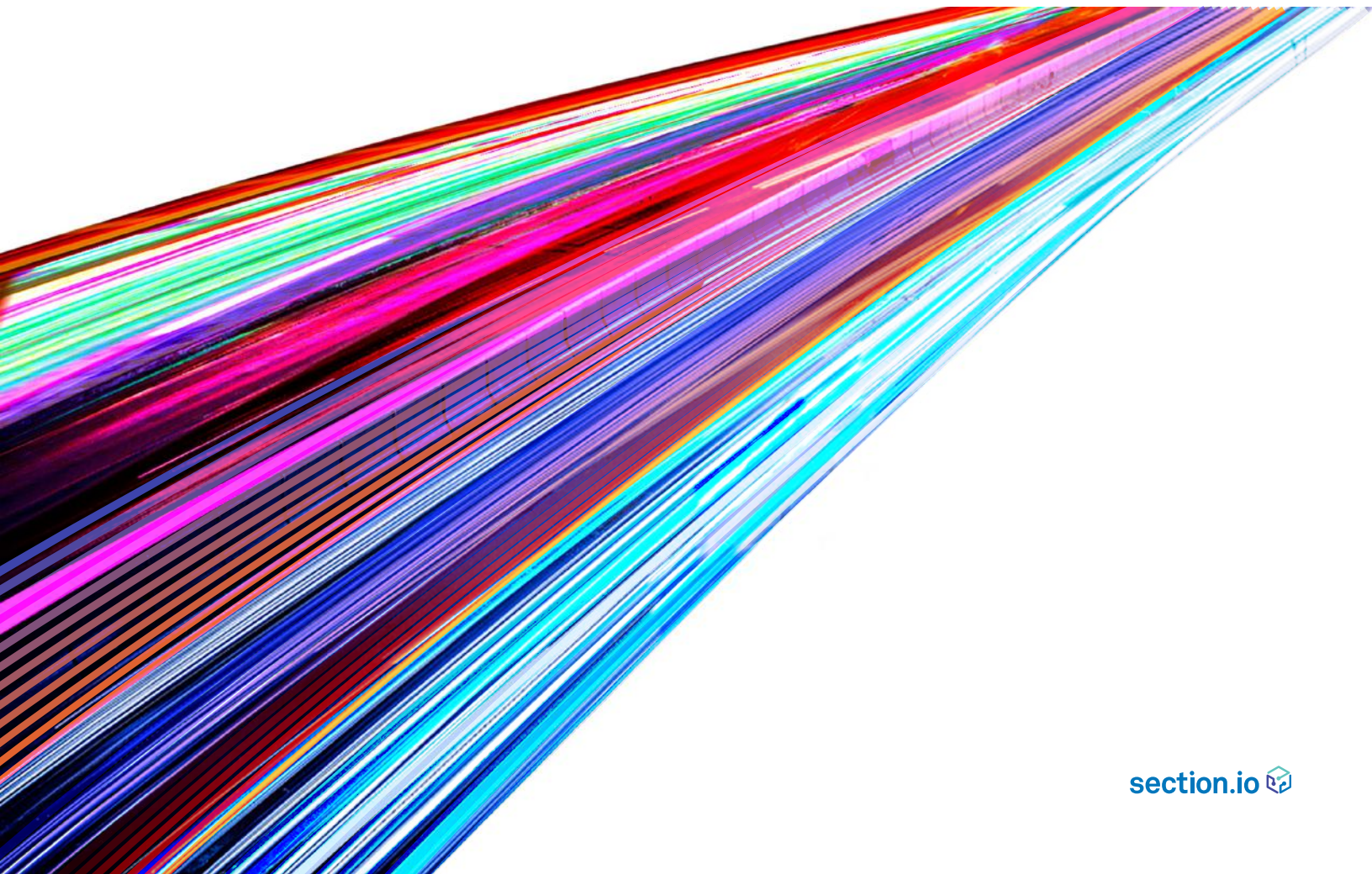


top tips

TO SPEED UP YOUR WEBSITE

by section.io

Broken down by difficulty level, cost, ROI and
front-end versus back-end improvements



Top Tips To Speed Up Your Website

Reports by ecommerce and media giants including Amazon, Walmart, and others have consistently shown that fast page load time is one of the most important elements of website success.

One study by the Aberdeen Group showed every 1-second delay in page load time led to a 11% decrease in page views and 7% loss in conversions, and it is reported that bounce rate increases by 50% with every 2 seconds of additional page load time. Website performance, the speed at which website pages load, is also crucial for SEO: Google takes page speed into account for both desktop and mobile search, meaning a slow website is sure to hurt your website's organic search ranking.

There are many ways you can optimize your website for better performance, ranging from quick fixes that could be performed by any team member with access to your website's CMS or code and a basic understanding of HTML, to more complex upgrades that would require a developer and a more significant investment in terms of both time and money. We suggest before you go about any changes you measure your current website performance and take stock of what you have to gain with a faster website. For ecommerce sites, improved web performance leads to increased product views, less bounces, and a higher checkout success rate that leads to more revenue. Media sites also profit from increased page views which allow them to sell more advertisements, and any type of website will see improved user experience from faster loading pages.

To get started, here are some tips to measure and improve your web performance and page load time. We've marked each one with an approximate level of technical difficulty, monetary investment, and speed improvement, so you can assess which to tackle first:

FRONT END IMPROVEMENTS

1 Do a quick analysis of your web page speed



DIFFICULTY LEVEL: **EASY**

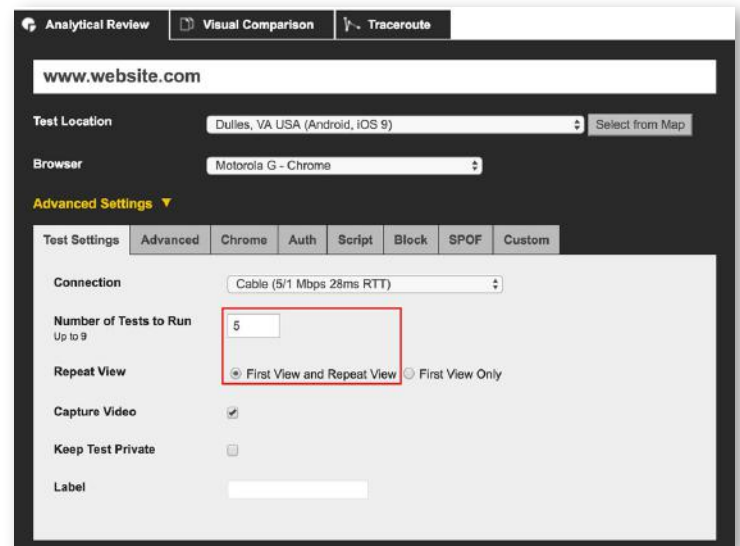
COST: **FREE**

SPEED IMPROVEMENT: **NONE** (This is your benchmark)

Tools such as [WebPageTest](#) or [Pingdom](#) will show you basic performance metrics along with exactly which elements are taking the longest time to load on your web page. Simply enter the URL of the page you're looking to evaluate and wait for the results to come in.

We recommend running about 5 tests (first and repeat view as illustrated on the right) so you can understand how your website performs the first and second times someone visits it. The multiple first views will help you understand if you have a delivery infrastructure caching working and the repeat views help you understand if you have an in-browser caching strategy set up.

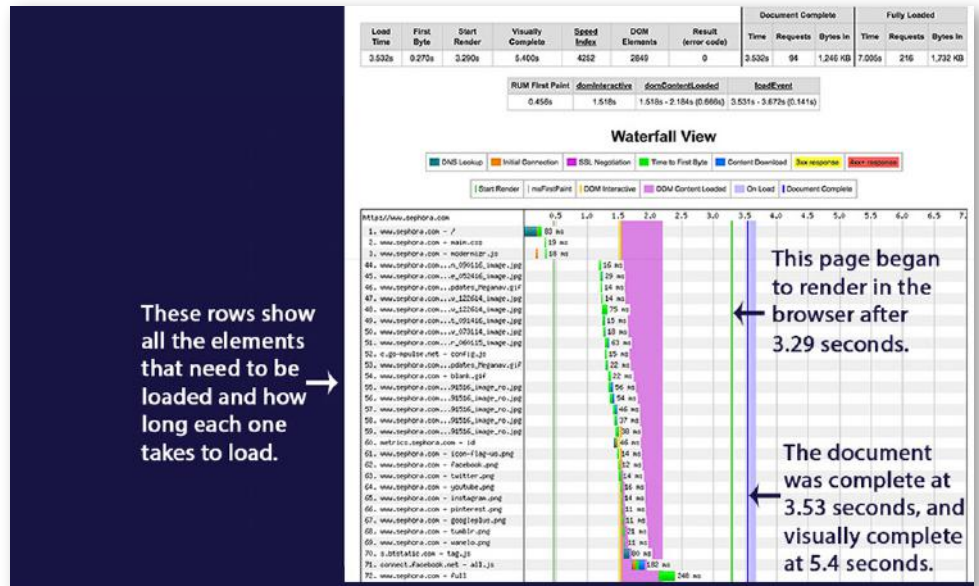
Test a website's performance



This test is for the homepage of beauty store Sephora: there are over 200 elements that make up this page, and by looking at the left column you can see what is taking the longest time to load.

For example, while the images are typically taking under 50 milliseconds to load, a Facebook plugin takes 182 ms. Learning how to read a web page test is extremely valuable as it will provide you with some immediate elements to fix along with baseline metrics to improve upon in the longer term.

WebPageTest result of sephora.com



There are dozens of different website performance metrics that can be valuable for diagnosing problems and optimizing website speed. However, in addition to examining the individual elements in a waterfall test to see which ones may be slower than others, here are the major metrics to examine when performing a web page speed test:

Time to First Byte (or HTML Load Time): Between the time a user attempts to load a page on your site to the time the page is fully loaded, dozens, sometimes hundreds, of different operations will take place. Content needs to be accessed from the server, images need to be retrieved, and style sheets need to be loaded. Before any of these operations can even start, the browser must look up your DNS address and connect to your server, and the server must send an HTML document back to the browser. The HTML document provides the instructions on what actions the browser needs to take and what files need to be retrieved to build the full webpage. The time it takes to deliver the HTML document from your server to your user’s browser is the Time to First Byte (TTFB). An ideal TTFB is around 200 milliseconds.

Time to Title: The title is the name of a page which appears in the browser above the web page address. While this metric is sometimes overlooked as it is only one of many pieces of content that are loaded and displayed to the user, it can go a long way to creating a positive perception in the eyes of your users. Most users have experienced sites that fail to load, have been shut down, or attempted to access a site with the wrong address. The moment a title is displayed for the page within the browser, anxiety for the user that they may be in the wrong spot is reduced. The longer it takes before the title is displayed, the less patience a user is likely to have while waiting for the rest of the page to load.

Start render time: The start render time is an important measure because it indicates when the viewer first sees the page appear in their browser. While the web page may still need to make dozens of additional server request to gather all the content needed, the faster a website begins to render the more likely the user will hang out long enough to load the entire page.

Page load time: The page load time is probably the most common metric used to assess web speed, as it is the easiest to understand. This metric references the time in seconds it takes from the moment a user attempts to access your website until all of the content has been loaded in your browser. The importance of page load time, however, can be overstated, as a user might perceive the page to be completely loaded well before page load is complete. If you have large images below the fold, or javascript elements loading in the background, your total page load time might be inflated but your user’s experience isn’t impacted. Ideal page load time is under 2 seconds to prevent users from bouncing and increasing engagement across your site.

2 Ensure your images are optimized for web



DIFFICULTY LEVEL: **EASY**

COST: **FREE TO \$\$** (if using hosted image optimization services)

SPEED IMPROVEMENT: **LOW TO MEDIUM**

Resize images using an image editing tool such as Photoshop or a [free image re-sizer](#) which allows you to size your images appropriately so you aren't making users download large files. To do this, first find out what the maximum allowed image size is for your web page or blog layout - it usually won't be more than 800px width, and even if you upload larger images they will be sized down.

Content Delivery Networks can also provide "on the fly" image resizing and optimization services so you don't need to make any change in your workflow in order to deliver optimized images to your browsers.

If you use **HTML** tags such as a width or height specification, you usually aren't reducing the image size on your server, only how it appears on the page. This is also the case if you are changing image sizes using a WYSIWYG tool in your Content Management System. Once you determine your ideal image size, save as that size. If you're using an image editor, you can also save at 80% quality which further reduces the file size, or using an online resizer you can select options which reduce the file size by your desired percentage (we don't recommend saving at more than 50% quality). JPG and PNG are the best file types for web.

Reduce the number of images on main pages: Landing pages such as your homepage, blog, and other pages you regularly link to in ads should load quickly and not be full of images that need to load before a user can take any other action on your website. We recommend keeping the home page simple and using CSS elements rather than images for style elements such as buttons. If you need an image-heavy homepage, you can enable "lazy loading" which will prioritize images that are above-the-fold on a user's browser. Implement this by installing a [plugin for jQuery](#) or search for one that works with your CMS, such as [Wordpress](#).

3 Reduce the number of plugins on your site



DIFFICULTY LEVEL: **EASY**

COST: **FREE**

SPEED IMPROVEMENT: **LOW TO MEDIUM**

Plugins like Google Analytics provide valuable information but can slow down page load time. These tools usually work by having you enter a JavaScript snippet somewhere in your website code (commonly in the header section), and when a user visits your page they need to collect this remote file before the page is fully loaded. If you have several of these snippets, say one for Google Analytics, one for sharing on Facebook, and one for sharing on Twitter, your page will take longer to finish loading. Check your HTML code regularly to make sure you still need all the plugins that are installed on your page and delete ones that are not necessary.

4 Remove unnecessary code in your CSS files



DIFFICULTY LEVEL: **EASY**

COST: **FREE**

SPEED IMPROVEMENT: **LOW**

Your CSS file needs to load before your page becomes viewable, but if you (and others) have been building upon the same file for some time, it likely has a lot of superfluous code - every extra space or line will add up to a slower page! Go through the code yourself in case there are any hidden elements that aren't being used, or use a [free CSS minifier](#) which will remove extra spaces and code for you. Here are some [resources Google suggests](#) for minifying HTML, CSS, and JavaScript code.

5 Fix broken links and missing files



DIFFICULTY LEVEL: **EASY**

COST: **FREE**

SPEED IMPROVEMENT: **LOW**

No one likes to click a broken link, but if your website has a lot of pages or hasn't had a thorough review in a while, there's a good chance you have a few broken links or missing images on your site. These broken links may be the result of you linking to external sites which have moved or shut down, or moving your own page addresses or changing file structures. Each time someone tries to click a broken link or loads a page with a missing file, they have a poor user experience and your page load time slows as the browser searches for the file. In addition, broken links have a negative effect on your SEO.

Checking for broken links will vary in difficulty depending how many pages your website has. If you are a relatively small site, it may be simple enough to check the links on all your pages. However, bigger sites will have a large number of links to check and for those we recommend using a free tool such as [LinkChecker](#) or a platform specific plugin like the [broken link checker for Wordpress](#). It should be considered a website best practice to check links at least once a month, especially external links that may be removed without you knowing.

6 Leverage browser caching



DIFFICULTY LEVEL: **MEDIUM**

COST: **FREE TO \$**

SPEED IMPROVEMENT: **MEDIUM**

By caching your pages in both users' browsers and on your website server you reduce the number of requests to your server, speeding up page load time dramatically. Caching also helps with scalability of your website during peak traffic times, such as when you are running an email marketing campaign or ecommerce sale. The two main types of caching are browser caching (a front-end metric) and server caching (which improves back-end performance).

Browser caching stores copies of your website in a user's browser so if they visit your site again the browser is able to load the website quickly without going back to your web server for all of the elements. Static elements that do not change much, such as logos, can be cached for several months with the right setting. The best way to set up browser caching for your website is to utilize cache-control, an HTTP header that enables you to define what files should be cached and for how long. Check out this [simple guide on setting up cache-control](#).

BACK END IMPROVEMENTS

7 Leverage server caching



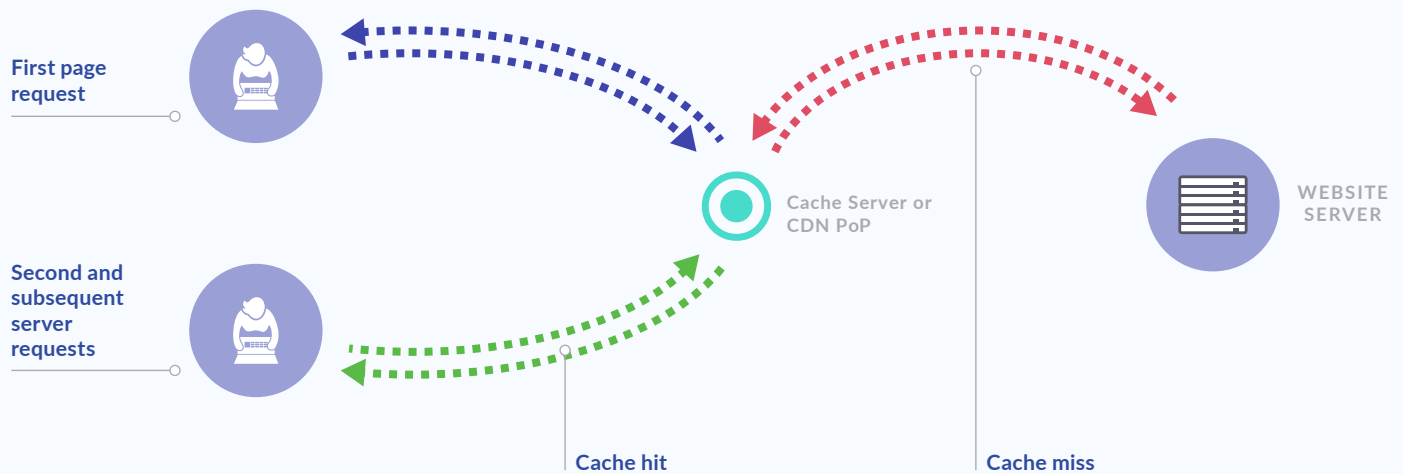
DIFFICULTY LEVEL: **MEDIUM TO HIGH**

COST: **FREE TO \$\$** (if utilizing a managed cache solution)

SPEED IMPROVEMENT: **HIGH**

When properly configured, caching content on your server is the number 1 way to drastically improve the speed of your website while also reducing the stress on your website servers. Server Caching sets up a cache directly in front of your origin web server, so you can store copies of files which multiple users can access without needing to go back to your web server. The first visitor to a website after a cache has been installed or cleared will be directed to the web server, which will then send a copy of the pages to both the cache and the end-user. The next time someone requests the same pages, the cache will be able to directly fulfill their request, resulting in shorter page load times.

Here's an illustration of how server caching, which can be implemented on one server or through a globally distributed Content Delivery Network, works:



There are multiple open-source options for server caching, which is more complex than browser caching but also will have a bigger impact on your website performance. We recommend [Varnish Cache](#), a best-in-class caching solution that is designed to respond to requests extremely quickly. Varnish Cache can be configured to cache all sorts of files, including full HTML documents for maximum performance improvements. To install Varnish Cache yourself, visit the [Varnish Cache website](#) to download the latest version. If you would like to install Varnish Cache on a global CDN which provides easy, pre-set configuration options, [sign up for a trial of section.io](#) or [contact us](#).

8 Use a Content Delivery Network



DIFFICULTY LEVEL: **MEDIUM TO HIGH** (depending on which CDN you choose)

COST: \$ to \$\$

SPEED IMPROVEMENT: **HIGH**

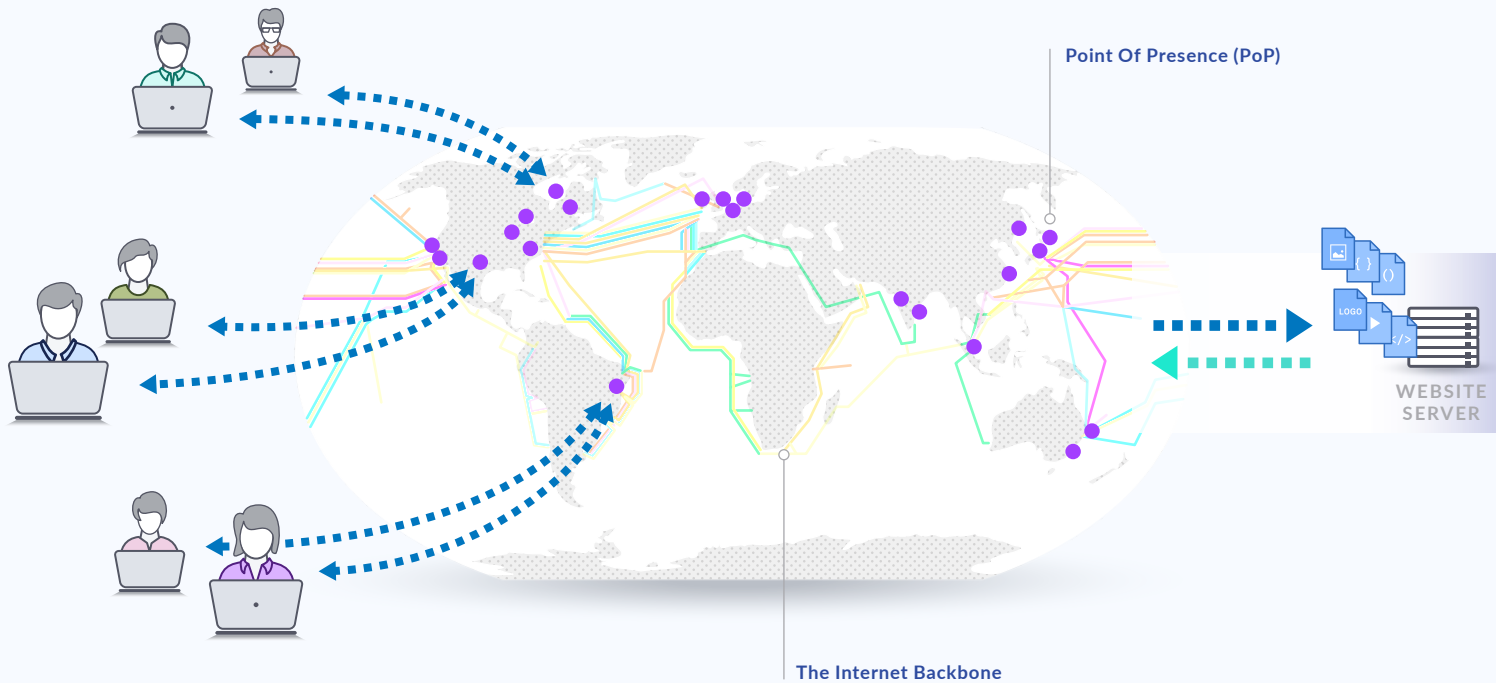
Content Delivery Networks or CDNs are increasingly becoming the de-facto way websites who value their users' experience improve their website performance and reduce strain on their website servers at the same time. CDNs are networks of servers distributed around the Internet. They are traditionally fixed networks of servers. Those servers are physically placed in locations called Points of Presence or "PoPs" which are designed to be closer to the Internet's end users around the globe. CDNs' PoPs act as a middleman proxy for your web server and will intercept the end users' requests. By intercepting the request and acting as a proxy, the CDN PoP has an opportunity to serve the request directly, block the request if it is malicious, or in some other way improve the response to the user (and hence the speed and the security of the website). The main reasons to utilize a CDN for your website are:

Offload or Scalability: Using a CDN can help offload requests and compute activity from your website servers. This means significantly greater scale as your server isn't handling every single user request.

Performance: Using a CDN brings content closer (in network time not necessarily distance) to your users so that round trips required to deliver a page are faster.

Security: Using a CDN can block spurious requests from reaching your web servers and potentially stealing private data or bringing your site offline.

If you choose to implement a CDN for your website you should consider what CDN will work for your customers, your development team, and your wallet. We recommend utilizing a modern CDN which has PoPs located strategically along the Internet backbone, and most importantly, a flexible, easy-to-configure CDN that your developers can work with. [section.io](#) provides developers with a local testing environment, a user interface to easily make CDN changes, and other tools which will make CDN configuration straightforward.



Modern CDNs have less, more powerful servers strategically placed along the internet backbone

9 Upgrade to HTTP/2

-    DIFFICULTY LEVEL: **MEDIUM**
-    COST: **FREE TO \$** (if you need to switch hosting)
-    SPEED IMPROVEMENT: **MEDIUM**

HTTP/2 is the first major update to Hyper Text Transfer Protocol (HTTP), which is the communication protocol used by the World Wide Web to transmit messages. HTTP/2 is designed for modern, content heavy websites and is a big step forward in terms of delivering website content quickly.

Some of the technical differences with HTTP/2 which lead to better performing websites include:

- **It is binary instead of textual**
- **It is fully multiplexed which allows multiple request and response messages to be in transit at the same time**
- **It can use one connection to gather content instead of opening several connections**
- **It uses header compression to reduce the size of headers so they are delivered more quickly**

Most modern web browsers will accept HTTP/2 traffic, in the USA HTTP/2 ready web browsers account for 91.17% of all Internet users. In order to serve your site over HTTP/2 it must be fully encrypted with a TLS (SSL) certificate and all the content should be on one domain. Next you need to make sure your Content Delivery Network or hosting provider can support HTTP/2. If they can, you can then optimize your website for HTTP/2. Here are some useful resources on HTTP/2 and switching to it:

Smashing Magazine - [Getting Ready For HTTP/2: A Guide For Web Designers And Developers](#)

GitHub - [FAQs on HTTP/2](#)

Tourque Mag - [A Quick Overview of HTTP/2](#)

section.io serves content over HTTP/2 and provides users with an automated SSL certificate at no additional cost. Contact us with any HTTP/2 questions or start a free trial today.

10 Use redirects wisely



DIFFICULTY LEVEL: **MEDIUM**

COST: **FREE**

SPEED IMPROVEMENT: **LOW**

Each redirect a browser has to follow - for example from yourwebsite.com to www.yourwebsite.com to go.yourwebsite.com - decreases your website speed. If you are using HTTPS (which we strongly recommend both for good user perception and improved security) then there will also be a redirect from HTTP to HTTPS. Another common type of redirect is from your main website to a mobile website if a user is on a mobile device.

When you buy a domain, you have access to both yourwebsite.com and www.yourwebsite.com, and will need to decide which one will be the main address (you will set up a redirect for the other). Although it can be appealing to use the bare domain as it is easier to say and type, we recommend using the www domain as your main domain for [several reasons related to caching and security](#). Whichever domain is your main domain, you should make sure to use that one on marketing materials and in links to reduce the number of redirects the browser has to take. Ensuring you are only using redirects when necessary (such as to provide a mobile optimized version of your website or to utilize HTTPS) will improve your website performance.

11 Choose a good hosting provider



DIFFICULTY LEVEL: **MEDIUM**

COST: **\$ to \$\$**

SPEED IMPROVEMENT: **MEDIUM TO HIGH**

As with any technology, website hosting and server infrastructure is constantly being upgraded to be faster and have less downtime. However, it can be expensive for hosting companies to switch to the newest hardware, so many will lag behind by a year or two. One of the best ways to ensure your website is one of the fastest out there is to ensure your hosting provider is using the most up-to-date technology, has minimal downtime, is able to utilize modern protocols such as HTTP/2, and has a 24/7 support system in case you run into any problems. It is also recommended that you choose a hosting system that has been around for a few years to minimize the risk that they shut down.

There are many options to consider when thinking about hosting - if you want a managed or self-managed solution, a shared server or more expensive dedicated server, and of course which hosting provider is best for the size of your website and the platform you are running on. VentureHarbor has a good list of [top hosting companies for various needs](#) and there are also numerous resources on platform-specific hosting, such as these [recommendations from PCmag on the best hosts for Wordpress](#).

Speed up your site in 5 minutes with section.io

Need help implementing the tips above? section.io is a website performance and scalability solution which improves your website by providing you with a globally distributed CDN and pre-configured caching solution through Varnish Cache. Simply **set up a section.io account**, update your cache configuration using our easy-to-use interface, and change your DNS to point to section.io.

See the benefits before you buy when you **sign up for our 14-day free trial**.

