

Improving Website Performance





The Importance of Website Performance



Website Performance

The speed at which web pages are downloaded and displayed in a user's web browser. Basically, website performance tells you how fast your website is.

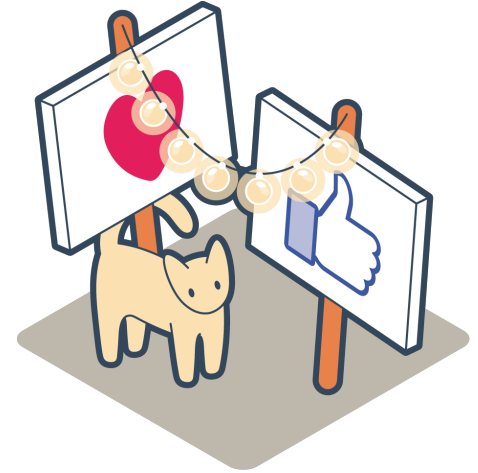
Website Performance Impacts:

- Rankings in organic search
- Visibility on Facebook
- The user experience

Search engines like Google want to offer the **best experience** to their users.

How Website Performance Impacts Facebook

If your post links to a slow website, it may not be displayed to people using the Facebook app.



5.3
seconds

How Quickly Should a Page Load?

Best-in-class webpages should become interactive within **5.3 seconds**. Any slower and visitors will abandon your site, reducing conversions and sales.

79%

Will people come back to a slow site?

79% of shoppers who are dissatisfied with site performance say they're less likely to purchase from the same site again.

Website Performance Affects:

- The accessibility of your site
- The usability of your site
- Your web design

Accessibility

The availability of a website and its contents to all people.

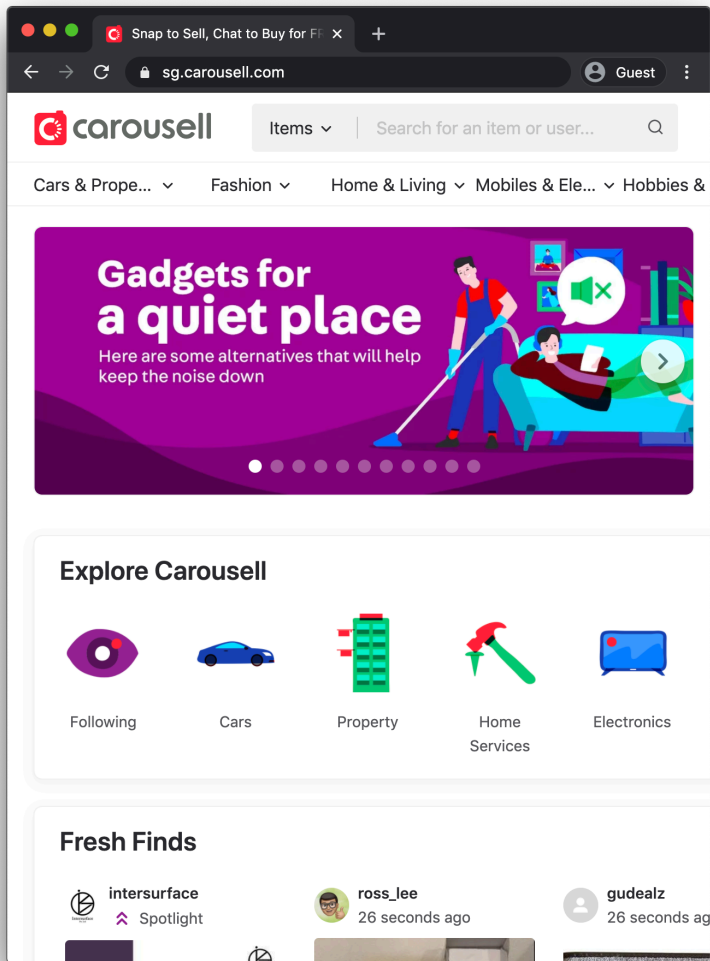
Usability

How efficiently and easily visitors can see or examine your website.

Website Design

The process of planning, ideating, and organizing content for the internet.

Performance impacts metrics marketers care about, like **traffic, conversion rates, and revenue.**



Website Performance for Carousell.com

When Carousell.com reduced their load time by 65%, they saw a 63% increase in traffic.




Website Performance for Obama's Campaign

A 3-second decrease in load speed helped the campaign raise an additional \$34 million.

Performance Budget

Benchmarks for the performance metrics that you care about.



Increasing Load Speed and Reducing Page Size

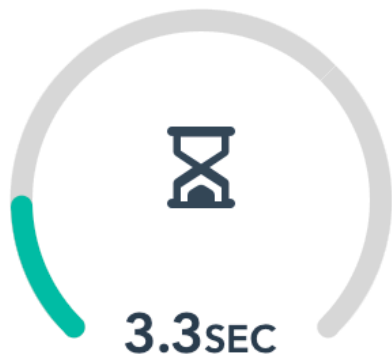


Load Speed

The time it takes to fully display the content on a specific page.

Best-in-class web pages
should become interactive
within **5.3 seconds**.

PAGE SPEED



Zoom zoom. Nice work.

Best-in-class webpages should become interactive within 5.3 seconds. Any slower and visitors will abandon your site, reducing conversions and sales.

[Read more](#)

Example Page Speed From Website Grader

In this example, the website speed is 3.3 seconds.

First Contentful Paint (FCP)

The time it takes in seconds for text or images to be shown to users.

Time to Interactive (TTI)

When the page responds to user interactions (such as clicking) within 50ms.

Minification

The process of reducing resources size by removing unnecessary comments and spacing in the source code.

The Components of a Website

- HTML provides the basic structure of sites, which is enhanced and modified by CSS and JavaScript.
- CSS is used to edit the presentation, formatting, and layout of a page.
- JavaScript is used to control the behavior of different elements.

What Does Minification Do?

- **HTML minification** removes all unnecessary characters from the HTML.
- **CSS minification** removes all the unnecessary characters and comments from your stylesheet file that contains font and layout rules.
- **JavaScript minification** removes all unnecessary characters and comments from the JavaScript.

Tools For Minification

- To minify HTML, try out the PageSpeed Insights Chrome extension.
- For CSS, try CSS Compressor.
- For JavaScript, you could use JS Compress.

Compression

Replaces repetitive pieces of code with markers directing to the first instance of that code.

Minification



Removes whitespace, comments, and non-required semicolons.

Compression



Removes all strings that are repeated.

```
5496     outline: 0;  
5497 }  
5498  
5499 .carousel-control-prev {  
5500     left: 0;  
5501 }  
5502  
5503 .carousel-control-next {  
5504     right: 0;  
5505 }  
5506  
5507 .carousel-control-prev-icon,  
5508 .carousel-control-next-icon {  
5509     display: inline-block;  
5510     width: 20px;  
5511     height: 20px;  
5512     background: no-repeat 50% / 100% 100%;  
5513 }  
5514  
5515 .carousel-control-prev-icon {  
5516     background-image: url("data:image/svg+xml,%3csvg xmlns='http://www.w3.org/2000/svg  
5517 }  
5518  
5519 .carousel-control-next-icon {  
5520     background-image: url("data:image/svg+xml,%3csvg xmlns='http://www.w3.org/2000/svg  
5521 }  
5522  
5523 .carousel-indicators {  
5524     position: absolute;  
5525     right: 0;  
5526     bottom: 0;  
5527     left: 0;  
5528     z-index: 2;  
5529     display: flex;  
5530     justify-content: center;  
5531     padding-left: 0;  
5532     margin-right: 15%;  
5533     margin-left: 15%;  
5534     list-style: none;  
5535 }  
5536  
5537 .carousel-indicators li {  
5538     box-sizing: content-box;  
5539     flex: 0 1 auto;  
5540     width: 30px;  
5541     height: 3px;  
5542     margin-right: 3px;
```

Original CSS File

The strings are easy to read.
A developer did this on
purpose.

```
15 *
16 * Released under the MIT license
17 * http://opensource.org/licenses/MIT
18 *
19 */*,:after,:before{-webkit-box-sizing:inherit;box-sizing:inherit}html
{-webkit-box-sizing:border-box;box-sizing:border-box}input[type=email],input
[type=password],input[type=search],input[type=text]{-webkit-appearance:none;
-moz-appearance:none}/*! normalize.css v7.0.0 | MIT License | github.com/necolas/normalize.css *//html{line-height:1.15;-ms-text-size-adjust:100%;
-webkit-text-size-adjust:100%}body{margin:0}article,aside,footer,header,nav,section
{display:block}h1{font-size:2em;margin:.67em 0}figcaption,figure,main
{display:block}figure{margin:1em 40px}hr{-webkit-box-sizing:content-box;
box-sizing:content-box;height:0;overflow:visible}pre{font-family:monospace,
monospace;font-size:1em}a{background-color:transparent;
-webkit-text-decoration-skip:objects}abbr[title]{border-bottom:none;
text-decoration:underline;-webkit-text-decoration:underline dotted;
text-decoration:underline dotted}b,strong{font-weight:inherit}b,strong
{font-weight:bolder}code,kbd,samp{font-family:monospace,monospace;font-size:1em}dfn
{font-style:italic}mark{background-color:#ff0;color:#000}small{font-size:80%}sub
sup{font-size:75%;line-height:0;position:relative;vertical-align:baseline}sub
{bottom:-.25em}sup{top:-.5em}audio,video{display:inline-block}audio:not([controls])
{display:none;height:0}img{border-style:none}svg:not(:root){overflow:hidden}button,
input,optgroup,select,textarea{font-family:sans-serif;font-size:100%;line-height:1.
15;margin:0}button,input{overflow:visible}button,select{text-transform:none}
[type=reset],[type=submit],button,html [type=button]{-webkit-appearance:button}
[type=button]:-moz-focus-inner,[type=reset]:-moz-focus-inner,[type=submit]
:-moz-focus-inner,button:-moz-focus-inner{border-style:none;padding:0}
[type=button]:-moz-focusring,[type=reset]:-moz-focusring,[type=submit]
:-moz-focusring,button:-moz-focusring{outline:1px dotted ButtonText}fieldset
{padding:.35em .75em .625em}legend{-webkit-box-sizing:border-box;
box-sizing:border-box;color:inherit;display:table;max-width:100%;padding:0;
white-space:normal}progress{display:inline-block;vertical-align:baseline}textarea
{overflow:auto}[type=checkbox],[type=radio]{-webkit-box-sizing:border-box;
box-sizing:border-box;padding:0}[type=number]:-webkit-inner-spin-button,
[type=number]:-webkit-outer-spin-button{height:auto}[type=search]
{-webkit-appearance:textfield;outline-offset:-2px}[type=search]
:-webkit-search-cancel-button,[type=search]::-webkit-search-decoration
{-webkit-appearance:none}:-webkit-file-upload-button{-webkit-appearance:button;
font:inherit}details,menu{display:block}summary{display:list-item}canvas
{display:inline-block}template{display:none}[hidden]{display:none}/*!
20 * # Semantic UI 2.4.2 - Site
21 * http://github.com/semantic-org/semantic-ui/
22 *
23 *
24 * Released under the MIT license
25 * http://opensource.org/licenses/MIT
26 *
```

Minified CSS File

Once this file is minified, the file size shrinks, but it is also a whole lot harder to read.

There are a couple solutions
out there for compression:
gzip and Brotli.

Compression with the HubSpot CMS Hub

If you're using the HubSpot CMS Hub, your files will be compressed automatically.



Compression is enabled by adding code to a file called **.htaccess** on the web server.

Optimizing Your Web Page Elements



Page Size (Page Weight)

The overall size of the block of stored memory that makes up a page.

Optimizing Web Page Elements

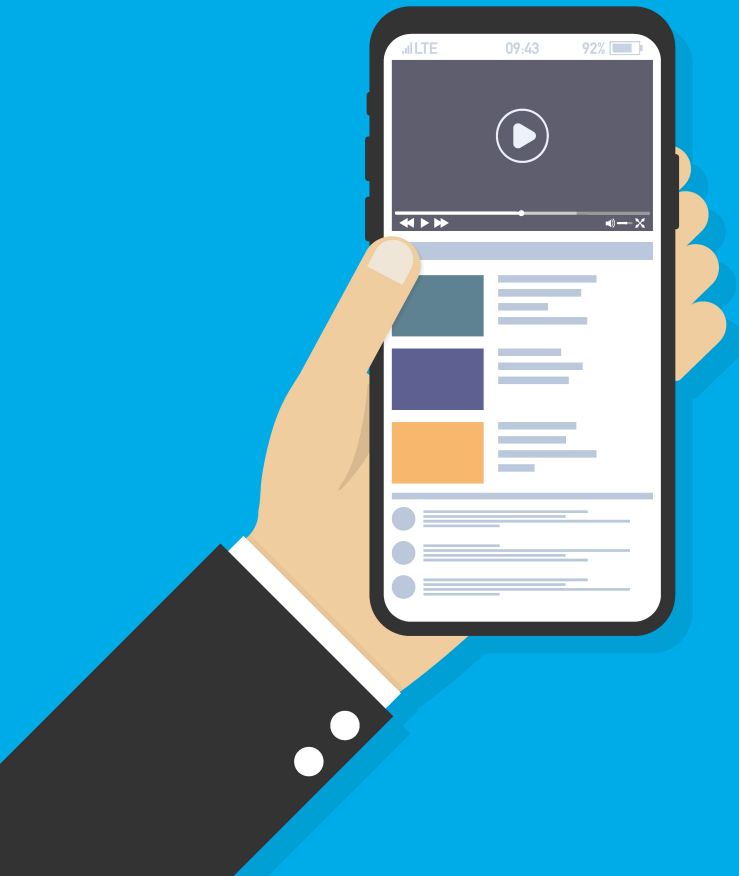
- Use Google Fonts instead of custom fonts.
- Use existing video hosting solutions.
- Compress your images.
- Make your images responsive.

The image shows the Google Fonts logo, which consists of the words "Google Fonts" in a white, sans-serif font, centered on a solid red rectangular background.

Google Fonts

Google Fonts

A collection of fonts that are hosted by Google and accessible to all web browsers.



Hosting Videos on a Web Page

Use an existing hosting solution, like YouTube, Vimeo, or Amazon.

Comparing YouTube, Vimeo, and Amazon

YouTube

YouTube is by far the most popular solution for many people getting started with video. Plus it's free.

But the videos do include ads and provide video recommendations at the end of the video.

Vimeo

Vimeo is an ad-free solution that'll cost you about the price of two coffees every month.

Vimeo optimizes videos hosted with them to serve smaller files to your website visitors. This means faster load speeds.

Amazon

Amazon offers more customization but is also more technical.

Depending on the size of your business and your level of technical competency, Amazon can be a good option.

Image Compression

Groups parts of an image together to reduce its size without visibly decreasing quality.

Original Image



2.8 MB

Compressed Image



1.3 MB

A great tool to compress your images is TinyPNG.com



The screenshot shows the TinyPNG.com website in a browser window. The browser's address bar displays 'tinypng.com'. The website's navigation menu includes 'WEB', 'CDN', 'PHOTOSHOP', 'DEVELOPER API', 'THIRD-PARTY', 'ANALYZER', and 'LOGIN'. The main content area features a large illustration of a panda eating bamboo. A central dashed box contains a download icon and the text: 'Drop your .png or .jpg files here! Up to 20 images, max 5 MB each.' Below this is a 'Go Pro' button. The 'tiny png' logo is positioned to the right of the panda. Below the main illustration, the text reads: 'Smart PNG and JPEG compression More than 1 billion PNG and JPEG images optimized and still counting!'. The page is divided into three columns. The first column is titled 'What does TinyPNG do?' and describes the lossy compression technique used to reduce file size. The second column is titled 'Why should I use TinyPNG?' and highlights its support for transparent images and faster processing. The third column is titled 'Get the Web Interface Pro!' and offers a premium version with a higher file limit and more concurrent uploads. A small illustration of a panda wearing a crown is used as a visual for the premium offer. At the bottom, the text 'Can anyone tell the difference?' is visible.

TinyPNG – Compress PNG images

tinypng.com

WEB CDN PHOTOSHOP DEVELOPER API THIRD-PARTY ANALYZER LOGIN

Drop your .png or .jpg files here!
Up to 20 images, max 5 MB each.

Like to compress more? [Go Pro!](#)

tiny png

Smart PNG and JPEG compression

More than 1 billion PNG and JPEG images optimized and still counting!

What does TinyPNG do?

TinyPNG uses smart lossy compression techniques to **reduce the file size** of your PNG files. By selectively decreasing the number of colors in the image, fewer bytes are required to store the data. The effect is nearly invisible but it makes a very large difference in file size!

Why should I use TinyPNG?

PNG is useful because it's the only widely supported format that can store partially **transparent images**. The format uses compression, but the files can still be large. Use TinyPNG to shrink images for your apps and sites. It will use less bandwidth and **load faster**.

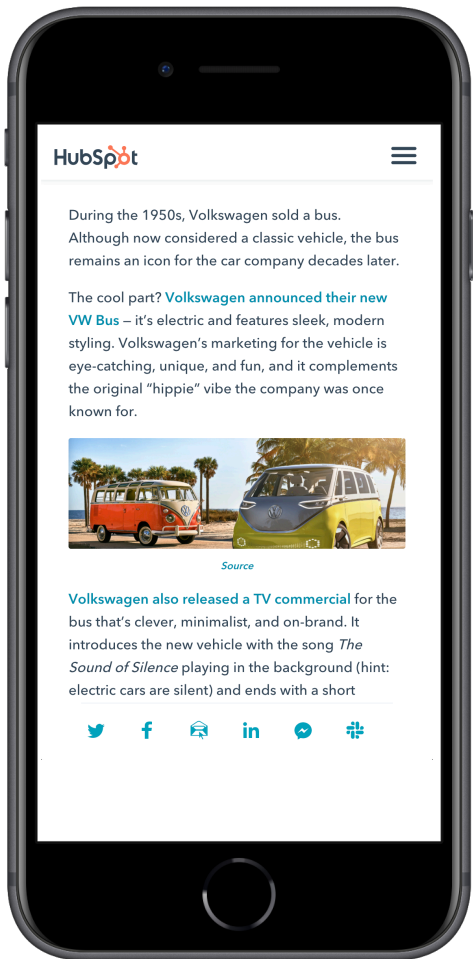
Get the Web Interface Pro!

Drag & drop **more than 20** files at once and have the 5 MB size limit **removed!**

Can anyone tell the difference?

SVG File (Scalable Vector Graphic)

A graphic file that uses a two-dimensional vector graphic format designed specifically for the internet.




Take a Look at Your Website From a Mobile Browser

How do your images look? Are they sized correctly for the screen?

How to Make Images Responsive

```
img {  
  width: 100%;  
  height: auto;  
}
```

Add a CSS rule that sets all images to fill the width of the container the image is in.



Reducing HTTP Requests and Maximizing Page Caching



Less frequent downloads
means that a website can be
displayed faster.

If you want to create a high-performing page, aim to have **30 requests maximum.**

HTTP Request

An ask for information from the browser, like Chrome or Firefox, to the server, the remote computer that fulfils that request.

How to Reduce the Number of HTTP Requests

- Combine text resources
- Combine image resources
- Move render-blocking JavaScript
- Reduce redirects

Every file that you eliminate
is **one less HTTP request**
required to load your page.



How to Combine Text Resources

Use an open source bundler, like webpack or Parcel, to combine JavaScript files.



You might have specific social share icons that match your brand's style.





Image Sprites

A group of small images that are included in one physical image instead of multiple.

JavaScript enables your website to **behave differently** based on criteria that you identify.

Move your JavaScript files to the **bottom of your page** for all non-essential functions.

Example JavaScript Function

```
<p>
  Welcome back, <span id="name"></span>!
</p>
<script>
  function insertText (username) {
    document.getElementById('name').innerText = username;
  };
  insertText(window.username);
</script>
</p>
```

Put critical JavaScript functions directly where they are needed on the page.

Redirect

A way to send both people and search engines to a different URL from the one they originally requested.

1

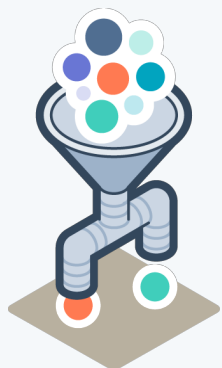
How Many Redirects Can You Have?

The best practice is to limit the number of redirects on your web page to a maximum of **one**.

Some Redirects Are Okay

- 303: Moved Permanently
- 302: Moved Temporarily

Solution #1



Use a Redirect

This increases the number of HTTP requests on your web page.

Solution #2



Use a Mobile Responsive Design

This optimizes your site for all devices without any redirects.

Caching

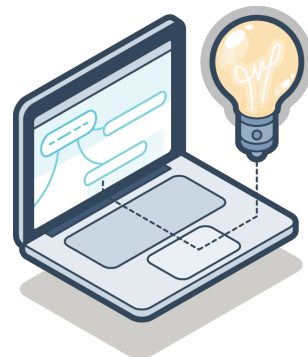
The process of saving resources to be reused.

Server-Side Caching



The server saves the result of a single render and serves that same result when it is requested again.

Client-Side Caching



The server tells a web browser to keep the files it downloads so that it doesn't have to download them again in the future.

The Benefits of Caching:

- Decrease network costs by reducing requests to your server.
- Improve responsiveness by making your website faster for browsers to retrieve.
- Content will be continuously available even if you experience server outages.



WP Super Cache

This plugin generates static HTML files of your web pages which will be served to the majority of your users.