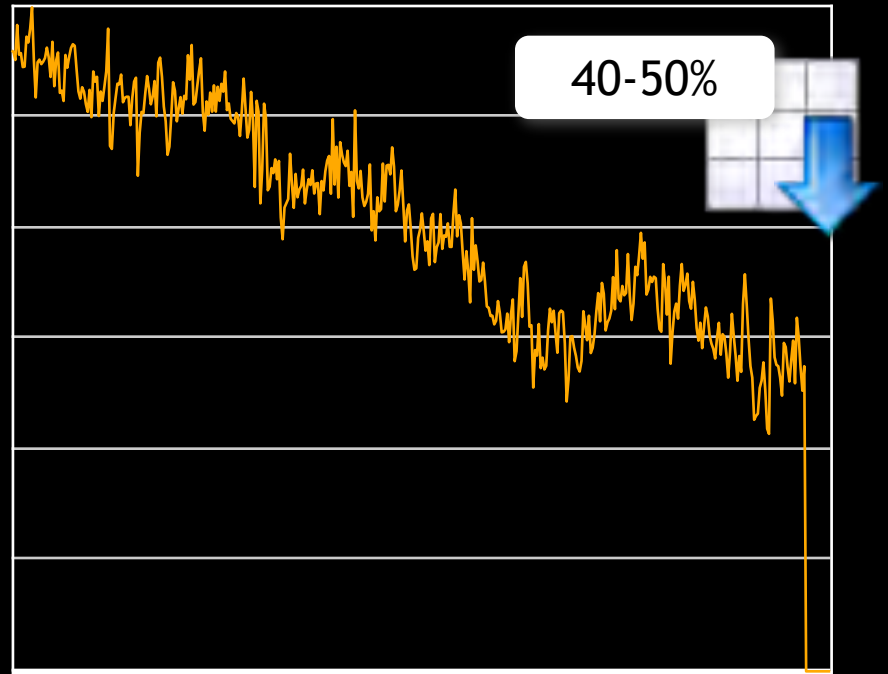
A close-up photograph of a brown leather suitcase handle. The handle is made of smooth, light-brown leather and is secured with a metal clasp mechanism. The clasp consists of two metal prongs that meet at the top, holding the handle in place. The background is blurred, showing a dark surface and some indistinct shapes.

# Case Studies

# Case Study:



- move JS to onload
- remove bottom tabs
- avoid redirects
- image sprites
- host JS on CDN
- combine JS files



387 42 387 70 387 98 26 388 54 388 82 389 10 389 38 380 66 389 94 390 22 390 50 390 78 391 106 391 34 391 62

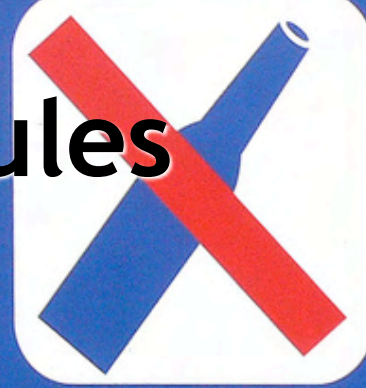
# 14 Rules



**NO ALCOHOLIC  
BEVERAGES**



**NO  
SMOKING**



**NO GLASS  
CONTAINERS**



**NO DOGS  
OR PETS**



**NO MOTOR  
VEHICLES**



**NO  
LITTERING**



**NO OPEN  
FIRES**



**NO  
CAMPING**

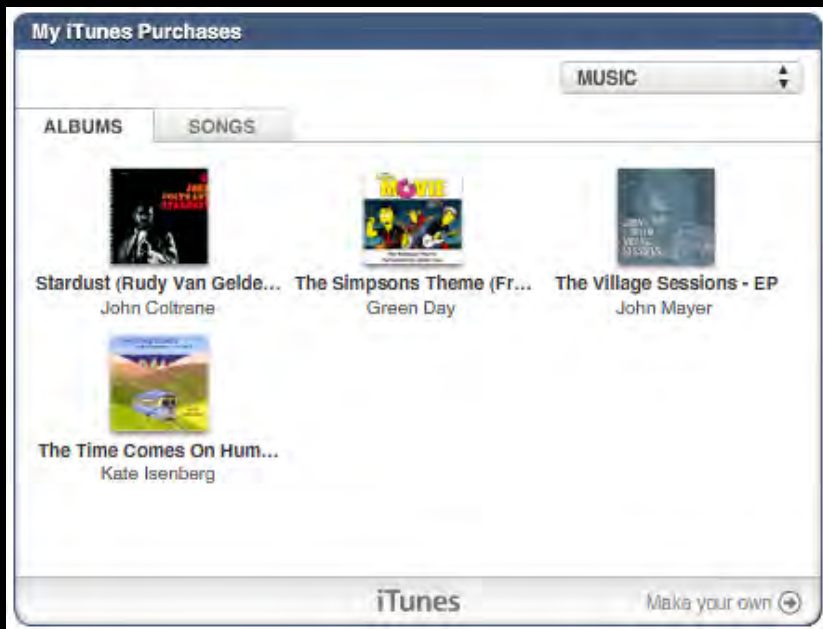


# 14 Rules

1. Make fewer HTTP requests
2. Use a CDN
3. Add an Expires header
4. Gzip components
5. Put stylesheets at the top
6. Move scripts to the bottom
7. Avoid CSS expressions
8. Make JS and CSS external
9. Reduce DNS lookups
10. Minify JS
11. Avoid redirects
12. Remove duplicate scripts
13. Configure ETags
14. Make AJAX cacheable

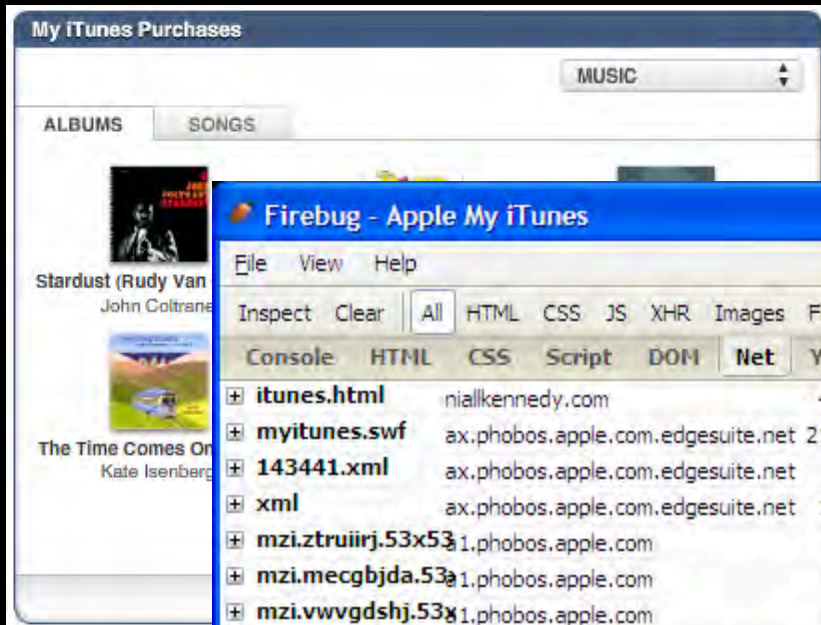
A vibrant concert scene with a crowd of people raising their hands in the foreground and a stage with bright blue and green lights in the background. The text "Widget Analysis" is overlaid in the center.

# Widget Analysis



# My iTunes

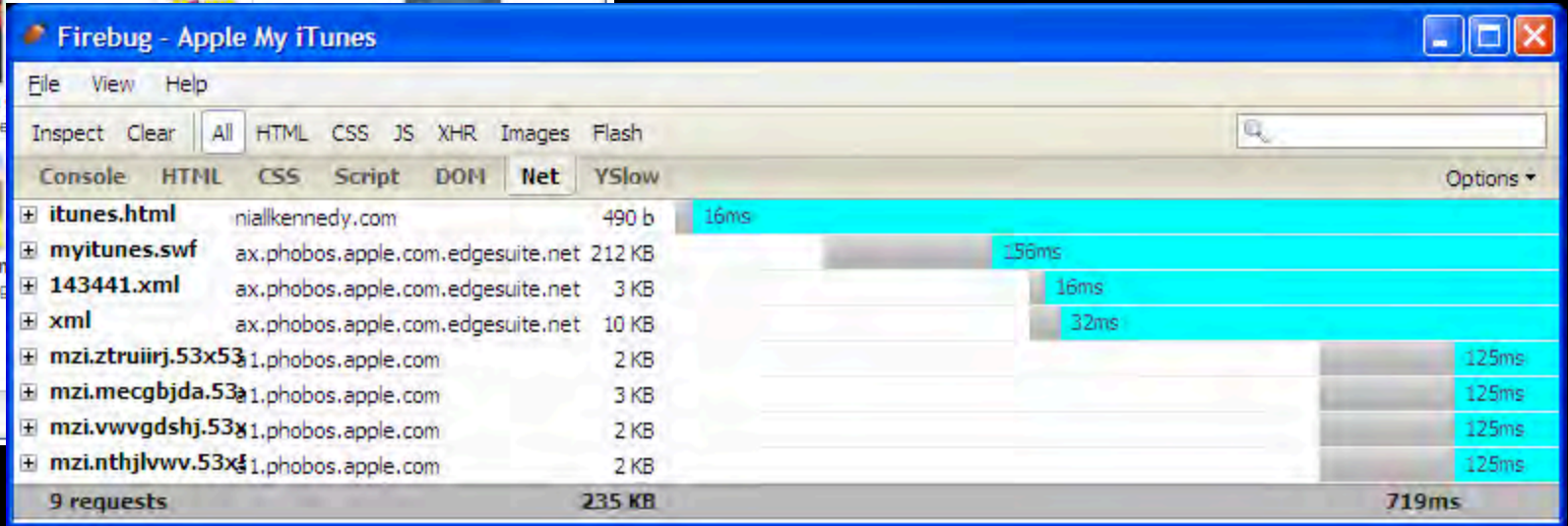
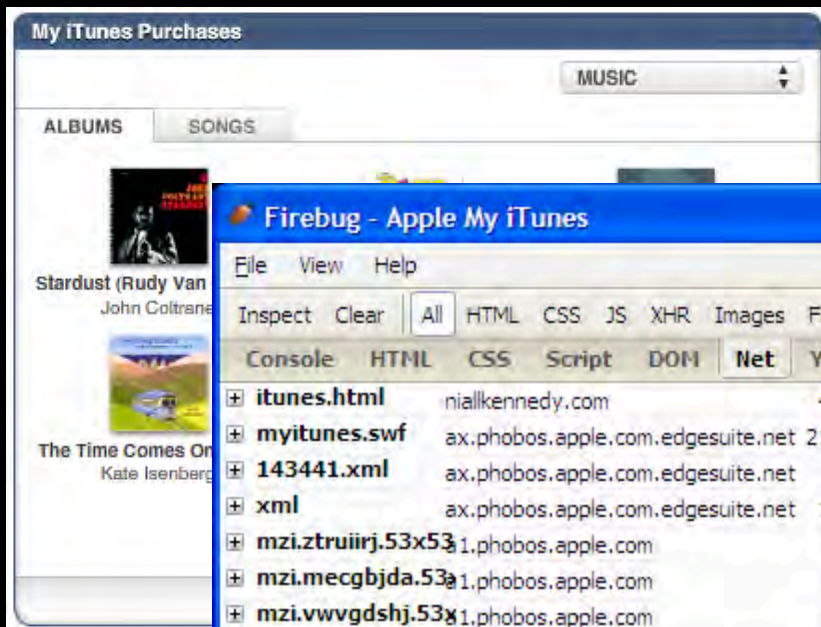
# My iTunes



The screenshot shows the Firebug - Apple My iTunes window. The 'Net' tab is active, displaying a list of network requests. The table below summarizes the data shown in the screenshot.

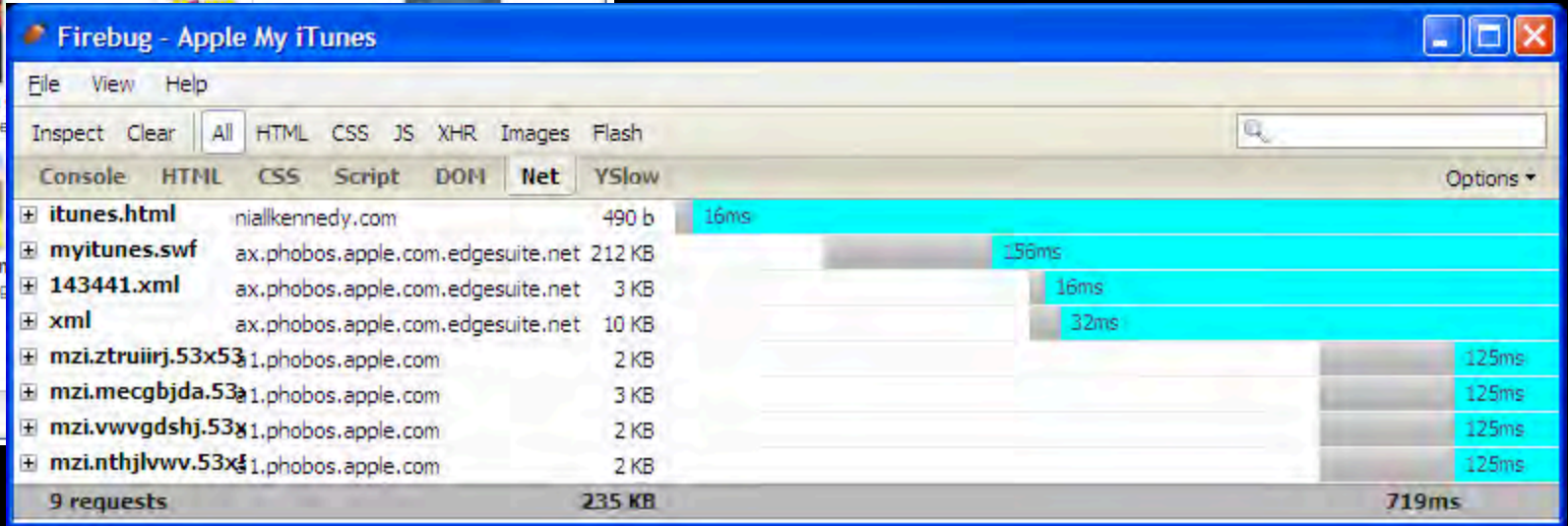
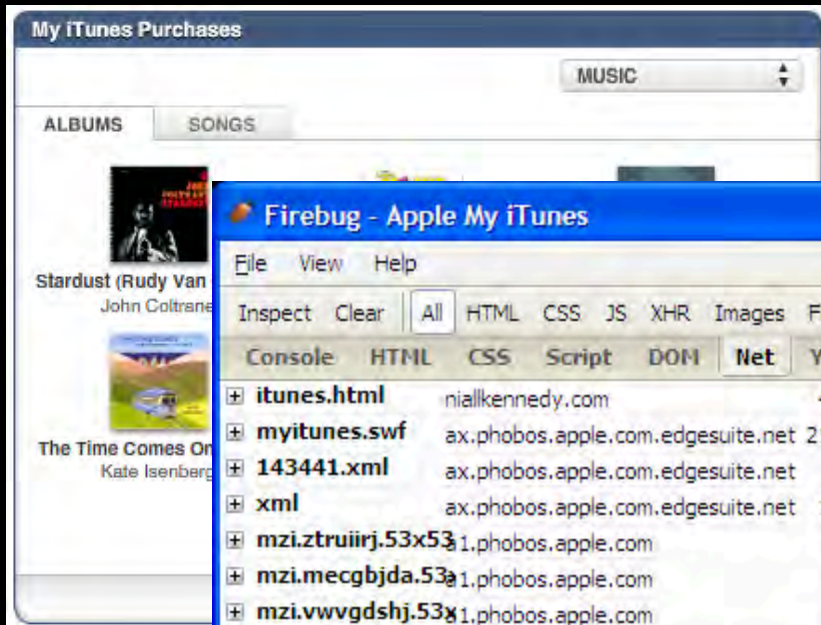
Request Name	URL	Size	Time
itunes.html	niaalkennedy.com	490 b	16ms
myitunes.swf	ax.phobos.apple.com.edgesuite.net	212 KB	156ms
143441.xml	ax.phobos.apple.com.edgesuite.net	3 KB	16ms
xml	ax.phobos.apple.com.edgesuite.net	10 KB	32ms
mzi.ztruiirj.53x53	1.phobos.apple.com	2 KB	125ms
mzi.mecgbjda.53x53	1.phobos.apple.com	3 KB	125ms
mzi.vwvgdshj.53x53	1.phobos.apple.com	2 KB	125ms
mzi.nthjlvwv.53x53	1.phobos.apple.com	2 KB	125ms
9 requests		235 KB	719ms

# My iTunes



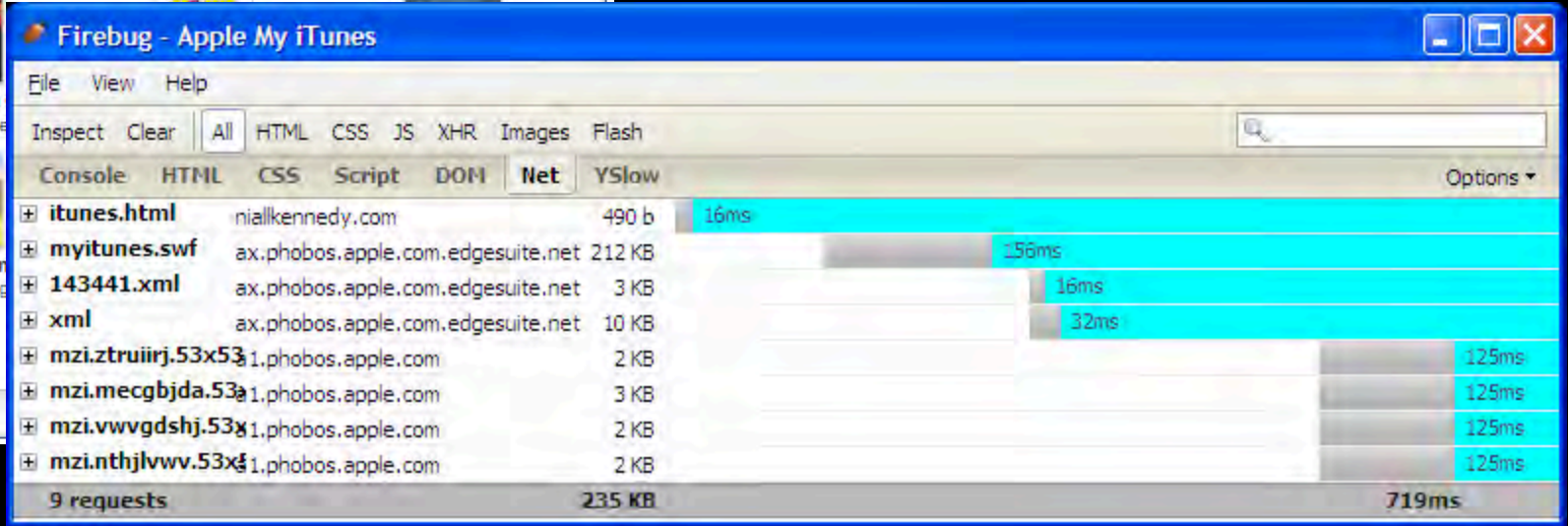
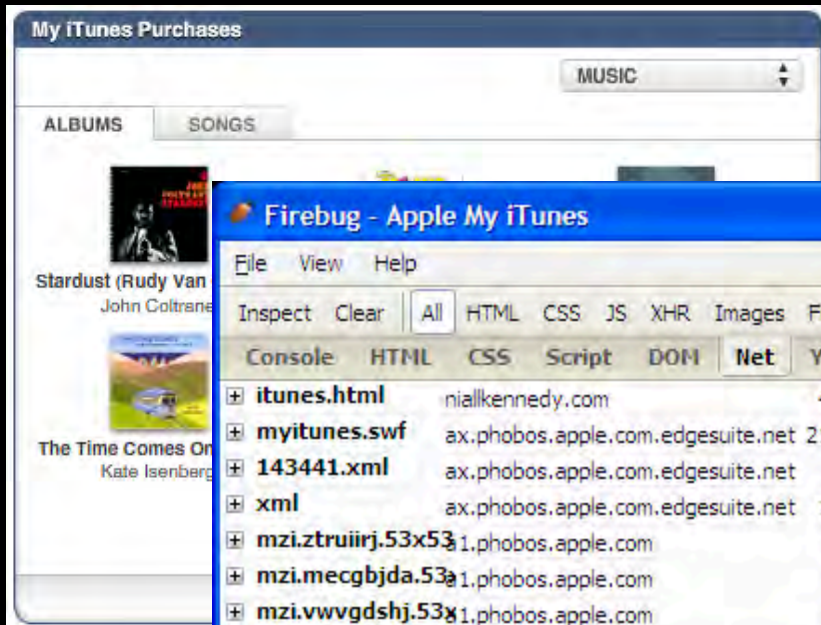
Flash-based

# My iTunes



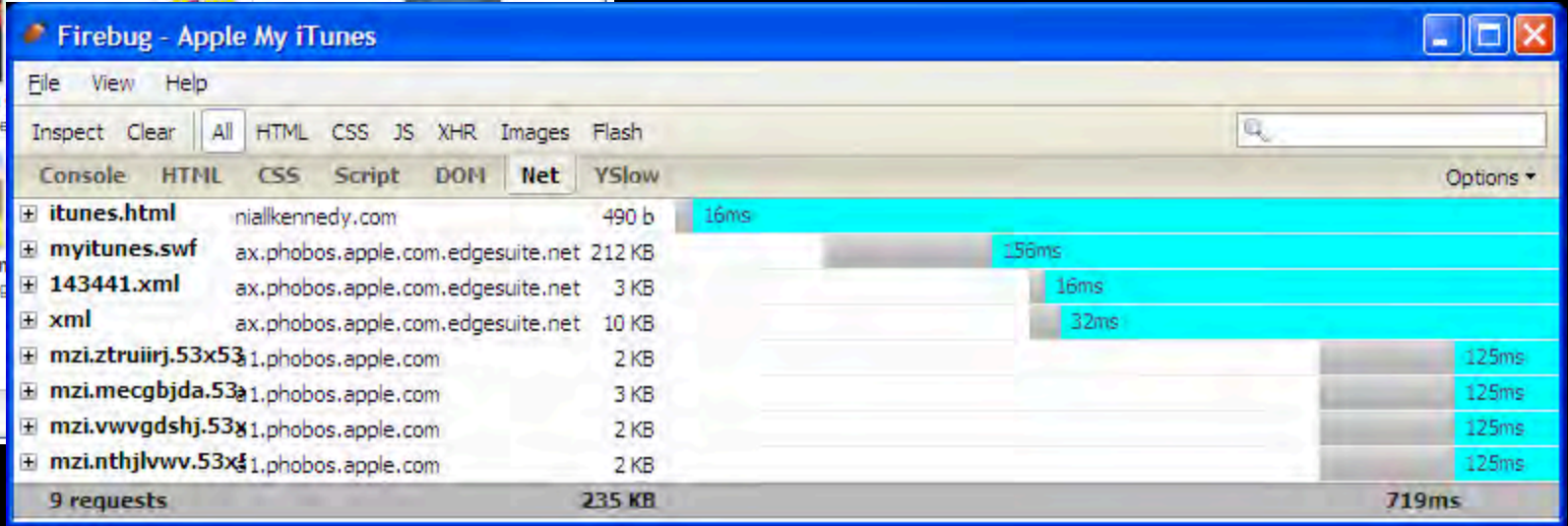
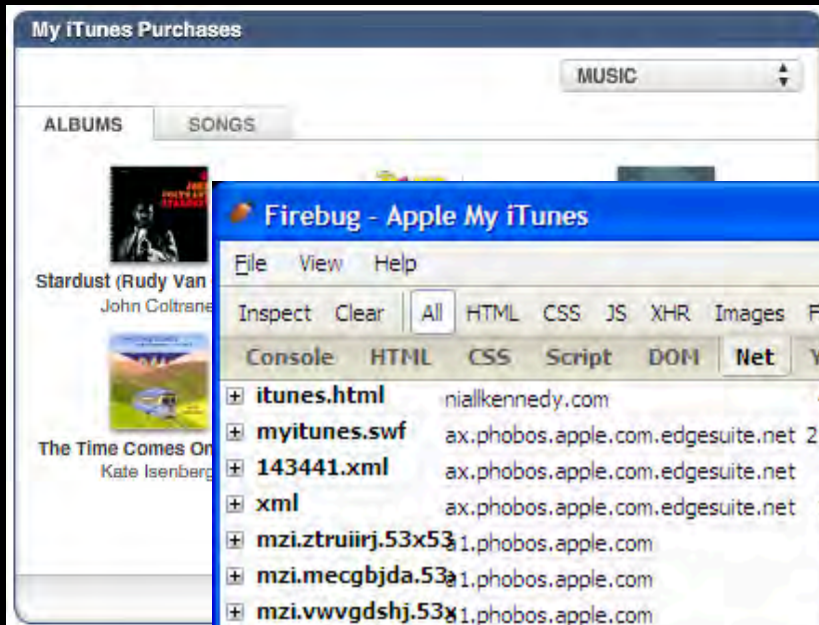
Flash-based  
8 HTTP requests

# My iTunes



Flash-based  
8 HTTP requests  
nothing is cached

# My iTunes



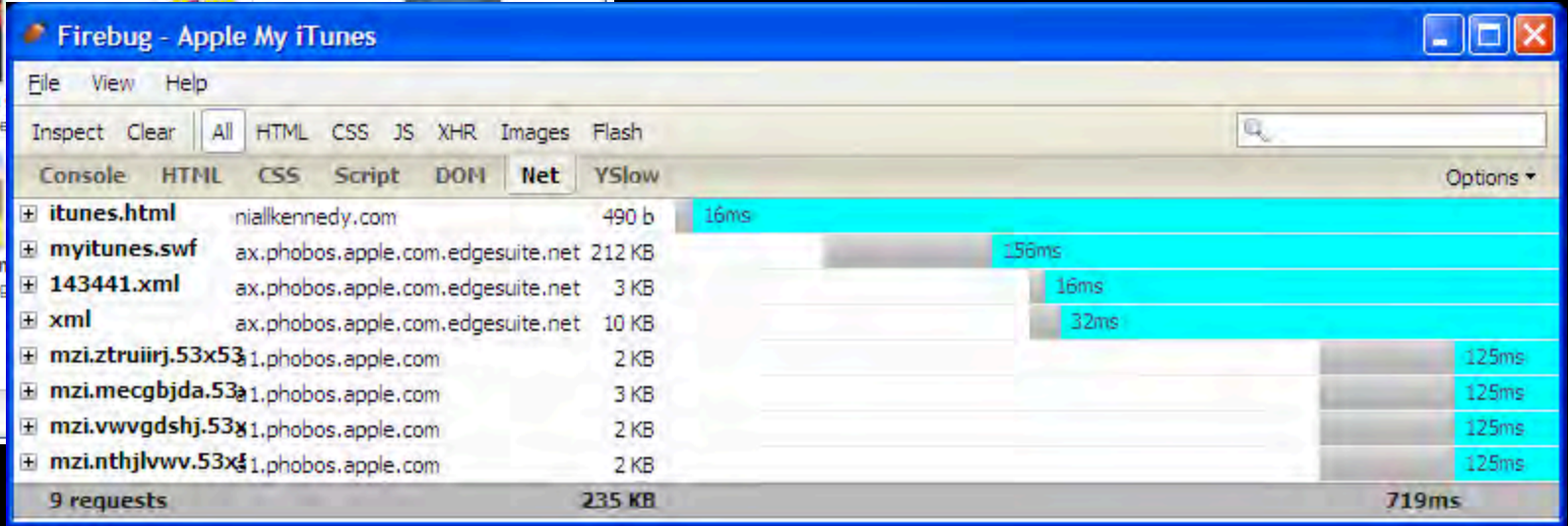
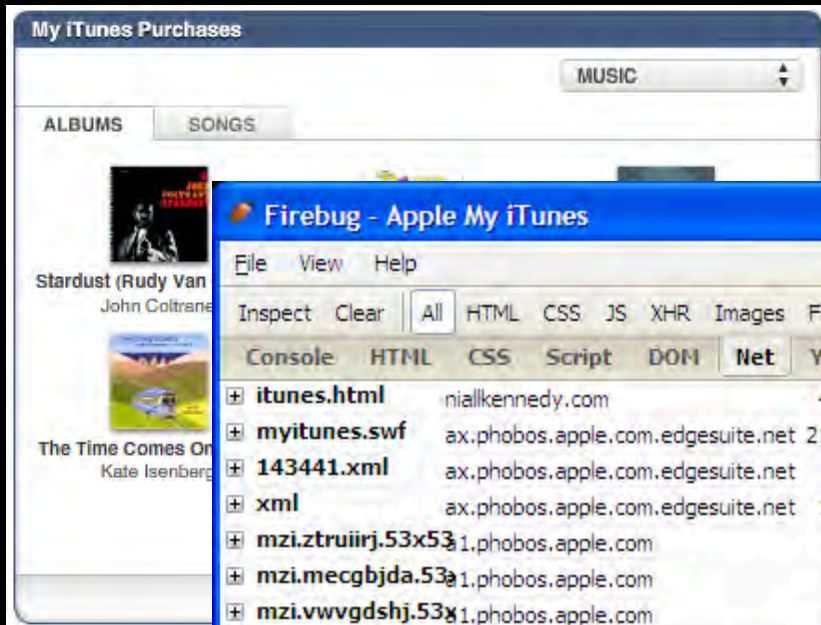
Flash-based

8 HTTP requests

nothing is cached

2<sup>nd</sup> page view: 8 HTTP requests (seven 304s)

# My iTunes



Flash-based

8 HTTP requests

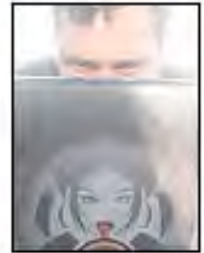
nothing is cached

2<sup>nd</sup> page view: 8 HTTP requests (seven 304s)

XML not cacheable, but images & CSS are

# Flickr

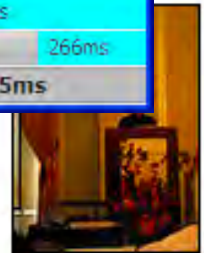
[www.flickr.com](http://www.flickr.com)



[More Flickr photos](#)  
tagged with  
[widgetslive](#)

# Flickr

[www.flickr.com](http://www.flickr.com)



More Flickr photos  
tagged with  
[widgetslive](#)

Firebug - Flickr badge

File View Help

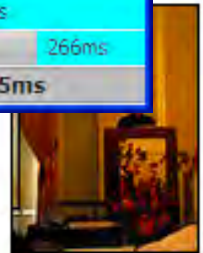
Inspect Clear All HTML CSS JS XHR Images Flash

Console HTML CSS Script DOM **Net** YSlow Options

+	flickr.html	nialkennedy.com	797 b	15ms		
+	badge_code_v2.g	flickr.com	456 b		510ms	
+	292868108_d3bd	farm1.static.flickr.com	7 KB		156ms	
+	309635100_7344	farm1.static.flickr.com	4 KB		172ms	
+	292793766_cda2l	farm1.static.flickr.com	6 KB		266ms	
5 requests			17 KB		875ms	

# Flickr

[www.flickr.com](http://www.flickr.com)



More Flickr photos  
tagged with  
widgetslive

Firebug - Flickr badge

File View Help

Inspect Clear All HTML CSS JS XHR Images Flash

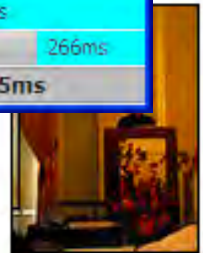
Console HTML CSS Script DOM **Net** YSlow Options

+	flickr.html	niallkennedy.com	797 b	15ms		
+	badge_code_v2.g	flickr.com	456 b		510ms	
+	292868108_d3bd	farm1.static.flickr.com	7 KB		156ms	
+	309635100_7344	farm1.static.flickr.com	4 KB		172ms	
+	292793766_cda2l	farm1.static.flickr.com	6 KB		266ms	
5 requests			17 KB		875ms	

JS-based

# Flickr

[www.flickr.com](http://www.flickr.com)



More Flickr photos  
tagged with  
widgetslive

Firebug - Flickr badge

File View Help

Inspect Clear All HTML CSS JS XHR Images Flash

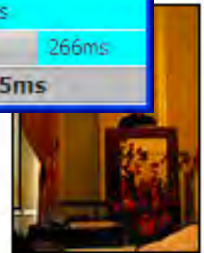
Console HTML CSS Script DOM Net YSlow Options

File	Size	Time
flickr.html	797 b	15ms
badge_code_v2.g	456 b	510ms
292868108_d3bd	7 KB	156ms
309635100_7344	4 KB	172ms
292793766_cda2l	6 KB	266ms
<b>5 requests</b>	<b>17 KB</b>	<b>875ms</b>

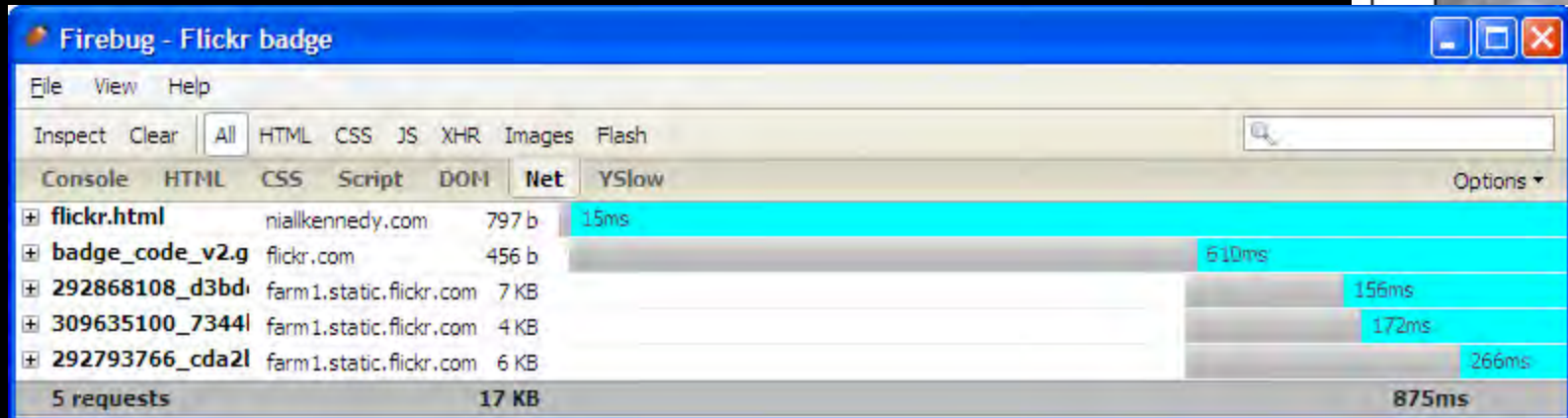
JS-based  
4 HTTP requests

# Flickr

[www.flickr.com](http://www.flickr.com)



[More Flickr photos tagged with widgetslive](#)



File	View	Help
Inspect	Clear	All
HTML	CSS	JS
XHR	Images	Flash
Console	HTML	CSS
Script	DOM	Net
YSlow	Options ▾	
+	flickr.html	niallkennedy.com 797 b 15ms
+	badge_code_v2.g	flickr.com 456 b 510ms
+	292868108_d3bd	farm1.static.flickr.com 7 KB 156ms
+	309635100_7344	farm1.static.flickr.com 4 KB 172ms
+	292793766_cda2l	farm1.static.flickr.com 6 KB 266ms
5 requests		17 KB 875ms

JS-based

4 HTTP requests

images are cached

# Flickr

www.flickr.com



More Flickr photos  
tagged with  
widgetslive

Request	Domain	Size	Time
flickr.html	niallkennedy.com	797 b	15ms
badge_code_v2.g	flickr.com	456 b	510ms
292868108_d3bd	farm1.static.flickr.com	7 KB	156ms
309635100_7344	farm1.static.flickr.com	4 KB	172ms
292793766_cda2l	farm1.static.flickr.com	6 KB	266ms
<b>5 requests</b>		<b>17 KB</b>	<b>875ms</b>

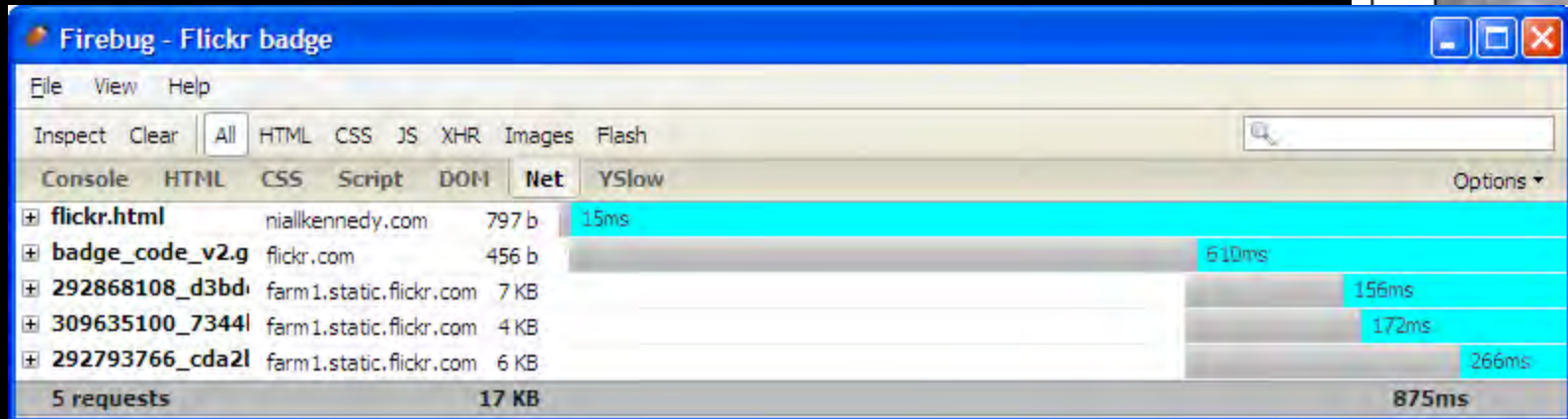
JS-based

4 HTTP requests

images are cached

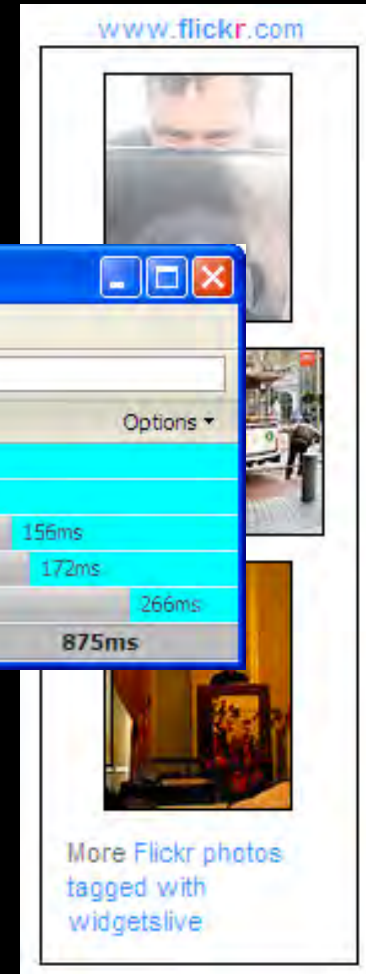
2<sup>nd</sup> page view: 1 HTTP request (badge JS)

# Flickr



The screenshot shows the Firebug network tab for a Flickr badge. It displays five requests with their respective domains, sizes, and response times. The total size of the requests is 17 KB and the total response time is 875ms.

Request	Domain	Size	Response Time
flickr.html	niallkennedy.com	797 b	15ms
badge_code_v2.g	flickr.com	456 b	510ms
292868108_d3bd	farm1.static.flickr.com	7 KB	156ms
309635100_7344	farm1.static.flickr.com	4 KB	172ms
292793766_cda2l	farm1.static.flickr.com	6 KB	266ms
<b>5 requests</b>		<b>17 KB</b>	<b>875ms</b>



JS-based

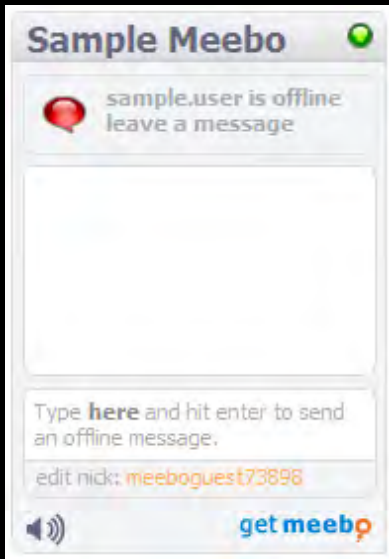
4 HTTP requests

images are cached

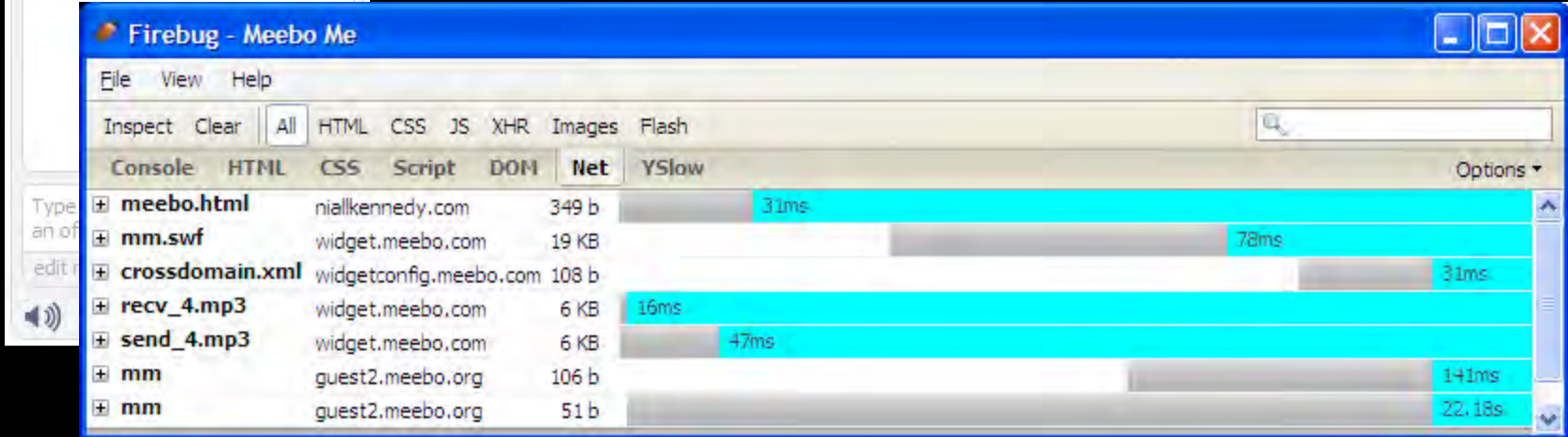
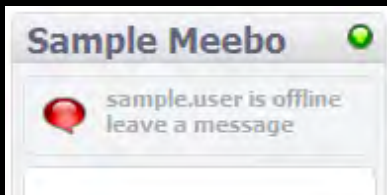
2<sup>nd</sup> page view: 1 HTTP request (badge JS)

JS gzipped, not minified (only 1.3K)

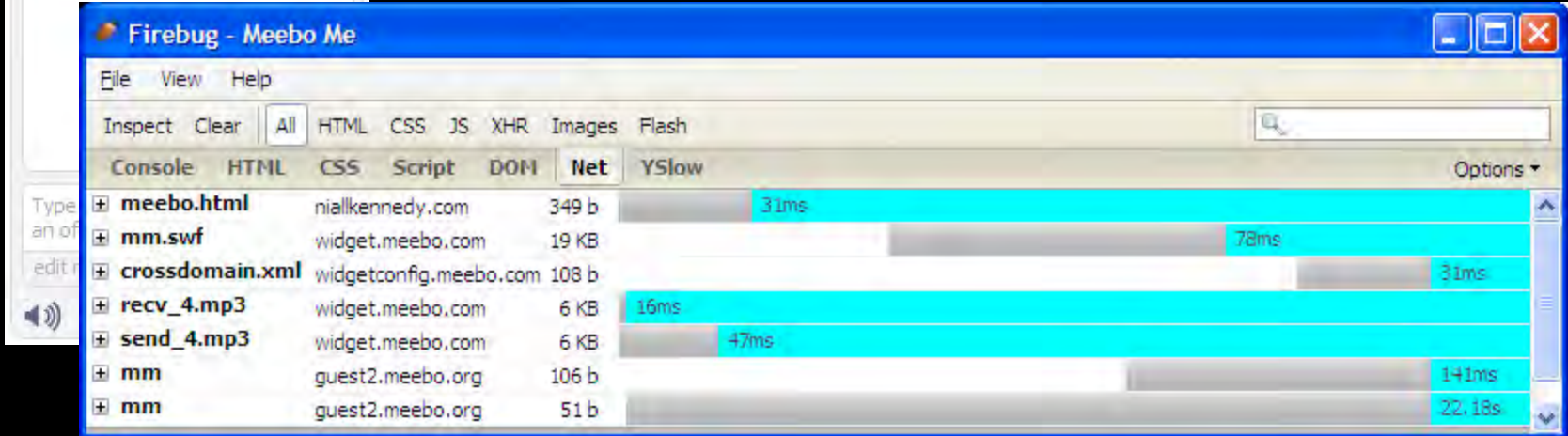
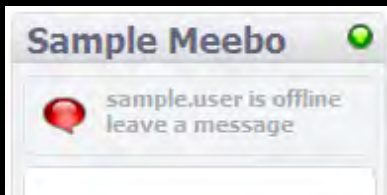
# Meebo



# Meebo

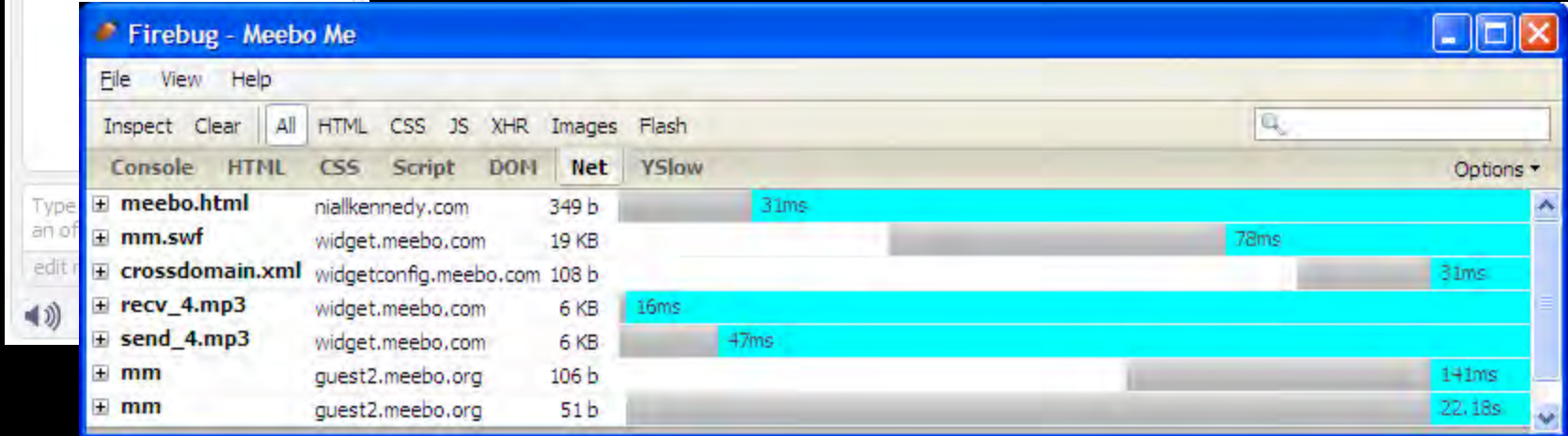
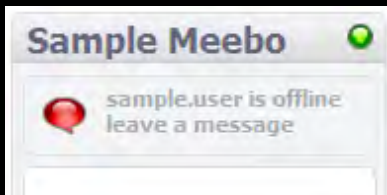


# Meebo



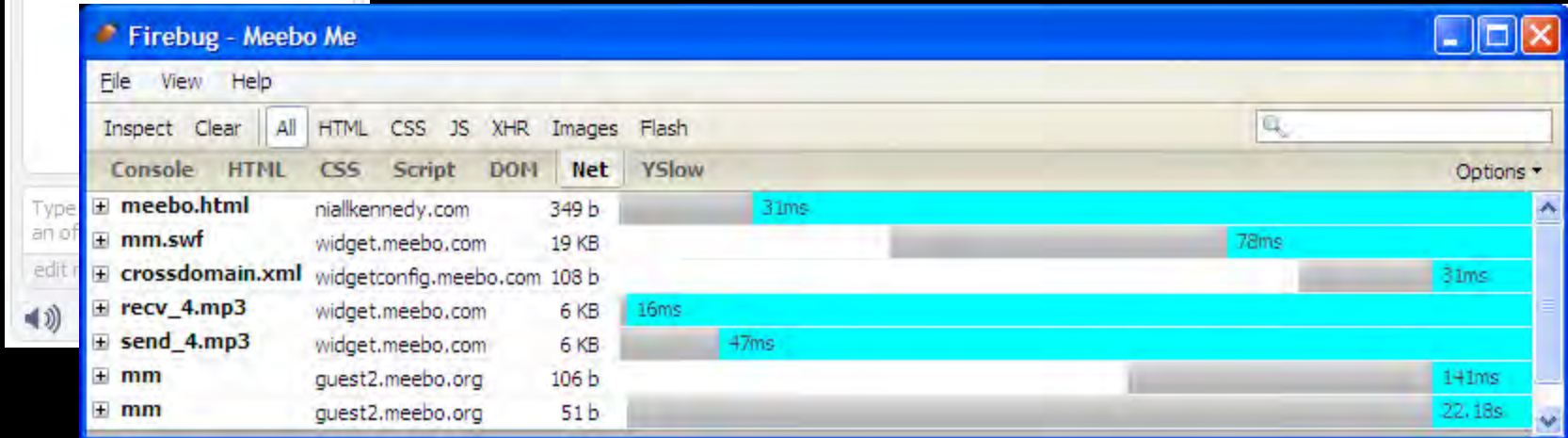
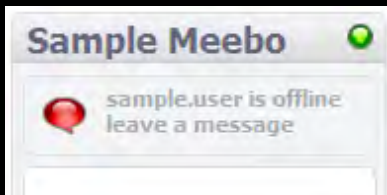
Flash-based

# Meebo



Flash-based  
8 HTTP requests

# Meebo

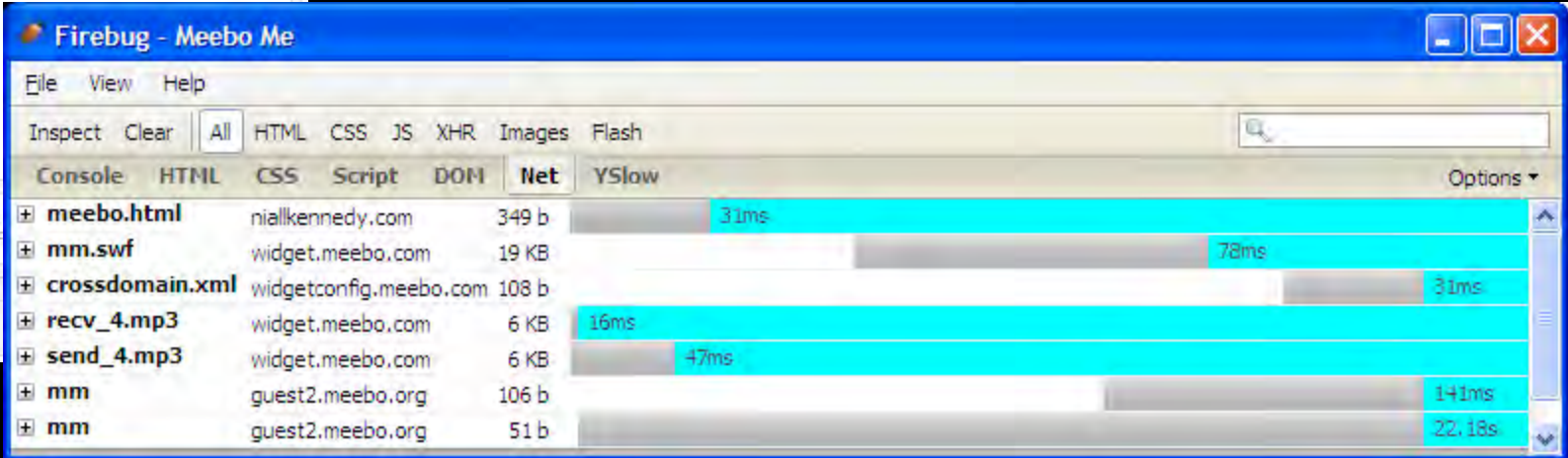
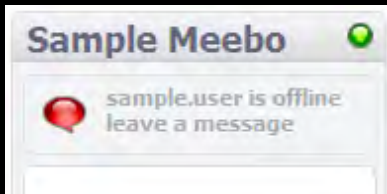


Flash-based

8 HTTP requests

nothing is cached

# Meebo



Flash-based

8 HTTP requests

nothing is cached

2<sup>nd</sup> page view: 8 HTTP request (four 304s)

# WeatherBug

Gadget by LabPixies.com

New York edit 

 Hi:  $\infty^{\circ}$  F  
**64.8 $^{\circ}$**   
Lo: 52 $^{\circ}$  F

Mostly cloudy. Lows in the lower 50s. Northwest winds  
or. [more...](#)

Tue	Wed	Thu	Fri
		 30%chance	 50%chance
65 $^{\circ}$ -55 $^{\circ}$	72 $^{\circ}$ -60 $^{\circ}$	75 $^{\circ}$ -62 $^{\circ}$	72 $^{\circ}$ -58 $^{\circ}$

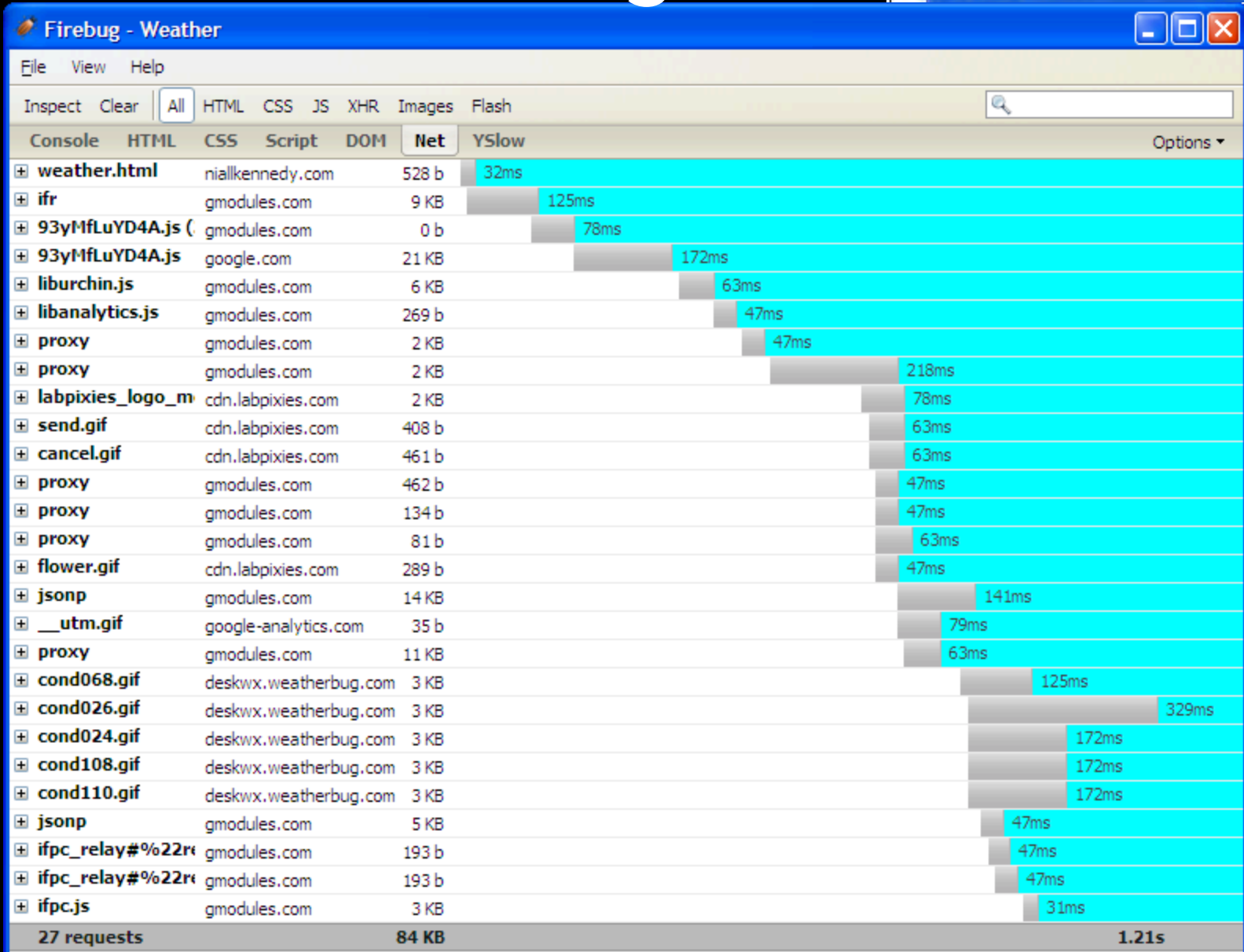
\* Great Gadgets by LabPixies! 

# WeatherBug

Gadget by LabPixies.com

New York edit

WeatherBug



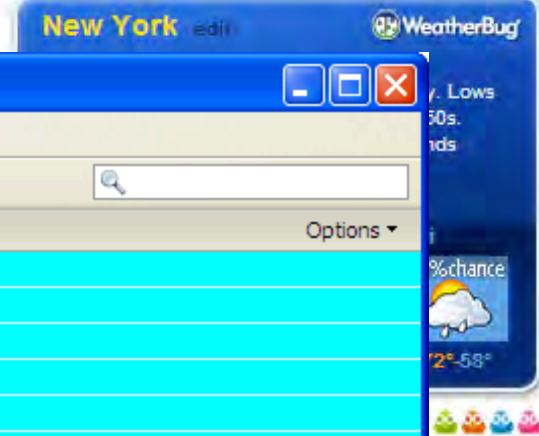
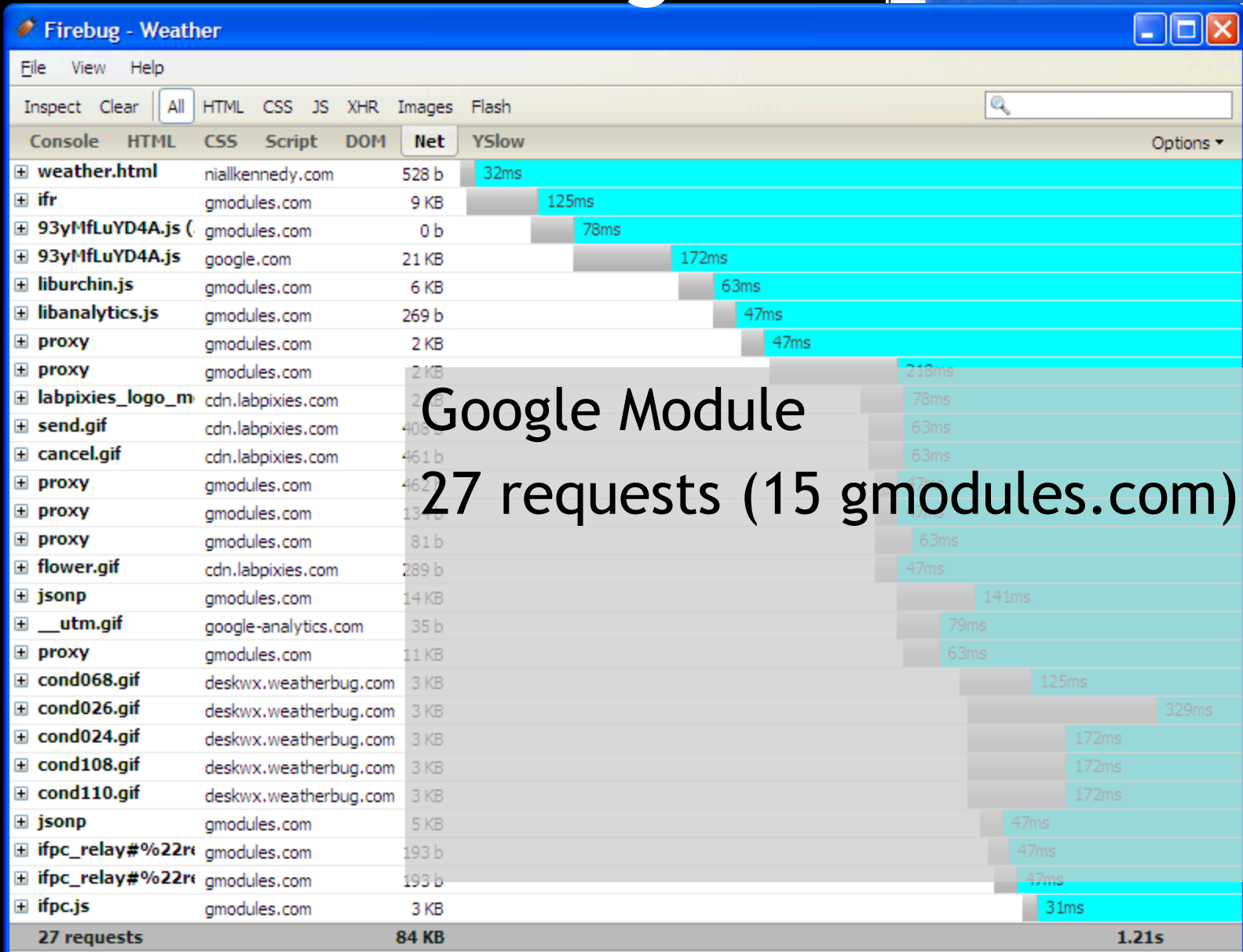
Low  
50s.  
nds

%chance

2°-58°

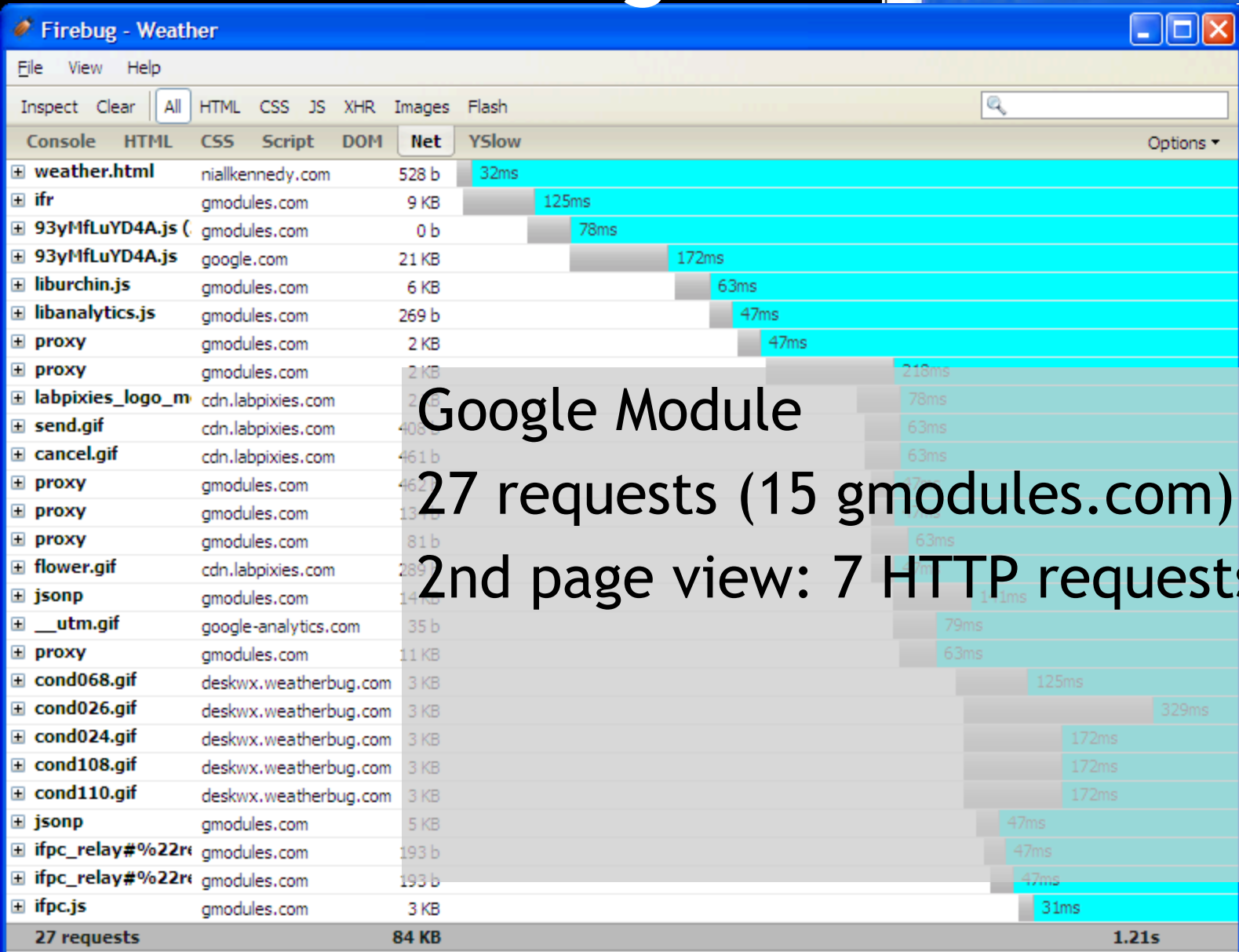
# WeatherBug

Gadget by LabPixies.com



# WeatherBug

Gadget by LabPixies.com



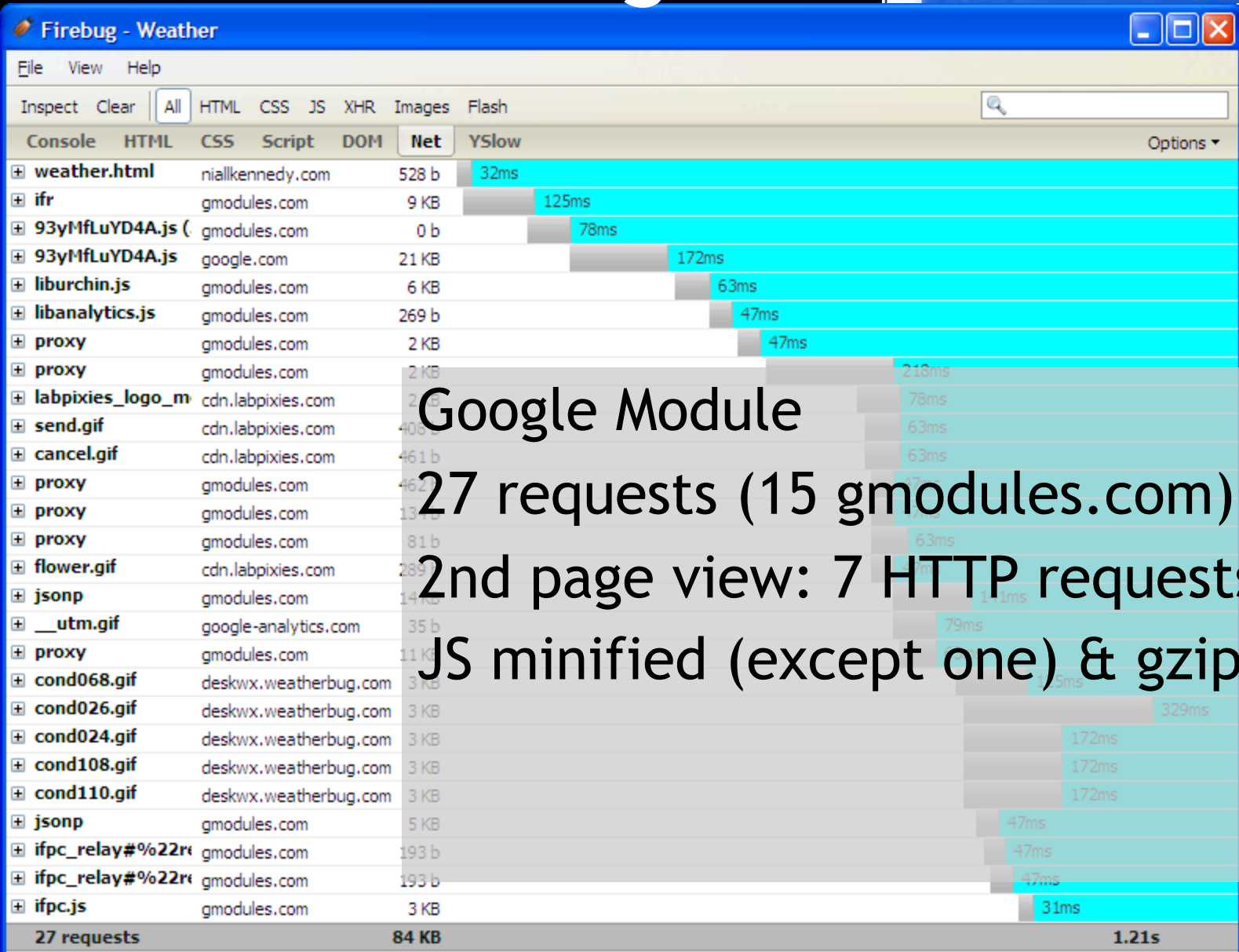
Google Module

27 requests (15 gmodules.com)

2nd page view: 7 HTTP requests

# WeatherBug

Gadget by LabPixies.com



Google Module

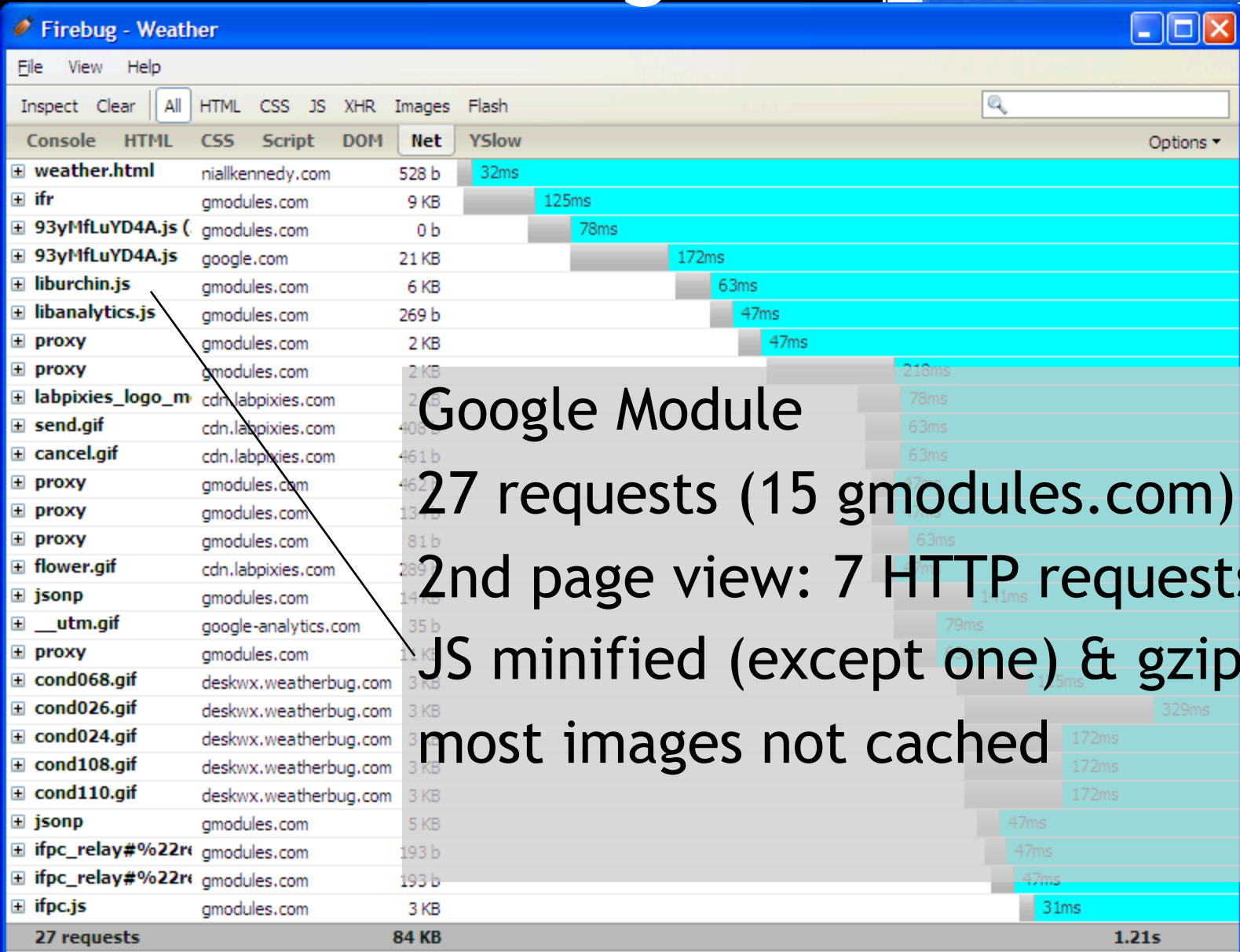
27 requests (15 gmodules.com)

2nd page view: 7 HTTP requests

JS minified (except one) & gzipped

# WeatherBug

Gadget by LabPixies.com



Google Module

27 requests (15 gmodules.com)

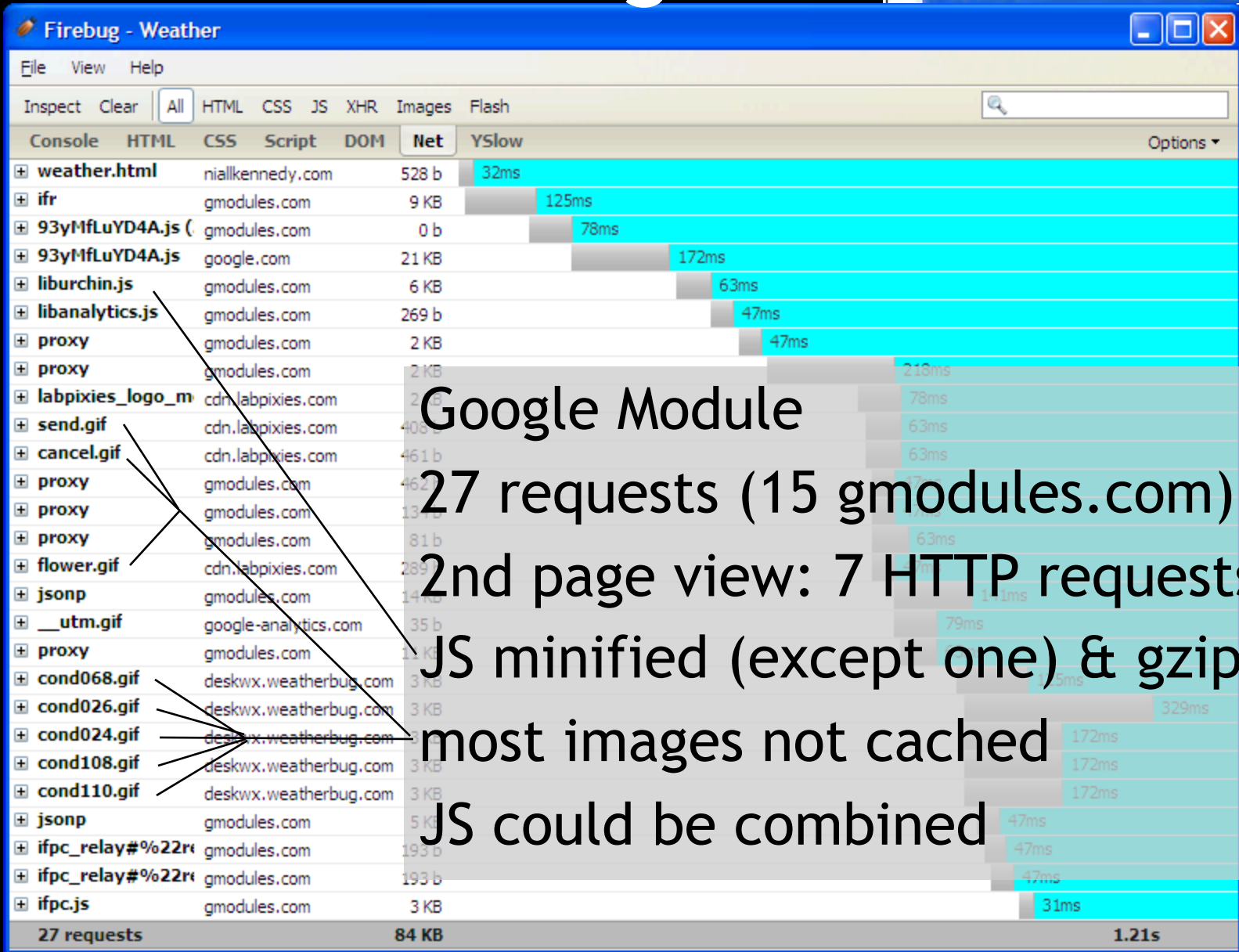
2nd page view: 7 HTTP requests

JS minified (except one) & gzipped

most images not cached

# WeatherBug

Gadget by LabPixies.com



# Yahoo! Finance

**YAHOO! FINANCE**

Enter Symbol  **SEARCH**

Quote  Web

NAME	LAST TRADE
<b>YHOO - NMS</b> YAHOO INC	<b>\$27.86</b> ▼

**6 MONTHS CHART**

YHOO GOOG MSFT

May Jul Sep

NEWS

- Stocks in focus for Tuesday at MarketWatch (Mon 7:01pm)
- Tomorrow's Headliners: Intel, IBM at TheStreet.com (Mon 6:50pm)
- Many options for Motricity after \$135M purchase bizjournals.com (Mon 6:38pm)
- Nothing To Yahoo! About at Forbes.com (Mon 6:00pm)
- [audio] Andrew O'Day's Money Markets & More f... at MarketWatch (Mon 5:54pm)

<b>GOOG - NMS</b> GOOGLE	<b>\$620.11</b> ▼
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syndication_2006	us.js2.yimg.com 8 KB	203ms
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trade.black.gif	us.i1.yimg.com 86 b	156ms
change.black.gif	us.i1.yimg.com 73 b	156ms
cell_bg_header_l	us.i1.yimg.com 2 KB	156ms
cell_bg_header_c	us.i1.yimg.com 306 b	156ms
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cell_bg_footer_le	us.i1.yimg.com 8 KB	156ms
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Tuesday  
7:01 pm

ers: Intel,

on 6:50 pm)

tricity after

n 6:38 pm)

About

6:00 pm)

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File View Help

Inspect Clear All HTML CSS JS HTML5 Pages Assets

Console HTML CSS Script DOM **Net** YSlow Options

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20 CSS background images - use sprites

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	# HTTP requests	page weight	onload time	HTTP time
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promote progressive rendering

# Takeaways

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LOFNO - be an advocate for your users



THANK  
YOU

Steve Souders  
souders@yahoo-inc.com

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