

# Under Two-Second Page Loads: How To Use Gatsby to Dramatically Increase Your Website Conversion

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### PREFACE

A typical successful demandgen project increases lead conversion by 5 to 10%. But e-commerce sites migrating to Gatsby have reported conversion increases from 50 to 100%.

Maybe your organization has already migrated onto Gatsby – or perhaps you're just starting to look into ways to increase conversion.

Either way, this e-book by Gatsby co-founder and Chief Strategy Officer Sam Bhagwat will show how to leverage the power of the modern web to deliver a lightning-fast experience to your customers – while increasing the bottom line.

### PART ONE

# Driving Conversion Through Increased Site Performance

## "What does that extra second of page load speed cost you?"

This is the magic question. It's a question that engineering leaders, C-suite executives, and demand-generation specialists have been trying to answer since the early 2000s.

Luckily, a body of literature has coalesced recently, suggesting a "magic number" to create a seamless experience for visitors.



## Quantitative Studies Show That Conversion Rates Spike As Page Speed Drops From 5 Seconds to 2 Seconds

Our intuition and experience tell us that performance is essential. But to justify an investment organizationally, it's helpful to quantify ROI. Performance vendors and digital agencies have conducted numerous studies over the years aiming to help engineering and marketing leaders do just that. They employ two techniques:

- **First, before/after studies** measure conversion data on client sites before and after a significant change.
- Second, visitor experience segmentation studies bucket visitors based on how fast their page loaded and calculate the different conversion rates for each page load speed.

Both types of studies provide insight. However, to generate granular data on how performance impacts conversion, visitor experience segmentation studies tend to be more helpful. Surveying all visitor experience segmentation studies conducted in the last ten years, while normalizing conversion rates across studies, yields fascinating results:



## Conversion Rates vs Page Load Times In Various Studies

The results show colossal conversion rate lifts from reducing site load time – ranging from +36% to +179% with a median of +114%. **In other** words, the median study showed that lowering average page load time from 5 seconds to 2 seconds more than doubled conversion.

Study	Description	Conversion Lift From 5s to 2s Page Load
Portent, 2019	Digital marketing agency looked at 94 million page views across ten e-commerce sites, from major national fashion brands to small, niche manufacturers, for 30 days.	+151%
Walmart, 2012	Walmart's infrastructure team measured conversion rates against page load times across millions of SKUs for tens of millions of visitors.	+179%
Radware, 2013	Five large e-commerce customers of a major edge computing platform	+36%
Yottaa, 2020	Large e-commerce customer of a performance platform over seven days	+78%

Conversion Rate Index (100 = site max)

## Google's Recent Core Web Vitals Update Targets 2.5 Seconds As "Good"

In June 2021, Google rolled out changes to their search algorithm, rewarding fast sites and punishing slow sites. We've discussed the **June 2021 Core Web Vitals Search Update at length elsewhere**, but it's worth noting two things:

- First, from a technical perspective, Google uses Largest Contentful Paint (LCP) to measure page load speed. LCP is defined as the render time of the largest image or text block visible within the viewport, relative to when the page first started loading.
- Second, Google's metric of "good" is 2.5 seconds. The Google team has publicly communicated that this will be a moving target and is likely to change (downwards) as teams have time to adjust practices and prioritize performance.



Image Source: web.dev/lcp

Google is perhaps the organization with the most data on the effect of web performance on click throughs and conversions – and has a vested interest in increasing conversions. Google's actions back up the thesis, articulated in publicly available literature, that improving site speed to 2 seconds will deliver dramatic results.

Our journey as a company, and the experiences of our users and customers, offer additional support. Since Gatsby's creation in 2015 and incorporation in 2018, our journey has been bound tightly to the web performance story.

### PART TWO

# How Gatsby Is Optimized To Deliver Top-Notch Site Performance

My co-founder, Gatsby creator and CTO Kyle Mathews paraphrases Tolstoy: "All fast websites are alike, but all slow websites are slow in different ways."

## **Why Performance Is Hard**

With the complexity of web technology stacks today, it's easy for performance to suffer death by a thousand cuts. Is your site slow because of your e-commerce backend? Your caching configuration? Your Javascript? The answer is yes.

Site performance isn't just a technological challenge. It's also an organizational challenge. For enterprise teams building in-house, multiple stakeholders can create a diffusion of responsibility. For example, if one group owns the CMS, another owns the UI, and another the app server, fixing performance can become an  $0(n^2)$  problem, where n is the number of teams.

The challenge is similar for organizations using pluginheavy platforms like WordPress, Drupal, or Shopify. Any plugin can run arbitrary code that slows down the site, and it's challenging to pinpoint who is responsible – let alone fix it.



## **How Gatsby Optimizes Performance**

Website performance is a well-understood engineering problem. However, that does not mean it's straightforward. The summarizers and condensers of perf tactics produce incredibly long documents: <u>80-item checklists</u> are not unusual.

Unless you have several team members dedicated explicitly to performance – and perhaps even if you do – these guidelines are simply overwhelming. But the good news is that Gatsby bakes in these performance improvements at the framework level. We nerd out about performance, so you don't have to!

We combine best-practice front-end development patterns like routebased code-splitting, PRPL, service workers, and offline support with dynamic data integrations via a rich set of integrations.

So: how are Gatsby sites so fast? Gatsby is designed to take the core tenets of stream processing and apply them to static websites. First, Gatsby precomputes state—in this case, assets and dynamic content or data—so webpage loads are super fast. Second, Gatsby's JAMstack architecture pre-delivers stable markup to render the page structure and appearance – then uses JavaScript-based client-side service workers to serve up dynamic content via APIs.

In other words, in a Gatsby site, all data is "alive" and on-call, reacting to browser behavior such as a user hovering near a button or scrolling toward the bottom of a page. The Gatsby framework anticipates what is likely to be wanted next, then starts to fetch and preload that content in the background before it's even requested by the browser meaning that the user's wish is delivered almost instantaneously.

## **Getting The Gatsby "Wow" Factor**

Over the last several years of building Gatsby, we've heard from hundreds of developers who built Gatsby sites that were really, really fast. Fast enough that people continually told them about it, "Wow, the site you built is so fast." We started calling this the "Gatsby wow" factor.

Then we started hearing from leaders at organizations using Gatsby – directors of engineering and demand generation – who measured conversions and performance before and after migration. They reported dropping page load times from 5-6 seconds to around 2 seconds. And they saw conversion gains far above and beyond expectations, from 50 to 100% and sometimes beyond.

And what we learned is that the Gatsby "wow" isn't just a neat anecdote. It's the qualitative marker of incredible business value.

## Berlitz

Berlitz is a global language company with over 7,000 employees and offices on five continents, with each country having a distinct digital presence tailored to the offerings available there.

In 2017, a new digital marketing team started looking for tools and technologies to craft a scalable digital strategy. They began by testing landing pages and found that converting their landing pages to Gatsby gave them a 98% lift – almost doubling conversions. Over the subsequent years, they've migrated their entire stack over to Gatsby, including their two main sites, Berlitz.com and Berlitz.de.



RealCedar

RealCedar.com is the homepage of the Western Red Cedar Lumber Association, representing 27 producers of lumber in the Pacific Northwest. Previously a full-stack WordPress website, it suffered from performance issues with lots of plugins and large images.

In late 2021, it **brought an agency on board to "lift and shift" the site** to a Gatsby + headless WordPress architecture – changing the UI code without altering the design or the content.

The results are impressive:

- organic traffic is up 66%, representing 100s of thousands of visitors
- conversion (user form submissions) is up 35%
- resource downloads are up 186%.



## YouFit

YouFit is a US-based gym chain. Started in 2008 in Florida, today, YouFit has more than 100 locations across 14 states. Over time, they noticed a growing proportion of traffic from mobile devices, popular among their demographic.

Unfortunately, they suffered poor page performance on mobile, decreasing organic traffic and increasing bounce rates. As a result, YouFit looked to Gatsby to improve its site performance and rev up its demand generation engine.

After migrating their site to Gatsby in 2018, YouFit noticed a <u>60% increase in lead conversion</u>.

At YouFit, You Come First. Our clubs are designed with you in mind: affordable, state of the art, and focused on helping you reach your personal fitness goals.



#### Nutrition powered by EatLove

Build long-lasting healthy eating habits with EatLove's intuitive technology that features easy recipes, smart restaurant choices, grocery lists and optional delivery. EatLove features more than 6.000 easy-to-follow, dietitia exercised peoper

### PART THREE

# What You Have To Do To Keep Your Gatsby Site Up To Speed

Starting with an excellent framework is being set up for success. However, it is not a **guarantee** of success.

As an analogy, consider driving a motor vehicle. If you purchase a top-of-the-line light truck or SUV, you're likely to get excellent performance – rapid acceleration and sharp turns around corners. However, if you then fill your vehicle with 2,200 lbs (one metric ton) of sandbags, your vehicle's performance will likely suffer.

Similarly, if you adopt Gatsby but then build lots of heavy pages, your site performance will suffer.



Here's another analogy: achieving and maintaining fast website performance is like staying in great physical shape.

- Simple, not easy. Like staying in shape, site speed is a simple concept. But your health is affected by lifestyle, diet, exercise, friends, daily routines, and work environment. Similarly, every line of code your team writes impacts site performance – it's a cross-cutting concern.
- Hard to find tailored advice. The optimal health and fitness regimen can vary substantially from person to person. As a result, there's an overload of information, making it challenging to find the right advice for you. The same is true with website performance. The thing slowing down your site may be unique to you.
- Get there AND stay there. There's little point in paying the price to get in shape if you don't stay in shape. Similarly, once your site gets fast, it's essential to stay fast.

Luckily, we've thought through this problem extensively. Not only have we built performance optimizations into Gatsby by default, but we've articulated systems and processes for your teams to ensure your website stays fast, aka, healthy.

There are two keys to keeping your Gatsby site up to speed: set up systems to track performance over time and focus on controlling the four key drivers of page bloat.

## Set Up Systems To Track Performance Over Time

### Per-commit performance tracking

We recommend using <u>Gatsby Cloud</u> to track performance over time. Because Gatsby Cloud runs a Lighthouse test on each commit and pull request, it's fairly straightforward to detect performance improvements or regressions.

Many Gatsby Cloud users make this a part of their workflow. Gabe Boisvert & Eric Sizer, the project/design lead and lead developer at Canadian agency Floating Point, send their clients Gatsby Cloud Lighthouse report screenshots and links whenever they do a deployment.



A Gatsby Cloud Lighthouse link Floating Point sent to its client

### Performance tracking over time

Gatsby users and customers like <u>the financial literacy website</u> <u>Moneygeek</u> have successfully used Google Search Console's Core Web Vitals tracking to track performance hotspots.

Google Search Console is a free tool that monitors your site's routes and identifies routes not meeting Google's 2.5-second load time goals, among other metrics. While Search Console is not Gatsby-specific and doesn't have visibility into your code, it can diagnose when pages on your site are not performing. In addition, the user interface is excellent and quite intuitive.

Because Google Search Console monitors all of your pages and tracks the results over time for both desktop and mobile, it makes a good "control center" for a campaign to improve performance.



Moneygeek's Google Search Console report

## Focus On Controlling The Four Key Drivers of Page Bloat

Because Gatsby delivers your site as static files stored on a CDN (rather than as responses from a server), Gatsby eliminates a whole class of problems. As a result, the optimization needed is all browser-side optimization rather than server-side optimization.

Browsers do four fundamental types of work browsers in loading Gatsby sites – loading scripts, parsing JavaScript bundles, loading and parsing CSS, and loading images and fonts.

## Delay Script Load

Because third-party scripts can often be the most costly part of production Gatsby sites, <u>Gatsby provides hooks</u> to allow you to easily delay these scripts until after the rest of the page has loaded. In addition, you can inline the script and save the cost of a network call.

## Trim Bloated Bundles

Gatsby breaks your application up into Javascript chunks that are pulled into each page as necessary. In addition, <u>Gatsby</u> <u>has plugins and documentation</u> to monitor page chunk weight, visualize page weight to identify problematically heavy JavaScript chunks (such as large third-party libraries).

In addition, the tools enable prioritization by segmenting page weight into global chunks, template-specific chunks, and page-specific chunks.

## Modularize Global CSS

<u>We document the specific CSS libraries</u> that you can use to ensure modular CSS to prevent global CSS from being pulled into each page.

### Optimize Images and Fonts

Gatsby's image plugin, descriptively titled gatsby-plugin-image, offers outof-the-box responsive images. Using **gatsby-plugin-image can increase Lighthouse scores by 10-15 points** for pages with large hero images.

We have specific recommendations for each type of work, which we'll dive into in the following section.

# Systematically Increase and Maintain Performance with TIRE

We've developed the **<u>TIRE methodology</u>** (Triage / Isolate / Refactor / Evaluate) to systematically:

- Triage: triage the overall impact caused by this type of browser work to decide your level of effort
- Isolate: Identify & isolate critical lines of code impacting perf
- Refactor: when clear-cut, remove or refactor code
- Evaluate: when not clear-cut, estimate potential perf gain from refactoring, and evaluate whether it's worth the time



Gatsby offers a Concierge program where we work with engineering teams using Gatsby, walking through their website's codebase to identify performance bottlenecks, sorted by concern, effort, and impact.

Further, we help Concierge customers incorporate the TIRE methodology into their performance work to ensure performance on an ongoing basis.

## Moneygeek

Moneygeek is a financial literacy site, creating a growing portfolio of content and interactive calculators, so people don't feel like they are making decisions in the dark. Search engine optimization is the primary user acquisition Moneygeek deploys at scale.

When Google announced their upcoming Core Web Vitals update, Moneygeek knew it was time to get from good to excellent. So they turned to the **Gatsby Concierge** service to take a look and see what they should be changing. The Concierge team dove through the code and came back with several recommendations: Reduce usage of custom fonts. Preconnect to Cloudinary. Remove Redux, which was slowing down the entire site despite being only used on one page. Modify or remove libraries like Lodash and Moment to vastly decrease the Javascript footprint.

When June 2021 rolled around, <u>Moneygeek had hit</u> <u>their goal</u> – they had gone green on all three Core Web Vitals metrics, with an average load time (LCP) of 2.1 seconds on mobile across their domain.

## \*\* The Gatsby Concierge service has been pretty amazing.

- MONEYGEEK CEO DOUG JONES

Good	Good URLs				N/A		55
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### LEARN MORE

If you're evaluating migrating to Gatsby, looking for help migrating, or are already on Gatsby and looking to optimize your performance, please reach out to us at sales@gatsbyjs.com.



