



A guide to optimizing site performance as you scale

How speed impacts your bottom line



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01 Introduction

Site speed helps customers find your site, navigate products and check out quickly. But achieving lightning-fast site speeds without compromising on user experience is challenging.

So how do you manage the trade-offs?



Executive summary

Whether you prioritize sales growth, customer retention, or international distribution, speed is essential to your success.

But the more your brand grows, the harder the task of improving or maintaining site speed. Even with vigilant development teams, small problems can easily go unnoticed. As issues accumulate over time, your codebase can become bloated, resulting in a slow site that bleeds sales.

In this guide, we'll look at why businesses of all sizes run into issues. We'll also run through typical site speed killers, as well as their fixes.

We've categorized these site speed issues according to the section of the customer journey they impact: discovery, browsing, and conversion. The main takeaway? No matter where speed issues occur, they can hurt your bottom line.

So let's start with a big question:

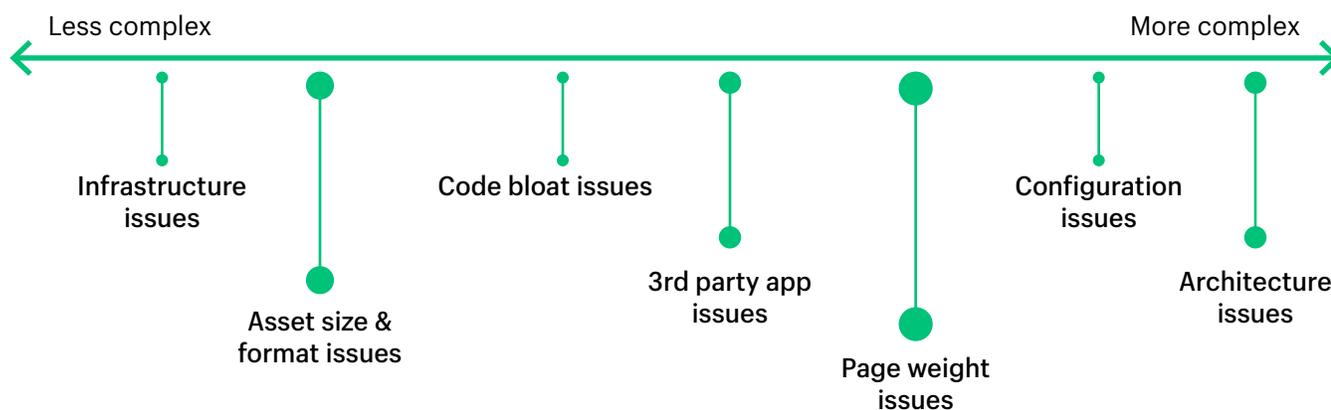
Why do even very large businesses struggle with site speed?



Why site performance gets harder as you scale

The more success you have in ecommerce, the harder it is to maintain optimal site performance. As the number of pages and features on your site grow, so does the codebase.

Performance issues as you grow



This is a problem that grows with complexity. As brands grow and become more sophisticated, their websites become richer. This richness usually comes with a price—unless you are actively paying attention to speed, changes will slow down your site.

Caitlyn Parish
Chief Digital Officer, Cicinia

So if site performance issues grow in number as you scale, **what steps can you take to mitigate their effects?**

Site performance and Core Web Vitals

If you're relatively new to site performance, the metric names might feel like a minefield of acronyms. These include:

First contentful paint (FCP): When the browser renders the first bit of content from the document object model (DOM), giving the feedback to the user that the page is loading.

Largest contentful paint (LCP): LCP approximates when the main content of the page is visible to users.

Speed index: Measures how quickly content is visually displayed during page load. Lighthouse captures a video of the page loading in the browser and calculates the visual progression between frames.

→ **Key web performance metrics you should understand in 2023**

Total blocking time (TBT): Measures the amount of time that a page is blocked from responding to user input, such as mouse clicks, screen taps, or keyboard presses

Time to interactive (TTI): Measuring load responsiveness. It helps identify cases where a page looks interactive but actually isn't. A fast TTI helps ensure that the page is usable.

Cumulative layout shift (CLS): Quantify how often users experience unexpected layout shifts—a low CLS helps ensure that the page is visually stable.

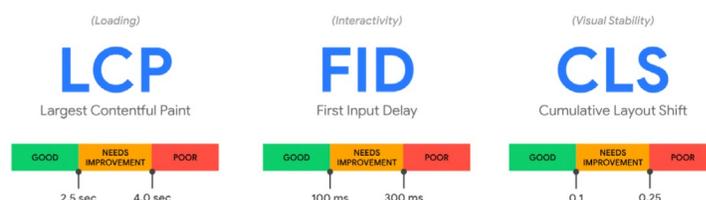
If you're scaling an ecommerce business, there are several reasons you may need some understanding of these metrics. A major one is Google.

Way back in 2010, Google confirmed site performance was a ranking factor in organic search. Then, in 2021, it updated rankings to give more weight to the three page experience signals that most directly impact users. Google calls these signals [Core Web Vitals](#):

Largest contentful paint (LCP): Measures loading performance. To provide a good user experience, LCP should occur within 2.5 seconds of when the page first starts loading.

First input delay (FID): Measures interactivity. To provide a good user experience, pages should have a FID of 100 milliseconds or less.

Cumulative layouts shift (CLS): Measures visual stability. To provide a good user experience, pages should maintain a CLS of 0.1. or less.



Case study

How Carpe achieved record-breaking sales by focusing on performance optimization

Web performance is often overlooked as a way to improve both user experience and business metrics. This case study shows the value that can be achieved when working toward improving loading speed and reducing user frustration.

We worked with Carpe to improve its key performance metrics resulting in:

52%

faster LCP

41%

improvement in CLS

These upgrades led to:

5%

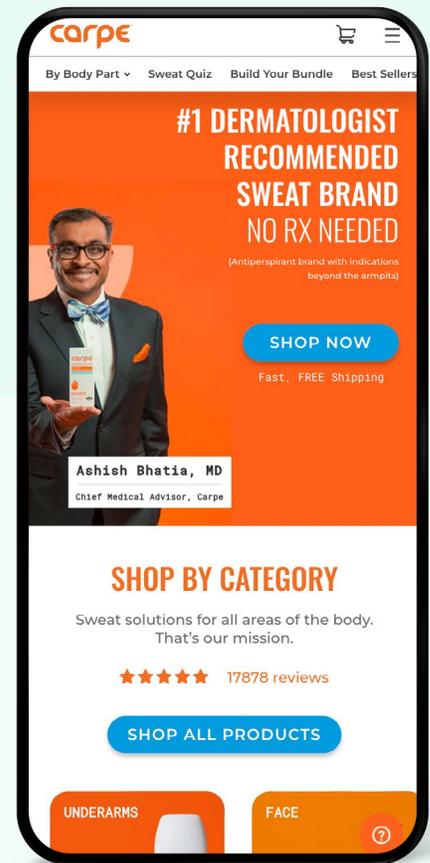
increase in online store conversion rate

10%

increase in traffic

15%

increase in online store conversion rate



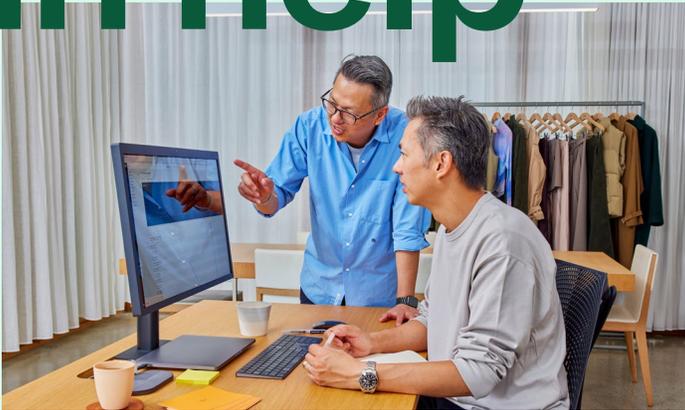
“Working with the Shopify performance team allowed us to take the Carpe website to the next level of user experience. As a result, we were able to drive more traffic to the website and increase revenue by 15%.”

Daniel Nunn
Director of Ecommerce, Carpe

[→ Read the full case study](#)

To pass Core Web Vitals, you need to reach the “good” threshold for all three metrics. Google has used the same three pillars since releasing Core Web Vitals. But change is coming. In March 2024, Interaction to Next Paint (INP) will replace FID. INP observes the latency of all interactions a user has made with a page. Not just the first interaction on first load. A low INP means the page was consistently able to respond quickly to all user interactions.

How Shopify can help



Storefronts are getting faster. On average, **30% more sessions** are experiencing passing the time to first byte (TTFB) metric in Core Web Vitals (CWV).

It's worth remembering that Core Web Vitals are a proxy for user experience. The goal isn't to please Google. The goal is to provide great user experiences to as many customers as possible. And to do that effectively, you need high quality data.

What tools can you use to measure performance?

As your business scales and complexity increases, a well-rounded view of your performance data is vital. Here's a list of tools you should consider using when working to improve your site performance:

- [CrUX](#): A public dataset that collects real-world user monitoring (RUM) data from millions of websites. It provides valuable insights into Core Web Vitals metrics based on actual user interactions.
- [WebPageTest](#): A free-hosted service that performs performance tests on public websites using lab and RUM data. It includes useful capabilities, like setting up network locations, network speeds, and customizing requests.
- [PageSpeed Insights](#): A useful tool for measuring the performance and Core Web Vitals of a page with lab and RUM data. It also calls out the elements on your site that slow down the page, like CSS and JavaScript.
- [Lighthouse](#): An open-source tool from Google that can be run from Chrome DevTools or from the command line. It's run locally and uses lab data, so it's most useful for development-time testing of your site.

Lighthouse is the most widely used tool. It's also the least useful. Why? Because it only measures a snapshot in time of a website, in a simulated lab setting.

This is helpful for debugging and initial testing of optimizations but many companies treat a Lighthouse score as the goal of optimization activities. In other words, it's become a victim of Goodhart's law: "When a measure becomes a target, it ceases to be a good measure."

Fixing your Lighthouse Score does not necessarily equate to improving site performance. Page speed and especially UX just can't be communicated via a single number. For real performance insights you need to monitor real user data across time.

Benchmarking performance with real-user monitoring

The best free source of real user data currently available is the Chrome User Experience Report (CrUX).

Chrome collects the data from users who opt in to share it and sends that data to central stores for aggregation. CrUX records a broad set of metrics important to measuring how a user experiences your site. As such, CrUX reflects how real-world Chrome users experience popular websites.

WebPageTest and PageSpeed Insights include access to CrUX data so you can see how your synthetic result compares to what real users see. CrUX is also the basis of the Core Web Vitals performance data that Google uses for rankings.

The data is a hugely useful resource but still has limitations—not least that it only relates to Chrome users. If your customers skew heavily toward Apple devices, they will not be represented, and you may need to invest in a full RUM solution.

The real takeaway here is less to do with CrUX specifically and more about the dangers of ignoring RUM in favor of the easy answers lab tests such as Lighthouse proffer.

→ [Read our blog to learn more about prioritizing real user performance with CrUX](#)



Case study

How Sunday Citizen improved conversions by focusing on performance

We worked with Sunday Citizen to improve its key performance metrics. After analyzing its real-world user monitoring (RUM) data and applying fixes, **we were able to achieve:**

25%

improvement in LCP

61%

improvement in CLS at the 75th percentile

This resulted in:

4%

decrease in bounce rate

6+%

increase in conversion



A guide to optimizing site performance as you scale

Users were also almost 4% more likely to add products to the cart, leading to more selling opportunities.

Web performance often is overlooked as a way to improve both user experience and business metrics. This case study shows the value that can be achieved when working toward improving loading speed and reducing user frustration.

[→ Read the full case study](#)



How ecommerce platforms compare on site performance

A guide to optimizing site performance as you scale

If your Core Web Vitals scores are too low, your rankings will suffer. Equally, scoring well can give you an advantage in search and ad rankings. So how does Shopify stack up compared to other ecommerce platforms?

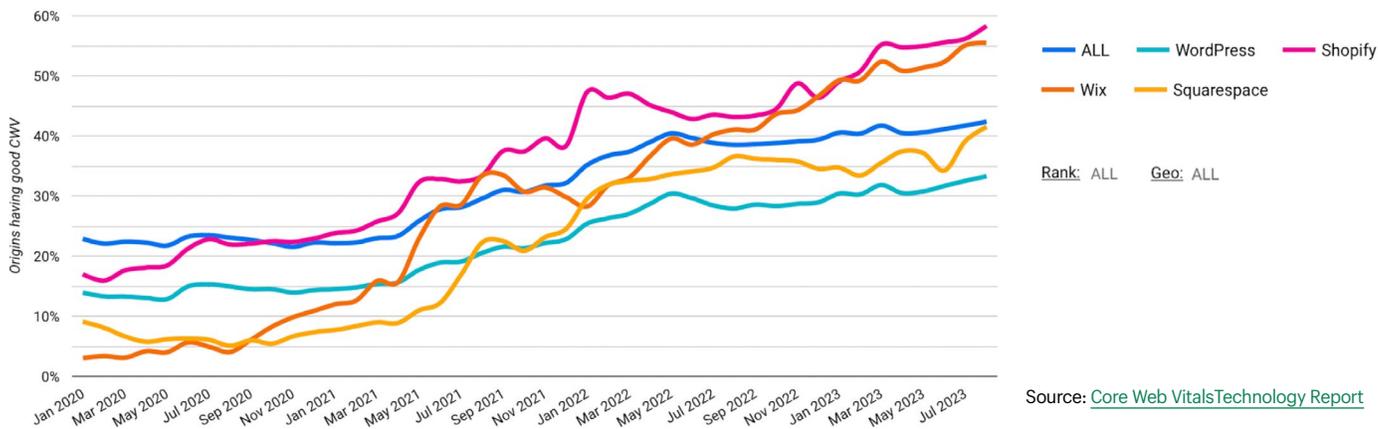
As of August 2023

42.36%

of all sites fulfill the Core Web Vitals assessment

58.27%

of Shopify storefronts pass



Shopify invests more than \$1 billion every year on R&D, which includes continuing efforts to keep improving performance. It's why Shopify storefronts currently perform **15.91% above the average**.

8 tips for optimizing your site performance

Achieving lightning fast site speeds without compromising on user experience is challenging. No matter where performance issues occur, they can hurt your bottom line.

So set up your storefront for success by understanding typical site speed killers and their fixes. Here are some tips for optimizing your ecommerce site as you scale.

01 Prioritize loading above the fold

Most users won't start scrolling until they're confident the page is loaded. For that reason, you should prioritize loading resources required to paint content at the top of the page. This could be as simple as ordering resources correctly but there are other tools to help inform the browser what is important and what is less important.

The main objectives include:

1. Telling the browser what is important content
2. Telling the browser what is less important and can wait
3. Making high priority resources load as fast as possible

02 Optimize your images

There are two parts to optimizing images:

- **Making sure the images are as small as possible at the necessary quality.**

This is so important for ecommerce businesses. [Learn the current best practices](#) for balancing speed and quality when it comes to images. You can use third-party integrations to handle image optimization, but these may damage your site performance in other ways. The [Shopify CDN](#) does the hard work for you.

- **Using the right tools to display the best image to the user at the right time.**

Implementing responsive images using native browser technologies helps you serve the right size image to the right device and helps the browser discover them quickly. You can supplement your most important image with "fetchpriority=high" to inform the browser this image is more important than any other. Finally any images that are below the fold should use the native attribute "loading=lazy." This saves bytes for users that don't scroll and helps images at the top of the page load faster. Avoid third-party lazy loading libraries as they introduce delays.

03 Keep your site lean and nimble

Smaller, well-maintained sites tend to load faster. The more you do to reduce bloat, the better your site will perform. Using templates like those provided by Shopify help make development super fast, but can often add a small overhead if you decide not to use all the features.

The two strategies here are to remove unused code and keep required code as small as possible. Often, third-party code gets added to sites and forgotten about. For example, if you A/B test on your pages, remove the tool when no experiments are running. When you permanently remove tools, check that all traces of code are deleted. Any code that is necessary should be compressed using GZip or Brotli. All files should be [minified](#) to make the code better optimized for the browser. Shopify does both automatically.

04 Improve performance with preconnects and preloads

[Preconnect to key third-party domains](#) to help browsers set up early connections before an HTTP request is sent to the server. This improves page speed. Preloading goes even further, not only telling the browser which domain will be needed, but also pointing to the file that should be downloaded.

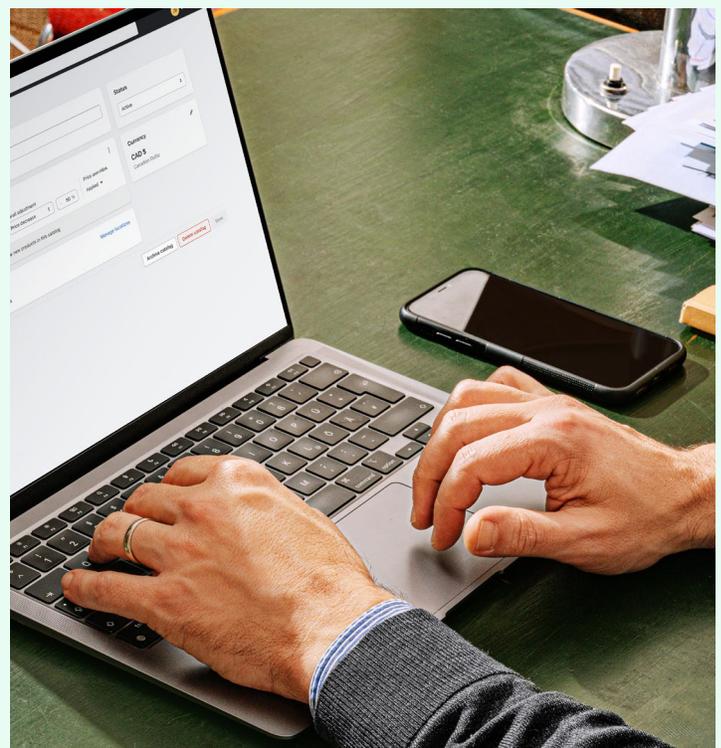
This should only be used when you are certain a resource will be used on a page. It should also be a resource that is needed to paint above the fold content. Otherwise, you risk slowing that content down. Remember: it's a common error to preload too much. If everything is important, nothing is.

05 Keep your site lean and nimble

Take a look at your existing integrations (e.g., apps). Now quantify the value they add to your business. Some apps power product recommendations and social image feeds and are extremely valuable. Others may do very little. Compare the value with possible performance reductions, and remove unnecessary integrations.

Questions to ask yourself include:

- Do you pay for this app?
- Does anyone still use it?
- When should we load it?
- And where should it be executed?



06 Improve rendering times by falling back to web fonts

Custom fonts can help maintain brand identity, but use them with care. Every custom font you introduce has a performance penalty. To reduce the penalty, try to self host your font, or load them from your own domain.

You can reduce this penalty further by using a standard font while you wait for your custom fonts to download. You can do this by adding a font-display: swap property in your @font-face declaration.

Or, if you're using Google Fonts, a & display=swap URL parameter (e.g., <code><link href="https://fonts.googleapis.com/css?family=Roboto&display=swap" rel="stylesheet"></code>). This will improve rendering times, but the tradeoff is a flash of unstyled text and a potential increase in cumulative layout shift. Be sure to select the standard font that best matches your custom font.

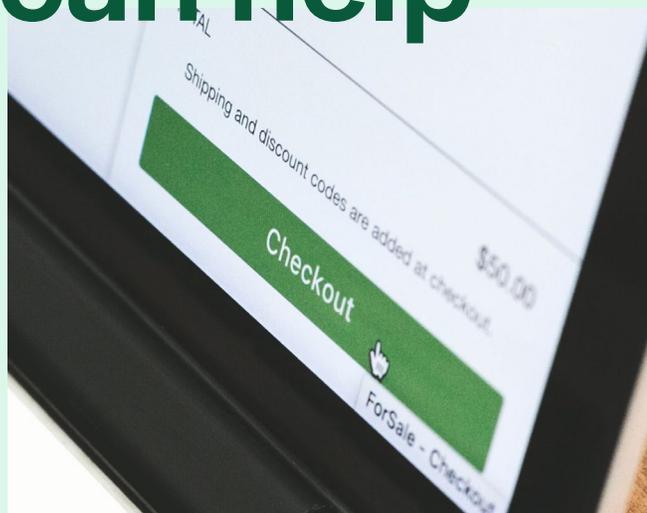
07 Speed up with a trusted global infrastructure

As your user base expands, a CDN can be a great way to continue to provide good performance for those users that reside further away. In addition CDNs can also provide many of the features to help with the tips above. Be sure the CDN you select has servers in the regions you plan to target in the future. The [Shopify CDN](#) does all this and more.

08 Don't underestimate the importance of page weight

Correlations show the bigger the HTML page, the slower they tend to be. So monitor the size of your HTML. We recommend setting a budget, such as 100 kilobytes, and continuously monitor how you do against it. If you add code that takes you above the threshold, consider removing something before pushing that new feature.

How Shopify can help



Storefronts are also getting faster.

On average, **30% more sessions are passing the time to first byte metric** in Core Web Vitals (CWV).

➔ [How to measure the impact of a third-party on user performance](#)

“
Seriously consider the trade-off between features and performance. Shopify provides some tools that allow brands to detect performance damage, and we plan to continue improving them to support their app choices in the future.

Javier Moreno
Data Science Manager, Shopify

Case study

Emazing Group

The [Emazing Group](#) is the parent company of a trio of leading lifestyle brands. It worked with its internal tech team and [outside agency partner](#) to improve site performance. Specifically, The Emazing Group improved its lazy loading times to make sure above-the-fold content loaded instantly.

The Emazing Group reports:

>3 secs

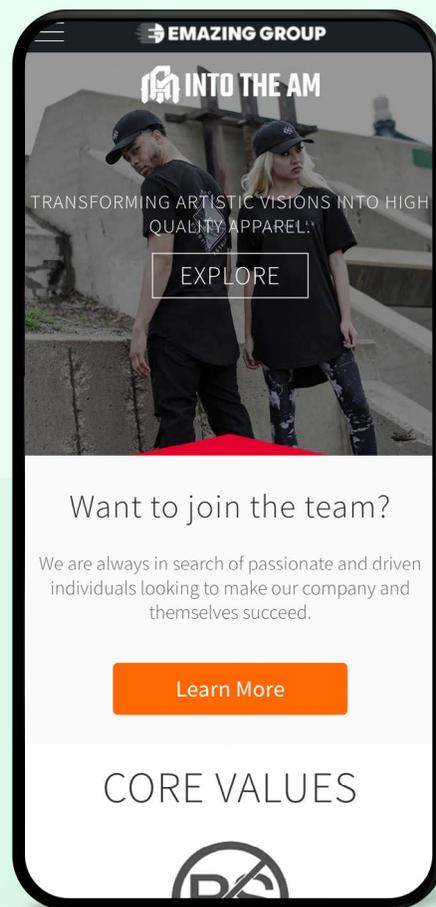
website load time, down from
4.5 seconds the previous year

4.08

increased in conversion,
from 2.45% the previous year

4.13

mobile conversions,
from 2.45% the previous year



“The biggest gain for us has been controlling loading priorities for different elements on each page. We would prioritize anything above the fold to give the illusion that the site is very fast.”

Bran Lim
CEO and Founder, The Emazing Group

The impact of speed on your bottom line

The faster your site, the better you can serve customers. That includes people abandoning slower competitor sites. A [research report by Deloitte](#) found a 0.1 second increase in site speed increased conversions by 8.4%. Those consumers spent almost 10% more in a single fast-loading session.

Don't underestimate customer expectations.

When it comes to site performance, [expectations are high](#):

64%

of customers who are dissatisfied with a site are less likely to return

46%

will do the same after just one bad experience

1 in 4

who are dissatisfied with their site visit will shop elsewhere next time

It's not uncommon to outgrow the foundation on which you build your business. Likewise, brands often lack the technical expertise needed to optimize infrastructure and marketing assets as they scale.

How Shopify can help

Shopify's new [accelerated checkout](#) boasts a 64% better conversion rate than our previous checkout. Shops with Shop Pay see an extra uplift of 10%.

Beyond DIY optimization

Improving site performance requires difficult trade-offs. Design sacrifices that improve speed can take away from the user experience. The reverse is true as well. What you can do must be balanced with what you should do.

The key advice is to remember that real user experiences can tell you much more about your website's performance than a single test in time. If you're not tracking real user data, then you're missing out on a wealth of information.

In the real world, so many variables can change how your website performs. These include the device, browser, internet connection, and location. You may make changes that you think will improve speed, but those changes will not be reflected in real user data, because of the variability beyond your control.

So let the real-world data guide you, and link site performance to financial performance. Test for yourself the impact a one-second change in load time has on revenue.

Finally, remember: the path to a fast website is a long game.

If you'd like help on your journey, talk to one of our web performance experts today.

**Ready to speed up your website and boost sales?
Talk to one of our site speed experts today.**

