Martin Neumann

WordPress
Speed Tuning for 2020

Introduction

Every business and every organization nowadays needs a website. Having your presence in the online world is crucial in order to be seen and to be able to communicate to your audience. It is well known that among the marketing channels available today, Internet Marketing is one of the most powerful and cost effective options available, and your website will be a crucial piece in your marketing strategy.

Having said that, you are left to choose the right platform to power your site. There are many options out there, but WordPress is the most popular one, and that for a reason. It is a stable, simple to use and flexible system to power your site. From its humble beginnings in 2003 it has quickly grown from a blogging platform, to a flexible Content Management System for all your publishing needs.

As of 2019 34% of all websites are powered by WordPress. Among the Content Management Systems it has 60% of the Market share, and the trend is rising. About 660 new WordPress sites are added every day. Several Fortune 500 companies and News outlets are using WordPress as part of their publishing strategy.

Here some of the main reasons why WordPress has reached all this popularity:

- Easy setup – You can get your site up and running within minutes

- Simple to use – You will need no technical skills in order to publish your blog post

- Flexibility – WordPress is made for blogs, business sites, photo blogs, portfolios, News sites, ecommerce or all of that combined on the same site

- User management – You can assign editing capabilities depending on user levels

- Easy Theme setup – You can change the look of your site with the click of a button

- Extend with Plugins – With more than 50.000 plugins available for free in the repository and numerous premium plug-ins for sale you can extend your site in remarkable ways

- Search Engine Optimization – WordPress is optimized for SEO right out of the box, and there are several SEO plug-ins available for further optimization

- Built in comments give your audience the possibility to interact

- Internationalization – Available in more than 70 languages, you are covered in almost every corner of this planet

- Own your data – Proprietary page builder are a pain in the neck if you want to change your hosting provider. With WordPress you own all of your data and can host it wherever you want.

But to ensure that your site will run stable, being protected from hackers, loads fast and has good SEO ranking, looks great on mobile and does everything that you want, you need to make some strategic decisions along the way that will be crucial for the success of your WordPress site.

Site speed is an essential factor for the success of your website, and there is statistical data to back this claim. 47% of consumers expect a website to load in 2 seconds. 40% of all users will abandon a site that takes longer than 3 seconds to load. 79% of online customers said they are less likely to shop on a site again that showed slow performance. And Amazon discovered in a study that every second of delay did cost them about 10% of their revenue. In reality though, an average website site takes 8,5 seconds to load. And on mobile things are even worse, and load times can double or triple compared to WIFI connections. Even so, 58% of all users expect a site to load on mobile as fast as on desktop. Considering that since 2017 more than half of internet traffic is generated on mobile, speed optimization for that market share turns out to be an important priority.

Site speed is equally important for SEO rankings. Since Google is interested in providing a positive user experience, it takes page loading speed into account as a ranking factor. Besides that, slow web pages will increase the bounce rate, which can influence ranking as well. A fast loading website should be surely a priority to optimize your ranking on Google.

Considering the trends of mobile use, Google started in July of 2019 to use mobile-first indexing. That means that that Google uses the mobile version of your page for indexing your site. Furthermore, if your page is not rendering a mobile friendly result, it will be significantly downranked in the Google search results. Google also monitors page loading speed on desktop and mobile and uses that as a ranking factor. The newly developed AMP standard can significantly reduce page loading times on mobile devides. We will treat this new technology in a subsequent chapter.

The first strategic step to get you started will be choosing the proper hosting for you.

Choosing the Right Hosting Provider

Hosting has a profound impact on the performance, security and stability of your site. If you decide to optimize your site, this will be one of the most important decisions to make. There are several options of providers available, and we will divide them roughly into 5 categories:

1. Shared hosting providers
2. Virtual Private Servers
3. Dedicated servers
4. Cloud Hosting
5. WordPress Managed Hosting
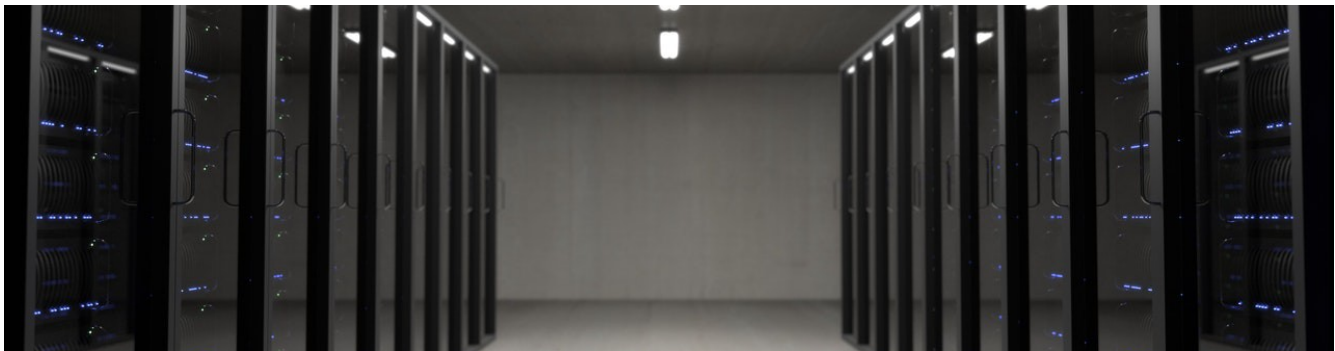
Shared Hosting Providers

Those are the cheapest entry level solutions that will range between $2 and $10 per month. Some companies have plans for 1 site and packages for unlimited sites. In this category fall the entry level plans of all the common hosting providers like Godaddy, Hostgator, Bluehost etc. Email accounts may be included in the package or not. Since you are sharing the resources with hundreds of other sites, the performance is far from ideal, which will reflect in slower page loading times. Up-time may vary a lot between providers as well as security, but for most parts it is up to you to maintain your WordPress installation secure. Be cautious in hosting a major launch on a shared hosting provider. A high traffic spike can bring your site speed to a crawl, and in some cases even crash your site entirely. This is surely not something you want to happen on a busy launch day.

Virtual Private Servers

Those hosting plans also share resources with other sites, but unless in shared hosting they guarantee certain amount of CPU and memory resources to be dedicated to your site. Prices range between $20 and $60 per month and you will normally see an improvement in performance, depending on how much resources you pay for. Since

you are getting a fully featured virtual web server, if you are tech savvy, you can host some custom applications far beyond your regular PHP scripts.

Dedicated Servers

Those plans will give you a real physical machine all by your own. It is not shared with other users and you can use it as you like. Some plans are giving you just the bare hardware with an operating system, and you need to set up the web server, Plesk or Cpanel etc. This will require some tech skills, but gives you also the greatest flexibility. As a downside, most providers do not give you a redundant system, that means you need to have a regular off-site backup in place in case that your server has a hardware crash. Prices are between $40 and $120 per month, allowing you to host unlimited sites on your server. Performance is normally better than a Virtual Private Server. Be aware though that all sites are sharing the same processor, and the same bandwidth, which is many times limited to a 1 Gigabit Ethernet uplink. For your regular launch you will probably be fine on this plan, but if you plan to do something of very high traffic, you may need to switch to the next option.

Cloud Hosting

In this category are falling the high caliber options like Amazon Web Services or Google Cloud Hosting. In short, those companies are providing for you the same technology that they are using to power their own sites. This means you have at your disposal a cluster of pretty powerful computers, and the most reliable redundant storage space that you can possibility get, and you can lease all the processing power and bandwith you need, just the sky is the limit. Accounting is quite flexible and you pay only for the capacity you use. It is though up to you to install the entire webserver and operating system you will use. You will find on the internet some tutorials on how to do that, but you definitely need quite a bit of tech skills to get the job done. You will be though rewarded with a top performing site that will not let you down, even on the biggest launch of the Internet history.

Managed WordPress Hosting

This is a hosting option that combines the power of Cloud hosting with the ease of use of the simplest webhosting plan. In many plans the WordPress installation is done with simply clicking a checkbox during registration process. Managed hosting means also, that caching, speed optimization, wordpress and plugin uppdates, backup and security is all taken care for you, so it is the best hands free option you can possibly get. Because of their infrastructure they give you also an impressive advantage in speed and work load compared to your shared hosting providers. The price range is normally between $15 and $50 for a single site, and there is often a limit of the number of monthly user sessions permitted on each plan.

The downside of managed WordPress hosting is that certain companies ban a few plugins that may be too resource intensive, drag down your performance, interfere with the caching or have the potential to break your site in any other way. If you need though a well performing site without needing to worry about all the tweaking and maintenance jobs, than Managed WordPress Hosting is the way to go.

Other Hosting Considerations

Historically the internet was powered by the HTTP 1 protocol. That worked fine in the grandfather days of the internet, where a page consisted typically of one HTML document and maybe 5 pictures. That was a total of 6 requests sent to the server. Each request needed to negotiate a new TPC connection with the server in order to receive the requested data. In the modern day world, a website makes typically 100 different requests, distributed between the pictures, CSS files, fonts and Javascript libraries. And there are a limited number of connections that can be handled concurrently. And some of the requests are made only after a former resource was loaded completely. On mobile networks the problem is made worse by the fact that latencies are much bigger between the request made and the response received. No wonder that many sites are taking over 10 seconds to load on a mobile device.

To remedy this problem, the HTTP 2 standard was born. It allows to send all of the 100 needed resources to build a website with one single TCP connection to the server. That reduces largely the overhead connected with establishing 100 separate connections, and especially solves latency problems on mobile networks. Unfortunately, HTTP 2 is not yet available by all hosting providers, especially on the cheaper shared hosting plans. When you choose your hosting provider, be sure to look out whether the HTTP 2 protocol is supported. Only this change can easily double the speed of your website.
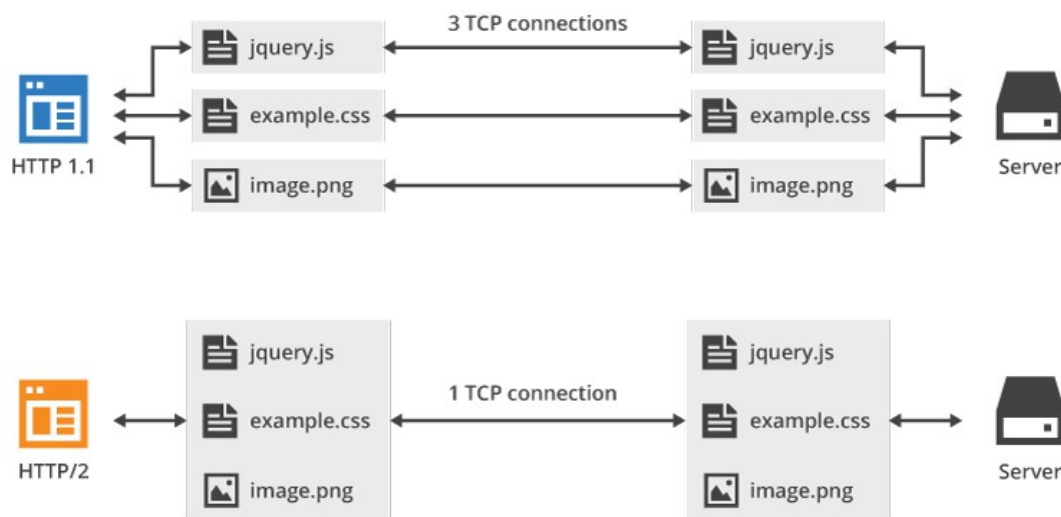
The HTTP 2 standard gets still into trouble when accessing a site over an unreliable mobile connection. Since all the resources are send with a single TCP connection to the server, when a transfer fails because the mobile signal is not good, all the other requests will be blocked at the same time. Google developed a new QUIC standard that remedies this problem, eliminating the blocking problem when packages go lost on poor connections. QUIC hopefully will be standardized soon as the HTTP 3 protocol, and implementations of the standard in the major browsers are on the way. Some early adopters like Siteground already support the QUIC protocol in their hosting plan.

One thing to consider is that HTTP 2 will work only on secure connections. For this reasons you need to either buy an SSL certificate for your site, or you choose a hosting provider that includes free Lets Encrypt certificates in the hosting plan. For most applications those free certificates are more than sufficient, and will save you another yearly expense.

Content Delivery Network (CDN)

A CDN is another way to improve your site speed. What it does, is to serve static resources like pictures, CSS and Javascript files from a delivery network of various servers spread out on strategic locations all over the world. It will automatically define the closest location relative to the visitor and serve the static webpage resources from this location. This will guarantee faster load times, since the distance to the required resources is greatly reduced. Especially if you are targeting an international audience, a CDN is going to be a valuable asset for you.
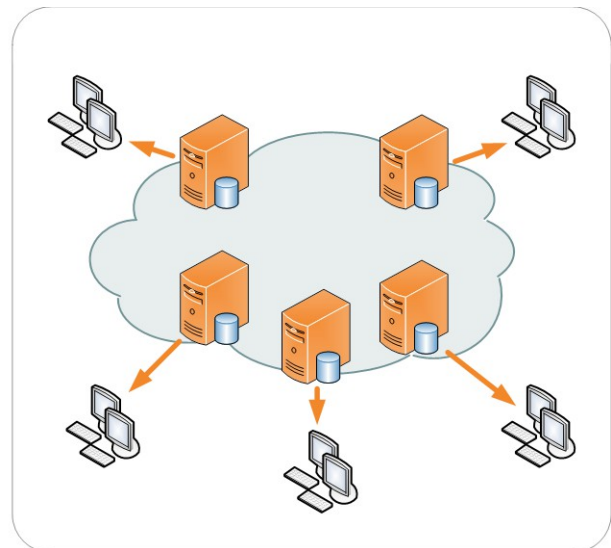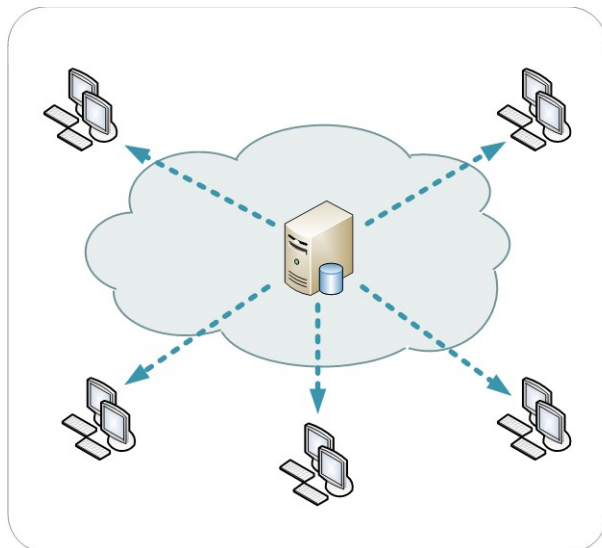
Some hosting providers already include a CDN in their hosting plan. Others will require you to purchase this service separately. For an entrance level site you can also get a free CDN account from Cloudflare.

Testing Your Site Performance

There are several tools that can give you good insights about your page performance. The first resource you can check out is Pingdom Website Speed Test. You put in your URL and will get specific insights on your page speed:


Performance grade and load time can give you a rough idea about the speed of your site, but they are not the most important metrics. You want to look closer at the page size and the number of requests being done. If you can reduce both of these numbers, it will help you a lot to speed up the loading of your site. Going further down you will have some insights which resources are causing the biggest toll on those numbers, and you get some recommendations on what aspects of the site can be improved.

Especially interesting is the waterfall graph. It gives you insights on how long every resource takes to load, and which one might be blocking the loading process of subsequent resources:
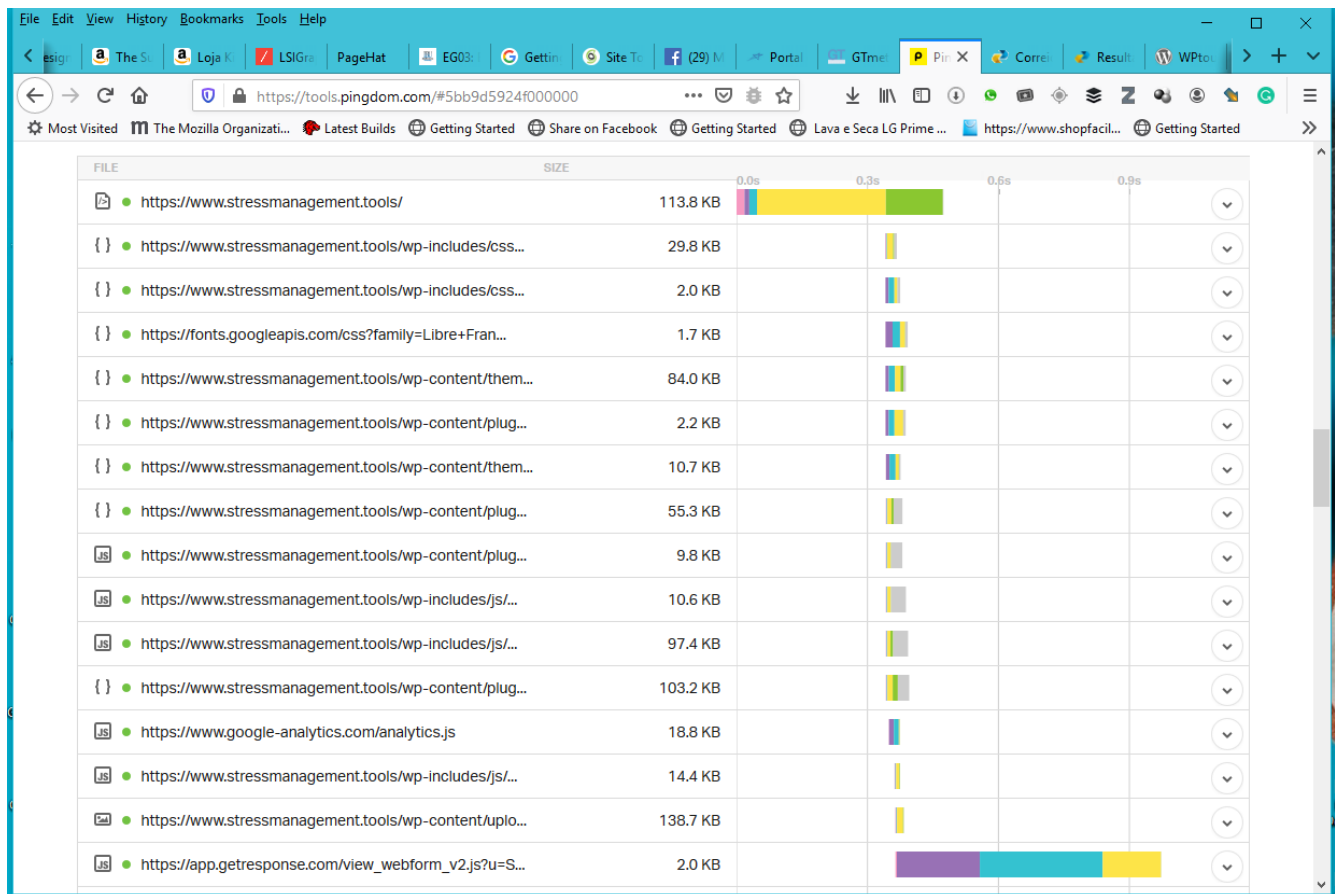
Once you analyze your main possibilities for optimization, you figure out which plugin or theme is loading this resource, and in which ones you are able to avoid, causing the major delays in the page loading cycle.

Another useful tool is [GTMetrix](). Again you put in your website, and you get optimization recommendations from Google Page Speed Insight and from the Yslow index. You find again a waterfall and other metrics. You need then to register for a free account in order to access the data in the Timings tab. This is giving us some more interesting markers:
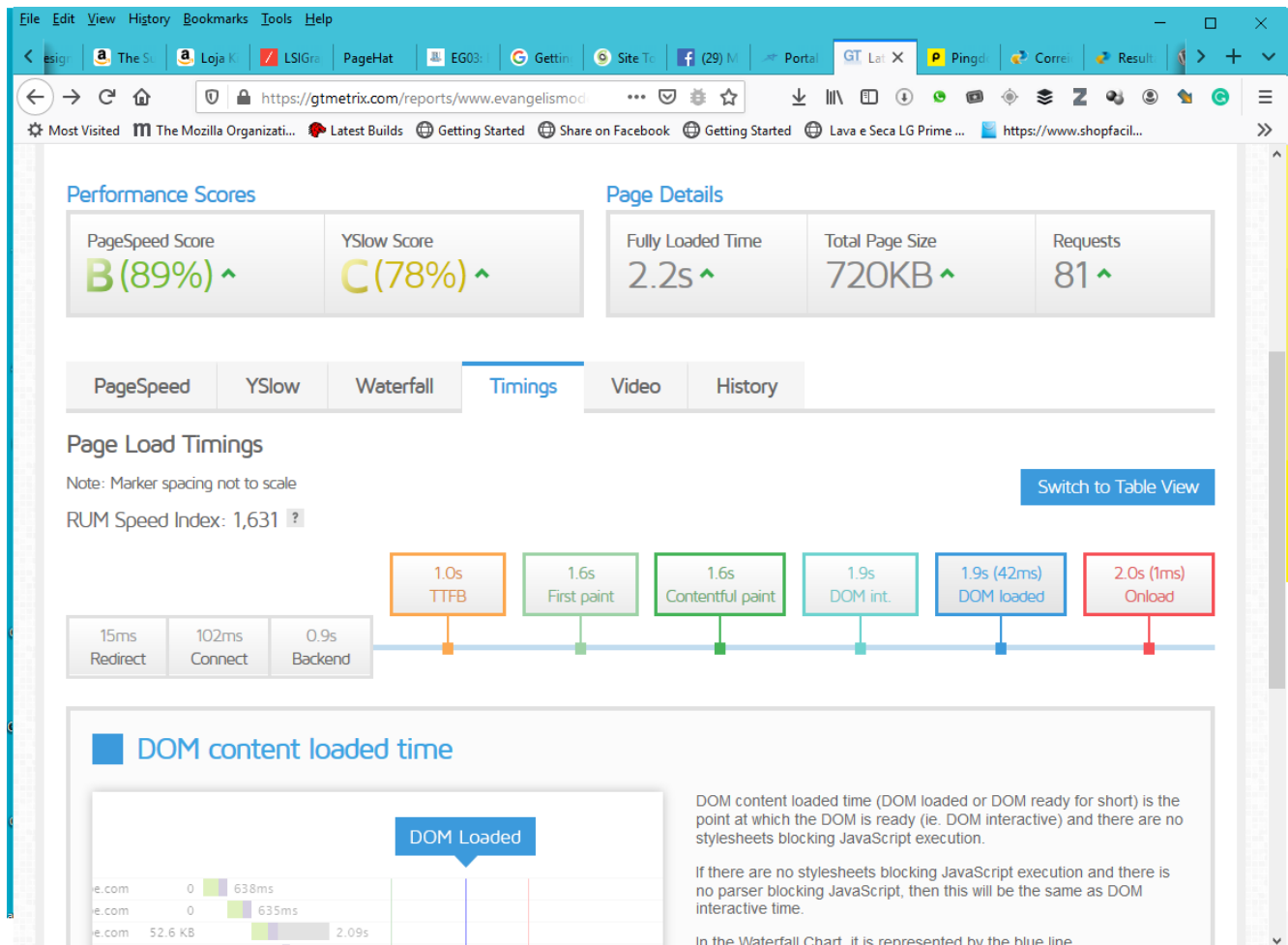
One metric that is quite important for the user experience is the First Contentful Paint, which occurs on this example after 1,6 seconds. That means the user waits for 1,6 seconds until seeing the first content showing up in their browser. Having the site just spinning its wheels will encourage visitors to abandon the site, but having some content showing early on can avoid this problem.

The next metric of interest is the time to interactive value. It measures how long the user needs to wait in order to be able to interact with the site, meaning that menus will work completely and drop-downs have loaded all its data. Most of those Javascript actions are started on the DOM loaded event, which is the metric you will try to optimize for. Keep especially these two metrics in mind when optimizing your page.

Now we go into specifics on what can be done practically to speed up a WordPress site.

Choose The Right Theme

Normally we tend to choose the theme according to the look and feel it is going to give to the site, and that is certainly an important consideration. Sometimes there are extra functionalities provided by a theme, that may be useful in a certain niche or application. But there are far more issues to consider when choosing your theme, that will be essential for the success of your website.

Fist, you want to be sure you get your theme from a reputable company. You want to be sure it is well coded, since a poor theme can potentially break your site. I had once a negative experience with OceanWP, a pretty popular theme in the WordPress repository. I got a website almost ready to launch, and then all of a sudden it started tho change around the header images of my pages. That was surely not a good feeling. I considered seriously starting all over with a different theme, but fortunately after updating another page, things suddenly normalized again. I guess this story gets the point across, that a stable theme will save you from many headaches.

Site speed is another important factor to consider when choosing a theme. A well written theme will have a small footprint in CSS and Javascript libraries needed on every page load. It is well worth making some tests before you settle for your theme. Choose some of the options in the WordPress repository that interest you, and test out how they influence your page load time after activating the theme.

Be sure to avoid especially bloated themes. Sometimes you find themes that include sliders, carousels, fancy menus and everything else you can imagine under the sun. Just all those features require extra Javascript and CSS resources that will slow down your site, even if you don't ever use them. It is better to settle for a lightweight theme and add the functionalities you really need with additional plugins.

Be Selective when Using Plugins

With over 50.000 free plugins just in the WordPress repository it is tempting to load a number of plugins that add some fancy gadgets to your site. Just loading extra features comes with a cost. First, plugins need to be loaded and executed on every page that is going to be shown on your site, using up additional processing time and slowing down the page load times. And still worse, many plugins add additional CSS and Javascript libraries to your page. Many of the plugins, like Contact Form 7 will load those resources on every single page of your site, whether they include a contact form or not.

Other contact form plugins like Ninja Forms, Caldera or Gravity Forms are more intelligent in loading just the resources that are really needed.

So when starting your website project, do your research. What functionalities are really essential for my site? What are the plugin options available, and which ones are most economic in the use of resources? Also try to eliminate plugins that have overlapping functionalities. For example, if you are using Yoast SEO, this plugin can provide you with an XML sitemap, and there is no need to install an additional plugin to do this task.

Reduce the Number of Fonts

Google offers a library of free Web fonts that can be loaded and used by your site. Each font used needs though extra resources. Try to reduce the number of fonts to the absolute minimum. Each font comes also in multiple variations of font weight as well as italic variations. Check your site and include only the variations that you really need.

If you want to save some extra load time, you can avoid loading any font at all by using the System Stack. Some themes have the option to apply this to the site, this way using only fonts that are available already on the local computer, without the need of loading of any font at all. It will not give you the exact same rendering on every system, but it will be good enough for a wide number of sites.

Optimize your Images

When you shoot a photograph with a medium quality camera, it will typically have around 3 to 5 MB of file size. The resolution can be around 5000 pixels, which is much more than can be displayed on any screen. Many website designers make the error in uploading the photographs as is without optimizing it to the resolution really needed. A full width image normally needs no more than 1200 pixels of width, and if you scale the images smaller, you can reduce the dimensions proportionally. So figure out which size you want your image to show, and resize it accordingly before uploading.

Besides image size, you can optimize the compression settings, which always involves a trade-off between quality and file size. And more so, your camera saves also a lot of metadata about your shot, which adds another few kB for every picture. Plugins like the EWWW Image Optimizer can help to reduce the file size of the images by optimizing those parameters. Image File format can also make a significant difference in file size, and in most cases the fairly new WEBP file format will give you the best results.

Caching

In WordPress, by default every page request is calculated based on website content, theme templates and plugin functionalities. This uses a lot of processing power and slows down the time until the page can be served. Caching is saving the final result of this operation and serving it to the next visitor requesting the same page. With this technology, your webpage will load almost as fast as a static HTML page.

There are a number of plugins available to provide you this service. Hummingbird and W3 Total Cache are one of the more flexible options that provide much more than just caching. We will talk about those techniques in the next chapters. If you want to shell out some additional money, you can get a premium plugin like WP Rocket. When I want a plugin that provides caching only, I like to use Breeze.

Normally caching is only done for anonymous users, since logged in users may be served individualized content on certain pages. Most plugins allow caching to be enabled on logged in users as well, but be aware that it can possibility cause some problems with individualized content. Advance with caution when enabling this option, since it could possibility reveal sensitive data when pages with personal information are getting cached.

Some hosting providers are offering server level caching. That means that cached pages are saved by the web server in Ram, and require not even the start of the caching plugin and the WordPress infrastructure anymore. This is obviously giving the highest performance boost among all caching options.

Minifying and Combining JS and CSS files

Javascript and CSS files tend to include comments and other markup that helps programmers to make the code more readable. Just this extra markup requires extra space, that is transferred on every single page request. Minification removes all this unnecessary markup for readability's sake, to serve a more compact version of your Javascript and CSS files. This can typically reduce those files by about 15-20%.

Combination will assemble the numerous CSS and Javascript resources that plugins and themes are using and combines them in a single file. This way it reduces the extra overhead of making separate requests to the server, which especially in the older HTML 1.1 standard makes a huge difference in the page load time.

Some plugins allow to defer CSS and Javascript resources to the footer. Files that are loaded in the header normally defer rendering until they are completely loaded. Resources loaded in the footer allows the browser to display the page before those files have loaded completely. There are though some drawbacks. CSS files are essential for

the styling of the page. If a needed CSS file loads later on, you will see several steps of ugly reformatting of the page happening during page load, which does not necessarily help for a good user experience. And some Javascript libraries will break if they are not available before loading the page. So use those feature with caution, with extensive testing in order to avoid your site to break because of over-zeal in your optimization.

We have mentioned already that many plugins are loading CSS and Javascript resources even on pages where there are not needed. This can be remedied with the Clearfy plugin. Besides lots of other optimization options, it allows you to select for each page which resources are needed, and which ones can be omitted. For example, if the only place you are using a form is the contact page, you can load the CSS and Javascript files of this plugin on this page only.

Enable GZIP Compression

Many resources like CSS, Javascript files and HTML pages are commands in human readable text characters. This kind of content has lots of repetitive patterns that makes it a prime candidate for compression. Typically traffic can be reduced by more than 50% when compressing this kind of files. Compression is done directly by the web server. If it is an Apache server, which is one of the most common webserver packages, you can add the following code to the .htacess file:

```
AddOutputFilterByType DEFLATE text/plain
AddOutputFilterByType DEFLATE text/html
AddOutputFilterByType DEFLATE text/xml
AddOutputFilterByType DEFLATE text/css
AddOutputFilterByType DEFLATE application/xml
AddOutputFilterByType DEFLATE application/xhtml+xml
AddOutputFilterByType DEFLATE application/rss+xml
AddOutputFilterByType DEFLATE application/javascript
AddOutputFilterByType DEFLATE application/x-javascript
```

If you are not sure about your configuration or run on a different web server, you can rely on Hummingbird to find out the correct configuration for you.

AMP Mobile Pages

AMP, which stands for Accelerated Mobile pages is a web component framework developed by Google with the goal to render pages much faster on mobile devices. This technology allows webpages to render typically in less than a second, even being served over a moblie connection. To achieve this extraordinary results, the new standard involves a few limitations:

- No Javascript except of the predefined AMP libraries
- No external CSS files, since the latency of mobile networks will significantly slow down the loading of additional resources.
- All CSS code combined needs to be under 50 kb.

This seems to be limiting at first, but the AMP library adds some interactive page elements that are specially optimized for the mobile experience. The problem is though that your pages needs to be served in two different formats. The desktop version and the AMP mobile version.

To provide this functionality, there are two interesting plugins that come to the rescue.

AMP – The Official AMP plugin for WordPress

This is the official version that Google is developing together with Automattic in order to make your WordPress site AMP compatible out of the box. The plugin can operate in 3 different modes:

Standard: Both, desktop and mobile pages are rendered by default in the AMP format, and all the webpages are marked as being AMP compatible.

Transitional: All pages have a canonical URL as well as a paired AMP URL. This AMP version is served to mobile users, and only if they find the site in Google search or another AMP enabled platform like Twitter and Pinterest. This way, the site gets all the benefits of AMP in the Google search engine, but mobile users entering the URL directly, will not be served optimized the AMP content.

Both of those modes require the theme to be AMP compatible. All Wordpress core themes from Twenty Ten to Twenty Twenty comply, as well as a few other handful of themes like Astra and the Genesis Framework.

Reader Mode: This mode discards your theme completely for the AMP version, and serves the pure content of your page without any additional formatting of the theme.

This mode supports serving AMP only for individual posts and pages, while on the other two modes the entire site is served in the AMP format.

As a new feature, the plugin allows the creation of AMP stories, that immerses readers in a fast-loading full-screen storytelling experience.

As a major problem remains the limited support of plugins. Any plugin that depends on Javascript for its functionality will either not render a valid AMP page, or removing the Javascript will break its functionality. For example, WPForms seems to be the only contact form plugin being compatible with the AMP plugin out of the box. For all other contact form plugins you need to exclude the contact page from the fast-loading AMP experience. The second plugin option comes to rescue to remedy that situation.

AMP for WP – Accelerated Mobile Pages

Defined by the author as the #1 WordPress AMP plugin, it is making use of the core modules of the official plugin and brings the AMP experience to a new level. If you want to run AMP on Desktop and mobile alike, this plugin works similar to the official version. If you decide to use the so called transitional mode, hosting both versions of a webpage, the plugin brings in an interesting feature. It can offer mobile redirection to the AMP version for all users accessing the site from a mobile device, no matter from where they were landing on your page. That guarantees that all mobile users will benefit from the faster AMP version.

When you update to the Pro version, the plugin enfolds its real strength. It has an impressive list of plugin support, starting with page builders like Divi and Elementor, going to a number of contact forms, WooCommerce, Facebook chat and much more. If you are serious on getting a smooth AMP experience on your site, you probably want to invest in the premium version of this plugin.

Conclusion

You can see that Speed Optimization is not a single action, but a sum of different optimization measures, that combined will make your site so much more responsive. If you can afford the trade-off in functionality, going for AMP is probably the measure that will give you the greatest benefits. Being a fairly new technology, the support in the WordPress ecosystem is though still limited. Hopefully this will improve in the next few years, because if you want a blazing fast experience on mobile, then AMP is the way to go.

In this manual we could just scratch the surface and talk about the most important techniques to improve page loading times. I hope it helped you to see the importance of speed optimization and get you on the right path. If you need more detailed information on the topic, I have a special offer for you. I am preparing right now a detailed course on how to optimize a WordPress site step by step. We will leave no stone unturned. We will give you step by step instructions on how to do WordPress optimization effectively on your own website. We will take the mystery out of it and deliver an easy and effective system for you to follow. If you want to be notified as soon as it is available, please leave us your email and you will be the first to be notified when it is available.

Yes, please sign me up!

Right Internet Marketing