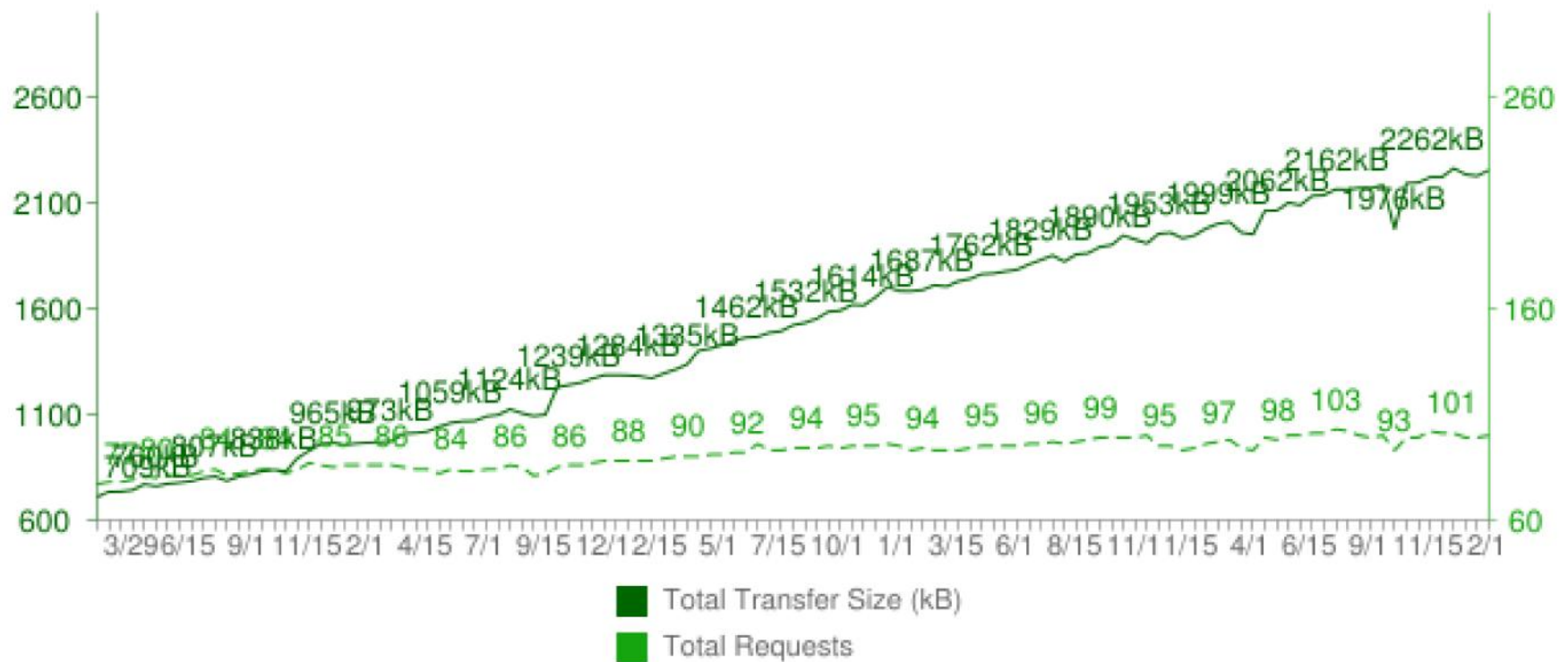


High Performance Images

Walter Ebert @wltrd

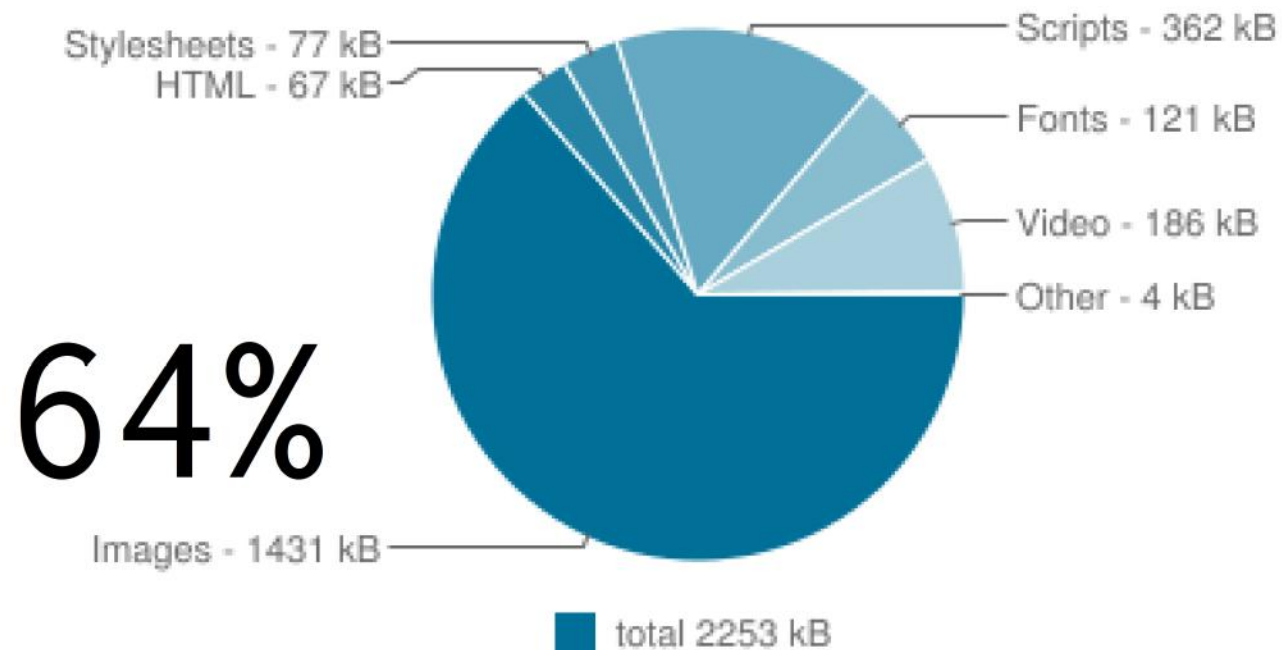
Frontend Usergroup RheinMain
3. März 2016

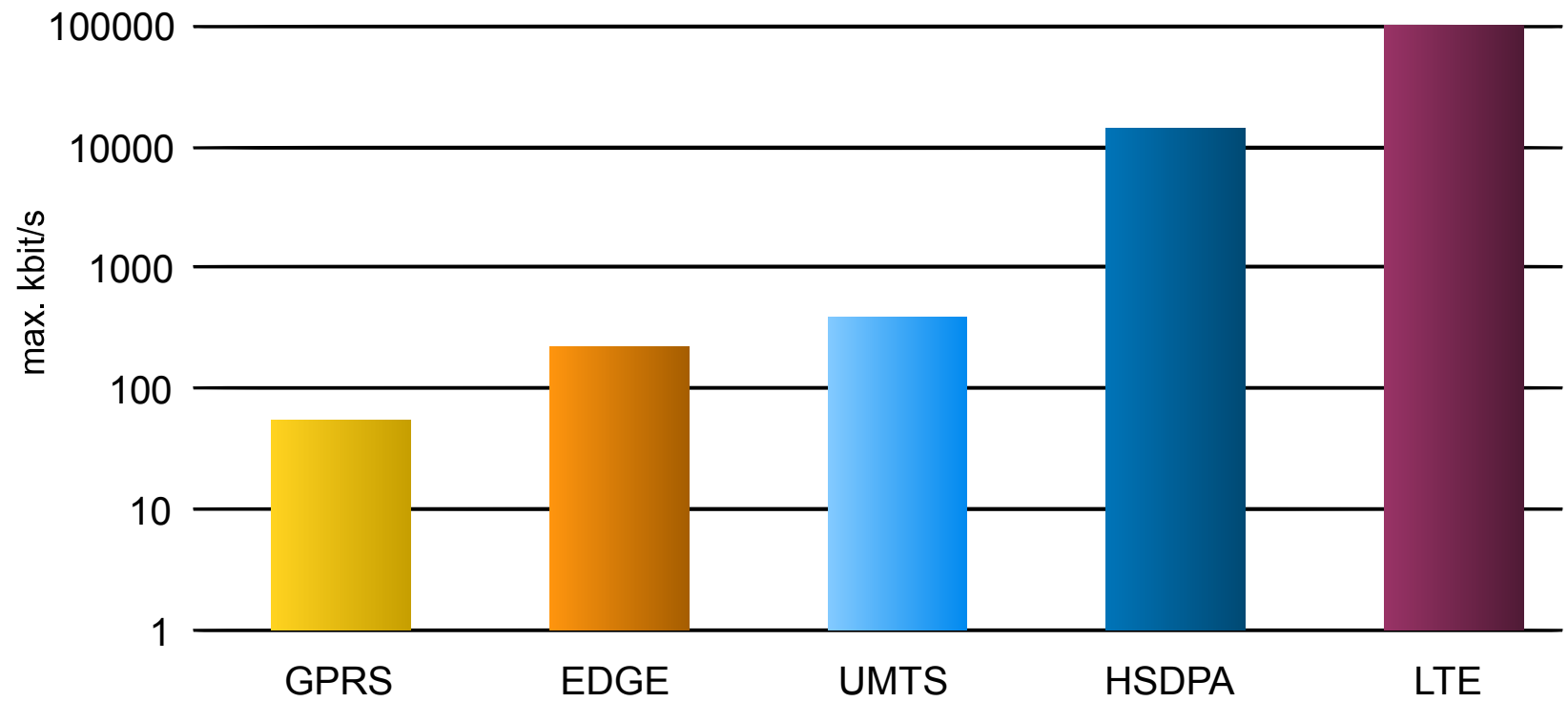
Total Transfer Size & Total Requests



709kB (2011) > 2262kB (2016)

Average Bytes per Page by Content Type







Christian Heilmann

@codepo8

Developer Evangelist - all the web, HTML5, writing and w... together. Works at Microso... opinions totally my own. #n

London, UK

christianheilmann.com/.../02/11/hel...

Joined November 2006

7,918 Photos and videos



Christian Heilmann @codepo8 · 2h

6gbp per mb.



1



6



£6.00/MB to use web &

Fri 22:54

PageSpeed Insights

ANALYSIEREN



33 / 100 Übersicht über die Vorschläge

! Behebung erforderlich:

Bilder optimieren

Durch eine korrekte Formatierung und Komprimierung von Bildern können viele Datenbytes gespart werden.

Optimieren Sie die folgenden Bilder, um ihre Größe um 1,8 MB (70 %) zu reduzieren.

Durch die Komprimierung und Größenanpassung von <https://2015.europe.wordcamp.org/files/2015/09/Gruppe-5-A2-1000x1414.jpg> könnten 306,5 KB (90 %) eingespart werden.

Durch die Komprimierung und Größenanpassung von <https://2015.europe.wordcamp.org/files/2015/09/Gruppe-1-A2-1000x1414.jpg> könnten 305,2 KB (90 %) eingespart werden.

Durch die Komprimierung und Größenanpassung von <https://2015.europe.wordcamp.org/...iles/2015/09/speakersketch-1000x1414.jpg> könnten 303,4 KB (90 %) eingespart werden.

Durch die Komprimierung und Größenanpassung von <https://2015.europe.wordcamp.org/files/2015/09/Gruppe-1-A2-1000x1414.jpg> könnten 305,2 KB (90 %) eingespart werden.



Bildformate

GIF

PNG

JPEG

Bildformate

GIF Gut für Logos / Grafiken

PNG Transparenz

JPEG Maximal 256 Farben
Animationen

Bildformate

GIF Gut für Logos / Grafiken

PNG Transparenz

JPEG Maximal 256 Farben

Animationen

Optimieren:

Gifsicle

Bildformate

GIF

PNG

Gut für Logos / Grafiken

JPEG

Transparenzstufen

PNG8 = 256 Farben (\pm 21% kleiner als GIF)

Komprimierung einstellbar 1 - 9 (gzip)

Bildformate

GIF

PNG

Gut für Logos / Grafiken

JPEG

Transparenzstufen

PNG8 = 256 Farben (\pm 21% kleiner als GIF)

Komprimierung einstellbar 1 - 9 (gzip)

Optimieren:

pngcrush, optipng, advpng, pngout, pngquant,
zopfli

Bildformate

GIF

PNG

JPEG

Gut für Fotos

Keine Transparenzen

Bildqualität einstellbar 1% - 100%

Bildformate

GIF

PNG

JPEG

Gut für Fotos

Keine Transparenzen

Bildqualität einstellbar 1% - 100%

Optimieren:

jpegoptim, jpegtran, mozjpeg

Bildformate

GIF

PNG

JPEG

SVG Vektorgrafiken

Animationen

CSS

JavaScript

SVG in HTML img element - LS

Global

91.03% + 5.28% = 96.31%

Method of displaying SVG images in HTML using .

Current aligned

Usage relative

Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			43					1 4.1	
8			44					1 4.3	
9			45					4.4	
10	12	41	46	1 8		1 8.4		4.4.4	
11	13	42	47	9	33	9.1	8	46	46
	14	43	48		34				
		44	49		35				
		45	50						

Notes

Known issues (2)

Resources (3)

Feedback

1 Partial support refers to not supporting embedded images (data URIs) inside the SVG.

 = Supported  = Not supported  = Partial support  = Support unknown

Backlink Checker Tool

Check all backlinks of any website. Free trial - buy it if you like it.



<http://caniuse.com/#feat=svg-img>

SVG mit Fallback

```

```

```

```

<http://caniuse.com/#feat=srcset>

<http://walterebert.com/playground/html5/img-svg/>

Inline SVG

```
<!DOCTYPE html>
```

```
<html>
```

```
...
```

```
<svg version="1.1" width="300" height="200">
```

```
<title>Grünes Rechteck</title>
```

```
<rect width="75" height="50" rx="20" ry="20"  
fill="#90ee90" stroke="#228b22" stroke-fill="1" />
```

```
</svg>
```

```
...
```

```
</html>
```

SVG optimieren

Scour

<http://www.codedread.com/scour/>

SVGO

<https://github.com/svg/svgo>

SVGOMG (online)

<https://jakearchibald.github.io/svgomg/>

WebP image format - UNOFF

Global

65.57% + 1.15% = 66.72%

Image format that supports lossy and lossless compression, as well as animation and alpha transparency.

Current aligned

Usage relative

Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			31					¹ 4.1	
8		38	43					4.3	
9		39	44					4.4	
10		40	45	8		8.4		4.4.4	
11	12	41	46	9	32	9	8	44	46
	13	42	47		33				
		43	48		34				
		44	49						

Notes

Known issues (0)

Resources (9)

Feedback

Animated WebP images are supported in Chrome 32+ and Opera 19+.

Current MS Edge status: **Not currently planned**

¹ Partial support in older Chrome, Opera and Android refers to browsers not supporting lossless and alpha versions of WebP.

WebP mit Fallback

```
<picture>  
  <source srcset="image.webp" type="image/webp">  
    
</picture>
```

JPEG-XR, JPEG-2000, WebP + JPEG

<picture>

IE

<source srcset="image.jxr" type="image/vnd.ms-photo">

<source srcset="image.jp2" type="image/jp2">

Safari

<source srcset="image.webp" type="image/webp">

Chrome

</picture>



FLIF - Free Lossless Image Format

FLIF is a novel lossless image format which outperforms PNG, lossless WebP, lossless BPG, lossless JPEG2000, and lossless JPEG XR in terms of compression ratio.

According to the [compression experiments we have performed](#) [\[older results here\]](#), FLIF files are on average:

- 14% smaller than lossless [WebP](#),
- 22% smaller than lossless [BPG](#),
- 33% smaller than brute-force crushed PNG files (using ZopfliPNG),
- 43% smaller than typical PNG files,
- 46% smaller than optimized Adam7-interlaced PNG files,
- 53% smaller than lossless JPEG 2000 compression,
- 74% smaller than lossless JPEG XR compression.

Even if the best image format was picked out of PNG, JPEG 2000, WebP or BPG for a given image corpus, depending on the type of images (photograph, line art, 8 bit or higher bit depth, etc), **then FLIF still beats that by 12%** on a median corpus (or 19% on average, including 16-bit images which are not supported by WebP and BPG).

Advantages

<http://flif.info/>
<https://github.com/UprootLabs/poly-flif>

BPG Web Encoder

BPG Web Encoder provides online transcoding of traditional jpg/png image to superior bpg files. The original [libbpg](#) encoder version is used to transcode the images with the default encoder options.



Captcha: The captcha has 3 mn validity.

[+ Add files...](#)[ⓘ Start upload](#)[⌛ Cancel upload](#)[⚙ Encoding options](#)

Notes

- **News** : usage of libbpg **0.9.6** and bpg encoding options.
- The maximum file size for uploads is **6 MB**.
- The maximum file count per captcha identification is **10**.
- Only image files (**JPG, PNG**) are allowed.
- Encoded and uploaded files will be deleted automatically **10 minutes** after the encoding end.
- 3 minutes encoding timeout. It may be an issue with image data close to the maximum allowed size.
- The application is hosted in a one core cpu openstack container. The encoding time is therefore **SLOW**.
- The encoding time on a multicore modern CPU PC is dramatically **FASTER**.

<http://bellard.org/bpg/>

<http://webencoder.libbpg.org/>

<http://calendar.perfplanet.com/2015/immaculate-imagery-with-lazy-pictures-bpg/>



Overview of JPEG XT



JPEG XT (ISO/IEC 18477) specifies a series of backwards compatible extensions to the legacy JPEG standard (ITU Recommendation T.81 | ISO/IEC 10918-1).

While JPEG is still the dominant technology for storing digital images, it fails to address several requirements that have become important in recent years, such as compression of images with higher bit depths (9 to 16 bits), high-dynamic-range imaging, lossless compression, and representation of alpha channels.

JPEG XT extends the JPEG specification in a completely backwards compatible way. Existing tools and software will continue to work with the new code streams, while new features will help move JPEG into the 21st century.

JPEG XT, like most other JPEG standards, is a multi part specification. The following parts are currently in the process of standardization:

Part 1, Core coding system

JPEG XT Part 1 specifies the base technology, and specifies as such the core JPEG as it is used nowadays, namely as a selection of features from ISO/IEC 10918-1, 10918-5 and 10918-6. Part 1 defines as what is commonly understood as JPEG today.

Part 2, Coding of high dynamic range images

JPEG XT Part 2 is a backwards compatible extension of JPEG towards high-dynamic range photography using a legacy text-based encoding technology for its metadata.

Part 3, Box file format

JPEG XT Part 3 specifies an extensible boxed-based file format all following and future extensions of JPEG will be based on. The format specified in Part 3 is itself compatible to JFIF, ISO/IEC 10918-5, and thus can be read by all existing implementations.

ZorroSVG - Put a Mask on it

The transparency of PNGs for the file size of JPEGs

Try it

Drag a transparent PNG or GIF from your desktop onto this page or use the file picker and see how many kB ZorroSVG can save you.

No file selected.

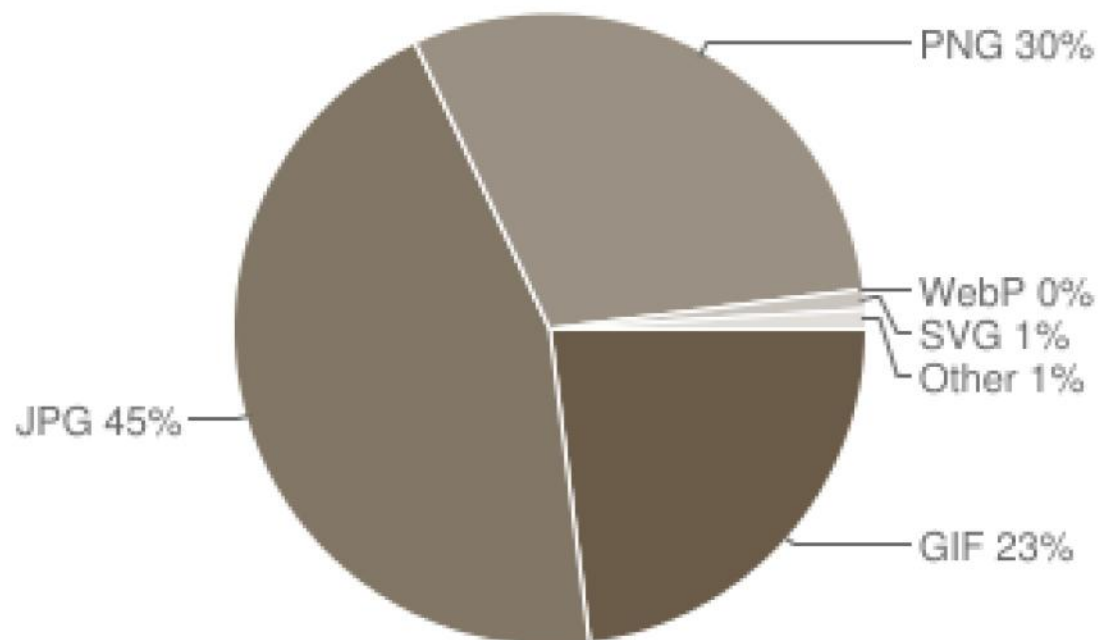


ZorroSVG

Transparent PNGs are great, but they come at a price: file size. Wouldn't it be nice if there were transparent JPEGs instead? Unfortunately there is no such thing, but ZorroSVG gives you the power of transparent PNGs for the size of a JPEG.

It achieves this by converting your PNG to an SVG which uses the compositing capabilities of SVG to create a masked bitmap on-the-fly using JPEGs for both the image and its mask - achieving most of the time a much better compression than PNG. Since all the compositing and masking happens inside the SVG there is no JavaScript required. **And it will work**

Image Requests by Format



Desktop-Werkzeuge

ImageOptim (Mac)

<https://imageoptim.com/>

<https://github.com/JamieMason/ImageOptim-CLI>

FileOptimizer (Windows)

<http://sourceforge.net/projects/nikkhokkho/files/FileOptimizer/>

Trimage (Linux)

<http://trimage.org/>

Nicht Verlustfreie Optimierung

ImageAlpha (Mac)

<https://pngmini.com/>

Imagemin App (Mac, Windows, Linux)

<https://github.com/imagemin/imagemin-app>

JPEGmini (Mac, Windows)

<http://www.jpegmini.com/>

cjpeg-dssim

<https://github.com/technopagan/cjpeg-dssim>

imagemin

NPM

<https://www.npmjs.com/package/image-min>

gulp-imagemin

<https://github.com/sindresorhus/gulp-imagemin>

grunt-contrib-imagemin

<https://github.com/gruntjs/grunt-contrib-imagemin>

Make the Web Faster g+1 429

Overview

PageSpeed

Analysis

Optimization

Service

Module

Get Started

Filter

Documentation

Optimization SDK

Public DNS

Hosted Libraries

Protocols & Standards

Best Practices

Community

PageSpeed Module

PageSpeed speeds up your site and reduces page load time. This open-source webserver module automatically applies [web performance best practices](#) to pages and associated assets (CSS, JavaScript, images) without requiring that you modify your existing content or workflow.

Features

- Automatic website and asset optimization
- Latest web optimization techniques
- 40+ configurable optimization filters
- Free, open-source, and frequently updated
- Deployed by individual sites, hosting providers, CDNs

Resource	Format	Type	Initiator	Size	Time
isapi.dll	200	text/javascript	isapi.dll	0B	61ms
isapi.dll	200	application/x-javascript	isapi.dll	0B	213ms
isapi.dll	200	text/css	format+en.def...	0B	90ms
isapi.dll	200	application/x-javascript	isapi.dll	0B	59ms
isapi.dll	200	application/x-javascript	isapi.dll	0B	112ms
isapi.dll	200	application/x-javascript	isapi.dll	0B	164ms
/speed/49	200	text/javascript	/speed/49	0B	25ms
/speed/63	200	text/javascript	/speed/63	0B	244ms
/speed/319	200	text/javascript	/speed/319	0B	199ms
jquery.min.js	200	text/javascript	jquery.min.js	0B	131ms



Get Started

- [Download and install](#)
- [Review documentation](#)
- [Frequently asked questions](#)
- Discuss PageSpeed for [Apache](#) and [Nginx](#)
- Subscribe to PageSpeed announcements for [Apache](#) and [Nginx](#)
- [Learn about performance best practices](#)

Learn about PageSpeed



Users & Partners

- 350,000+ optimized web sites
- Hosting providers and CDN's, including:





Original JPEG

853K

2592 x 1456 pixel

jpegtran

742K jpegtran -copy none -optimize

708K jpegtran -copy none -optimize -progressive

mozjpeg

704K jpegtran -copy none

697K jpegtran -copy none -fastcrush



Original JPEG

853K

2592 x 1456 pixel

5,6M PNG

1,5M FLIF

318K WebP

284K BPG



Original JPEG

853K

2592 x 1456 pixel

5,6M PNG	697K JPEG quality 85
1,5M FLIF	588K JPEG quality 75
318K WebP	327K JPEG quality 50
284K BPG	319K cjpeg-dssim



Original JPEG

853K

2592 x 1456 pixel

5,6M PNG	697K JPEG q 85	225K JPEG 1024 x 575
1,5M FLIF	588K JPEG q 75	96K JPEG 640 x 360
318K WebP	327K JPEG q 50	40K JPEG 320 x 180
284K BPG	319K cjpeg-dssim	

In 2012 waren

86%

der responsive Webseiten

in der Mobil-Ansicht

genau so schwer

wie in der Desktop-Ansicht



RESPONSIVE IMAGES COMMUNITY GROUP

We're a group of developers working towards a markup-based means of delivering alternate image sources based on device capabilities to prevent wasted bandwidth and optimize display for both screen and print.

JOIN US!



Examples of [art direction](#). See more [demos of responsive images](#).

WHAT IS THE `PICTURE` ELEMENT?

The `picture` element is a markup pattern that allows developers to declare multiple sources for an image. By using media queries, it gives developers control as to when and if those images are presented to the user.

SAMPLE MARKUP FOR `PICTURE`

```
<picture>
  <source media="(min-width: 40em)" srcset="big.jpg 1x,
  big-hd.jpg 2x">
  <source srcset="small.jpg 1x, small-hd.jpg 2x">
  
```

WHAT IS THE `SRCSET` ATTRIBUTE?

The `srcset` attribute is an extension to the existing `img` tag that provides some of the functionality of the `picture` element. It uses a more concise syntax, part of which can be used by the `picture` element.

SAMPLE MARKUP FOR `SRCSET`

```

```

[Read the srcset Specification](#)

[Example srcset parser](#)

HTML5 srcset

```

```

HTML5 srcset

```

```

```

```

HTML5 picture

```
<picture>
```

```
  <source srcset="S.jpg" media="(max-width: 600px)">
```

```
  <source srcset="L.jpg" media="(min-width: 1200px)">
```

```
  
```

```
</picture>
```

Responsive Image Webdienste

Cloudinary <http://cloudinary.com/>

Responsive Image Breakpoints Generator
<http://www.responsivebreakpoints.com/>

imgix <https://www.imgix.com/>

Resize.ly <https://resize.ly/>

ReSRC.it <https://www.resrc.it/>

Leaner Responsive Images With Client Hints

By [Jon Arne Sæterås](#)

🕒 January 18th, 2016

💬 [24 Comments](#)

Responsive images have been around long enough for most of us to have taken them for a spin, or at least to have learned from the experiences of those who have. Beyond doubt, the [responsive images](#) specification is a great win for the web. However, quite a few reports from the front lines suggest that responsive images **can become pretty ugly**.

The good news is that there is a fix! No, not throwing JavaScript

Advertisement

Search on Smashing Magazine

e.g. JavaScript

Search

Advertisement

[Advertise with us!](#)



Smashing Newsletter

Subscribe to our email newsletter for useful tips and valuable resources, sent out every second Tuesday.

email address

Subscribe

181,757

Subscribers

powered by *MailChimp*



It's finally here. [Smashing Book #5](#), our new book on **real-life responsive design**. With front-end techniques and patterns from actual projects, it's a playbook to master all the tricky facets and hurdles of responsive design. [Get the book.](#)

Free shipping.

at the challenge, but by asking the web server for a helping

hand. Enter **Client Hints**, an initiative spearheaded by Google

<https://www.smashingmagazine.com/2016/01/leaner-responsive-images-client-hints/>

Lazy-loading

```

```

Lazy-loading

```

```

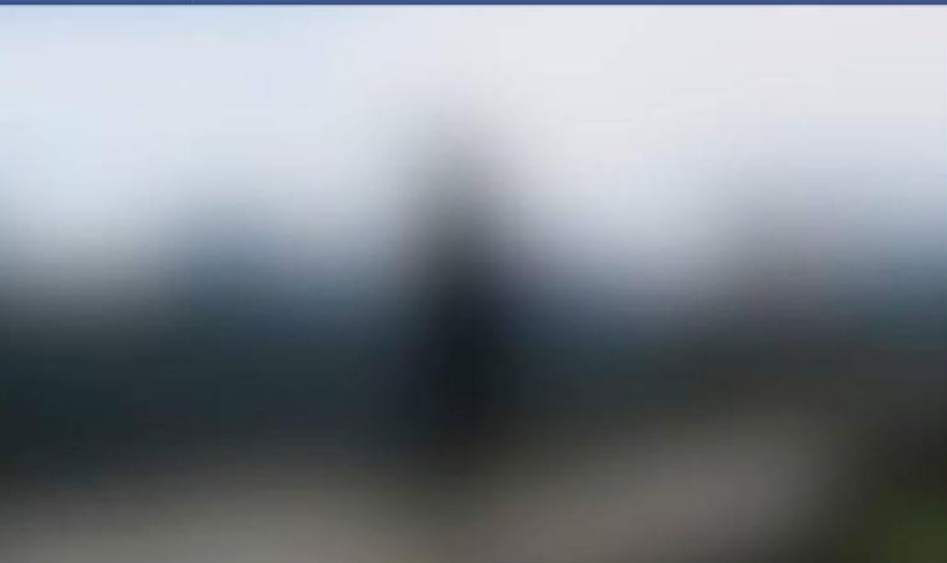
Ab IE 11

Low Quality Image Placeholders (LQIP)

```
<script src="lazysizes.min.js" async></script>
```

```

```



 6 August 2015
  MOBILE • PHOTOS • USER EXPERIENCE • PERFORMANCE • OPTIMIZATION

The technology behind preview photos



Brian K Cabral



Edward Kandrot

First impressions matter, whether you're on a first date, in a job interview, or just choosing new decorations for your house. Some of the first things you see when you visit someone's profile or page on Facebook are the pictures. These pictures are an integral part of the Facebook experience, but sometimes they can be slow to download and display. This is especially true on low-connectivity or mobile networks, which often leave you staring at an empty gray box as you wait for images to

download. This is a problem in developing markets such as India, where many people new to Facebook are primarily using 2G networks. Our engineering team took this on as a challenge. What

Related



Faster Photos in Facebook for iOS



Lazy-loading mit <template>

```
<ul class="cardlist">
  <li class="card"></li>
  <li class="card"></li>
  <template>
    <li class="card"></li>
    <li class="card"></li>
  </template>
</ul>
```


Lazy-loading mit <template>

```
<script>
window.addEventListener('load', function(ev) {
  if ('content' in document.createElement('template')) {
    var t = document.querySelector('template'),
        list = t.parentNode,
        contents = t.innerHTML;
    list.removeChild(t);
    list.innerHTML += contents;
  }
});
</script>
```


Iconfonts

Funktioniert nicht mit Benutzer-definierten
Schriften (z.B. wegen Lesestörungen)

In iOS9 kann man Support für Webfonts
deaktivieren

Kein Support in Opera Mini (277M Benutzer)

SVG-Sprites

```
<svg xmlns="http://www.w3.org/2000/svg"
      style="display: none;">
  <symbol id="icon-1" viewBox="214.7 0 182.6 792">
    <!-- ... -->
  </symbol>
  <symbol id="icon-2" viewBox="0 26 100 48">
    <!-- ... -->
  </symbol>
</svg>
```

```
<svg class="icon">
  <use xlink:href="#icon-1" />
</svg>
```



IcoMoon

Pixel Perfect Icon Solutions



IcoMoon App

- ✓ Browse 4000+ free vector icons
- ✓ Custom & crisp icon font generator
- ✓ Import your own SVGs to make fonts
- ✓ Convert to SVG, PDF, Polymer, XAML, CSH
- ✓ Basic glyph editing



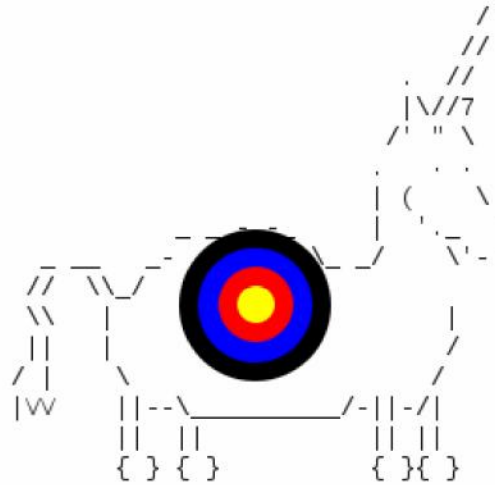
Icon Packs

- ✓ 2000+ vector icons
- ✓ Handcrafted on a grid
- ✓ In various formats: SVG, font, etc.
- ✓ Money back guarantee
- ✓ Free updates



Go Premium

- ✓ Cloud syncing
- ✓ Quick usage links
- ✓ Serve icon fonts or SVG icons
- ✓ Powered by Amazon Web Services
- ✓ Easily update your icon sets



Drag & Drop ur SVGs on the Grumpicon plz.



Grumpiconfig

■ filament group

With special guest, Eric Ponto
unicornkey head drawn by R.B.Cleary in 1995

<http://www.grumpicon.com/>
<https://github.com/filamentgroup/grunticon>

jkphl / **svg-sprite**

Watch

14

★ Star

337

Fork

44

SVG sprites & stacks galore — A low-level Node.js module that takes a bunch of SVG files, optimizes them and bakes them into SVG sprites of several types along with suitable stylesheet resources (e.g. CSS, Sass, LESS, Stylus, etc.) <https://github.com/jkphl/svg-sprite>

239 commits

2 branches

55 releases

10 contributors



Branch: master ▾

svg-sprite / +

jkphl Merge pull request #115 from lukebarton/master



Latest commit 9bbf1ee 13 days ago

bin	Introduced CSS positioning values floating point precision (#102)	2 months ago
docs	Added accessibility features to symbol sprites (#107)	a month ago
lib	Added accessibility features to symbol sprites (#107)	a month ago
test	Added CSS class namespacing (#42)	3 months ago
tmpl	Remove "." (dot), selector already has one.	3 months ago
.editorconfig	Initial next generation commit	10 months ago
.gitattributes	Initial next generation commit	10 months ago
.gitignore	Updated dependencies	15 days ago
.jshintrc	Updated dependencies (#67, #82)	5 months ago
.travis.yml	Make io.js optional in Travis build as long as node-sass is in a bad ...	2 months ago
CHANGELOG.md	Updated dependencies	15 days ago
LICENSE.txt	Update year	10 months ago

<> Code

Issues

5

Pull requests

1

Pulse

Graphs

HTTPS clone URL

<https://github.cc>

You can clone with [HTTPS](#) or [Subversion](#).[®]

Download ZIP

Animated GIF



<https://www.washingtonpost.com/news/the-switch/wp/2015/08/06/tesla-unveils-weird-new-car-charging-robo-snake/>

Animated GIF



GIF = 4,3 MB WebP = 3,3 MB MP4 = 143 kB

```
ffmpeg -i video.gif -c:v libx264 -an -movflags faststart \  
-pix_fmt yuv420p -s 544x292 video.mp4
```

Video

```
<video controls autoplay muted loop>  
  <source src="video.mp4" type="video/mp4">  
    
</video>
```

<http://caniuse.com/#feat=mpeg4>

<http://walterebert.com/blog/video-autoplay-on-mobile/>

<http://walterebert.com/blog/removing-audio-from-video-with-ffmpeg/>

Veraltete Techniken wegen HTTP2

- Spriting
- Inlining

#

HTTP/2 protocol - OTHER

Global

63.24% + 7.89% = 71.14%

Networking protocol for low-latency transport of content over the web. Originally started out from the SPDY protocol, now standardized as HTTP version 2.

Current aligned

Usage relative

Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
8			² 45					4.3	
9			² 46					4.4	
10		² 43	² 47			8.4		4.4.4	
^{1 2} 11	² 13	² 44	² 48	^{2 3} 9	² 34	² 9.2	8	47	² 47
	² 14	² 45	² 49	^{2 3} 9.1	² 35	² 9.3			
		² 46	² 50		² 36				
		² 47	² 51						

Notes

Known issues (0)

Resources (5)


Feedback

See also support for [the SPDY protocol](#), precursor of HTTP2.

¹ Partial support in IE11 refers to being limited to Windows 10.

² Only supports HTTP2 over TLS (https)

³ Partial support in Safari refers to being limited to OSX 10.11+

 = Supported = Not supported = Partial support = Support unknown

This test consists of 200 small images from [CDN77.com](https://cdn77.com) so you can see the difference clearly.



HTTP/1.1
1.15s

REFRESH

HTTP/2
0.26s



walter.ebert.engineering

@wltrd

walterebert.de

slideshare.net/walterebert