



# 5 Ways to Supercharge E-commerce Website Performance



Gatsby

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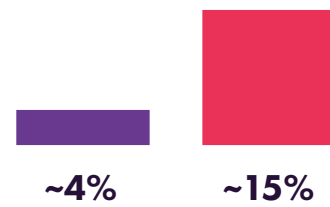
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Over the past decade, e-commerce has grown from ~4% of total US retail spending to ~15%. This growth is expected to continue and the majority of consumer spending will someday be done online. Given this scale of growth, it makes sense that e-commerce is one of the most competitive industries. E-commerce companies like Walmart, Amazon, Shopify, and Square are constantly innovating in order to gain more market share. As such, e-commerce tools, plugins, platforms, APIs, and frameworks keep evolving in the quest to please marketers, developers, and ultimately, consumers.

Amidst all this innovation, there are five recent and important ways that e-commerce companies are supercharging their websites. These include adopting technologies and web development patterns like server-side rendering (SSR), progressive web apps (PWAs), content delivery networks (CDNs), dev tools like React/GraphQL, and the headless e-commerce pattern (which decouples the back-end CMS with the front-end presentation). These technologies are helping e-commerce companies increase conversions, decrease bounce rates, delight shoppers, simplify scaling, improve security, and keep their developers engaged.

This ebook will explore the ways that e-commerce companies are making their websites faster, better, more user-friendly and more profitable. We'll dive into why e-commerce companies are migrating away from monolithic CMSes like WordPress and Drupal, which can do everything but very little well. We'll explore how companies are leveraging static sites, server-side rendering, and content delivery networks to improve site speed, conversions, search-engine ranking, and scalability. We'll cover why companies are migrating towards modern web development tools like React and GraphQL. We'll examine the 'headless e-commerce' trend, which allows companies to integrate multiple best-in-class services (e.g. Shopify, Contentful) and APIs into the best possible experience for their customers. We'll see how companies are incorporating progressive web application (PWA) patterns to improve conversions and user experience. Finally, we'll cover how Gatsby incorporates all these technologies and patterns into one coherent framework.

## E-commerce growth over the past 10 years



Over the past decade, e-commerce has grown from ~4% of total US retail spending to ~15%

## Optimize site speed for better search ranking and conversions

Site speed is especially important for an e-commerce website. Fast websites get better conversions, lower bounce rates, and better SEO rankings. As an example, **Youfit Health Clubs** is one company that overhauled their previously slow website in order to improve their search ranking and performance.

Site speed and bounce rates directly translate to revenue gained or lost for e-commerce sites. Sites need to load quickly or shoppers will look elsewhere. 53% of mobile users will abandon sites that take longer than 3 seconds to load (according to a 2016 report by Google). Google has also openly declared that site speed is a search ranking factor. E-commerce companies are using a variety of development patterns to increase their site speed. Faster site speed often leads to better conversions, lower bounce rates, and higher SEO rankings.

But it's not easy to build a fast site with a CMS like WordPress/Drupal or a SPAs built with Angular/Ember. With a few too many scripts, large images, DOM re-painting, or plugins, it's easy to bog a site down.

Youfit is an example of a company whose slow website was hurting their conversions and revenue.

Youfit Health Clubs are redefining how people approach health by creating an inclusive, affordable gym environment that welcomes everyone. Founded in 2008 by Rick Berks, Youfit has more than 100 locations across 14 states. Youfit's website is an important source for lead generation and their previous slower site had a bounce rate of 60%. They were also getting punished by Google for slow loading pages (some pages took up to 22 seconds to load!).



**53% of mobile users  
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seconds to load**

A significant portion of the Youfit traffic comes from new visitors and these issues were causing them to bail before they even had a chance to see who Youfit really was AND miss the opportunity to fill out a form for a free trial. Youfit badly needed an overhaul.

They decided to use Gatsby for the rebuild due to its proven track record of building blazing fast sites which ended up increasing their lead conversion rate by 60%. Since the relaunch of the website, they've also experienced: a 22% increase in organic traffic, an immediate 10% decrease in bounce rate, and a 60% increase in lead conversion rates as more people signed up for a free trial.

Prior to the website rebuild, Youfit viewed their website as an "add-on" because the team did not see it as critical to the success of the company. But now that they are experiencing first-hand the benefits of Gatsby, their website has become a primary channel for lead generation.

**“ We are very happy with the results so far, especially the 60% increase in leads. The website went from a burden to a strategic tool we use to capture leads and generate ROI.**

**Zach Muha**

Director of Digital Marketing at Youfit



**22%**

**22% increase in  
organic traffic**



**60%**

**60% increase in lead  
conversation rates**

## Simplify Scalability with Static Sites + CDNs

“ **We’ve had thousands of concurrent users on the site at once with no scaling concerns and zero performance impact.** ”

Scalability is a major concern for any e-commerce company or website but it can be challenging to get it right. E-commerce companies like **Harry’s** are serving their product pages as static markup hosted on Content Delivery Networks (CDNs) to deliver content faster and make their sites more scalable.

Many e-commerce sites use Monolithic frameworks like WordPress and Drupal, which need to be hosted on a server. If a server experiences a large spike in traffic, perhaps during a successful launch or promotion, it can crash and cost thousands (or more) in lost revenue. Properly scaling servers to handle occasional traffic spikes becomes complicated and resource-intensive. High-traffic sites that use WordPress and Drupal will often cost thousands to host every month.

CDNs are used by most high-traffic websites (e.g. Facebook, Reddit) to host static assets like images or fonts. CDNs handle large traffic spikes well, deliver content quickly to a user, and cost a fraction of what servers do. With a static site, all files are hosted on a CDN, making them inherently more scalable.

Early ‘static site generators’ were initially used for static landing pages and ‘brochureware’ sites. These sites are fast and cheap to host. But if developers wanted to add dynamic or stateful functionality, this ‘static-ness’ was a major barrier. And so e-commerce developers would use CMSes like WordPress for some sites and static site generators for others.

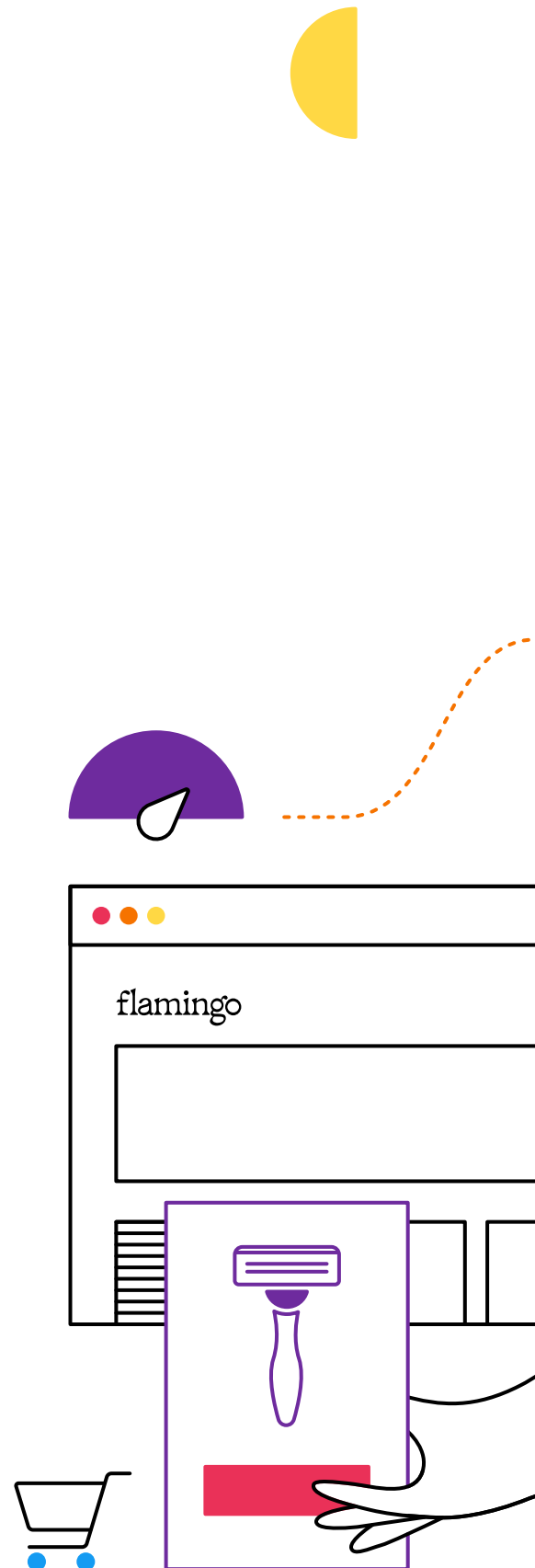


There are now several frameworks, like Gatsby, that allow static sites to take on dynamic functionality through the use of APIs. This paradigm is sometimes called the JAMstack (**JavaScript, APIs, and Markup**). JAMstack sites offer the best of both worlds: the speed of static sites while still allowing for dynamic functionality (like an e-commerce shopping cart). This clever combination of technologies is changing web development and e-commerce as we know it. Harry's is one example of an e-commerce company that is leveraging these technologies to the fullest.

Harry's was founded in 2013 with one simple premise: 'Every man deserves a quality shave at a fair price'. Harry's also serves over one million female customers and their engineering team wanted to create a brand and shopping experience tailored to women's specific needs. After years of research, the team put their expertise and technology towards a new brand, **Flamingo**, that makes body care and hair removal products designed specifically for women. Shopflamingo.com went live in October 2018 with thousands of users visiting the new website and hundreds of thousands of page views in the first week. The launch triggered the need for an optimized website with performance built-in.

**Shopflamingo.com was built with Gatsby**, is deployed via CircleCI to Amazon S3, and served via Fastly's global CDN. The Harry's team configured Fastly and S3 to ensure users are getting the most updated cached version of the site. Flamingo's content is stored in Contentful where a webhook will trigger a new build should that content get updated or changed. A Gatsby plugin called **gatsby-source-contentful** allows Harry's developers to pull in Contentful's data into their React components via GraphQL queries.

Flamingo's architecture is extremely scalable. "We've had thousands of concurrent users on the site at once with no scaling concerns and zero performance impact," said Tim Brown, a Senior Software Engineer at Harry's. The site gives users an elegant, visually-stimulating, and fast-loading shopping experience. The site has all the speed and scalability of a static site while featuring a dynamic and modern online shopping experience.



The Harry's team believe that [shopflamingo.com](https://shopflamingo.com) can be a model for how to architect other e-commerce sites. All of their developers' blog posts and tweets beam with pride about their creation.

A few days after implementing basic SEO data on the site, Harry's marketing team noted that ShopFlamingo's Google search ranking improved and they were quickly the top result for all of their branded terms with no outside consulting.

### THREE

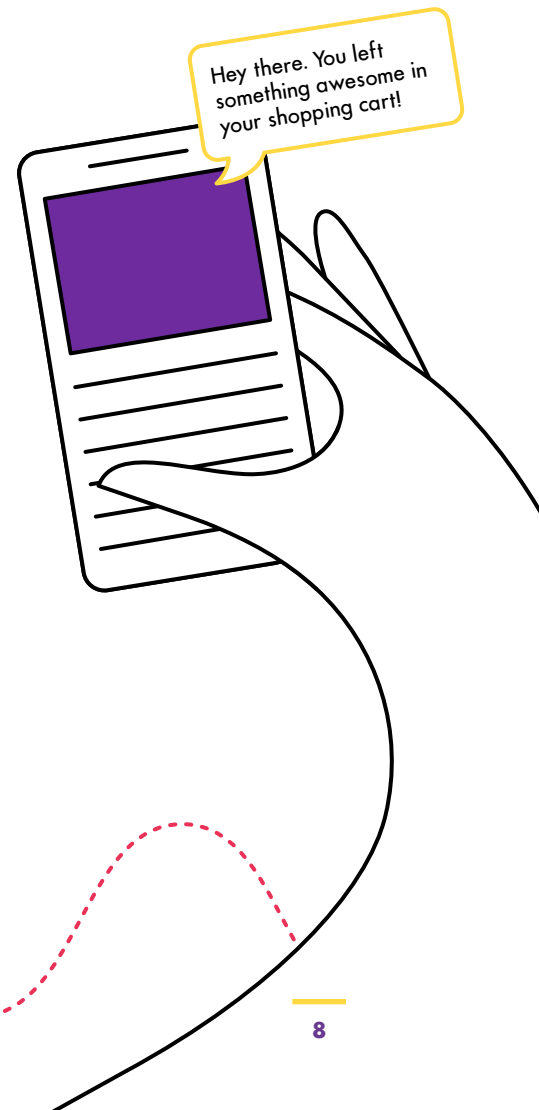
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## Leverage PWA patterns to engage users

E-commerce companies are adopting PWAs (Progressive Web Apps) in order to make mobile shopping faster and more engaging. PWAs aren't the easiest to implement so companies are choosing tools that do the heavy lifting for them.

PWAs are one of the most exciting recent innovations in e-commerce. In an era where few people want more apps on their phone, PWAs offer a native-app like experience within the mobile browser. PWAs load quickly and work well offline or with poor signal. They can be saved to the home screen and offer notifications like 'Hey there. You left something awesome in your shopping cart!'. PWAs are SEO-friendly and easy to monitor with conventional web analytics. Google calls PWAs "Reliable, fast and engaging." The inventor of the PWA term, Alex Russell, says PWAs are "Just websites that took all the right vitamins."

E-commerce companies like AliExpress, Starbucks, Tinder, Uber, Housing.com, and Carnival Cruise Lines have all launched PWAs and seen significant improvements in conversions and engagement. For companies needing to serve users in places with spotty 2G/3G connections, PWAs can mean the difference between reaching those users or not.





PWAs also save smaller companies from having to recruit scarce Swift/Kotlin mobile development talent, as PWAs are built with web development languages.

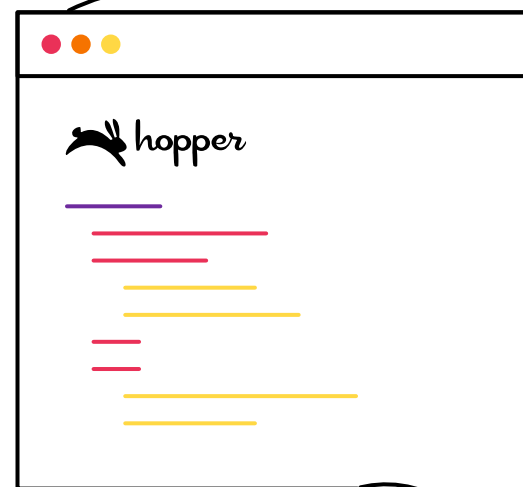
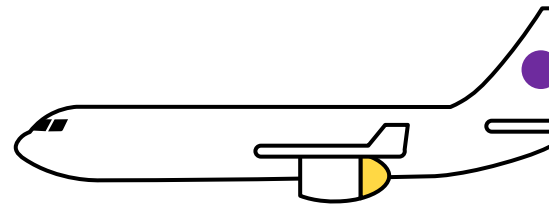
Building this type of website (a PWA) and giving it the right vitamins is no simple exercise. If getting a site to load 2-8x faster were simple, everyone would do it. Thankfully, like most development tasks, you can use a framework. Gatsby was created to make PWAs easier to create.

Here's Gatsby founder, Kyle Matthews, reflecting on this in an interview in 2017:

**“Google does a lot of research about how to make fast websites, and PWA is sort of an umbrella term for these patterns. So with Gatsby, we just asked ourselves, why not bake these patterns and all these things that make a website fast, into a website framework?”**

Vancouver-based **Narative** is one agency that leverages Gatsby to build PWAs for their clients. Narative builds software for a variety of companies and startups. They recently used Gatsby to build a refreshed version of **Hopper.com**, a leading travel booking app. In their technical write-up on this process they describe the ease of using Gatsby versus trying to roll their own PWA. “Gatsby handles a lot of the complexity of delivering a fast website for you. There are new performance standards built into it; we don't have to worry about code splitting, service workers/progress web app capabilities, server side rendering, asset optimization, and basic security.” They also like the site speed gains that Gatsby provides.

**“Great performance out-of-the-box is a huge win. Our team does not have to focus on these optimizations anymore. Instead, we focus on telling the story and building the values of our partners into our websites and web apps.”**

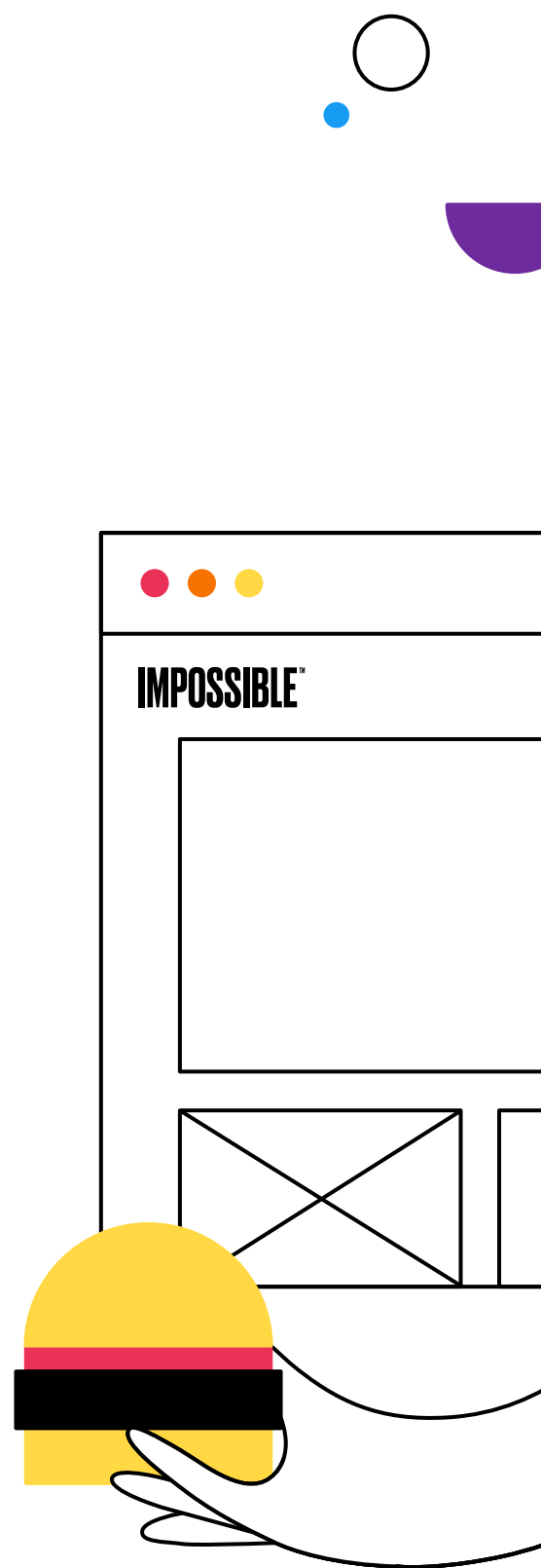


## BYOC: Bring your own content with seamless integration

Building a modern e-commerce website involves seamlessly combining data and content from multiple best-in-class services. E-commerce companies like **Impossible Foods** are starting to leverage tools that will facilitate this.

We seldom stop to appreciate just how many content and data sources an e-commerce website needs to incorporate into a coherent website experience. The main landing and content pages will likely pull data from a CMS like WordPress or Contentful. The jobs or human resources pages will be updating job listings from a service like Greenhouse or Lever. The product listings might be managed with a service like Shopify or Square. The FAQs and help pages will need to be updated and managed by the support team (and whatever help software they use). The list goes on. Pulling all this content and data into an integrated user experience is a challenge. Failing to get this right can easily lead to lost revenue, disgruntled customers, and missed recruiting goals. Monolithic CMSes like WordPress can often do a lot of these tasks. With a score of plugins, custom post types, and custom fields, WordPress can be bent to the will of the developer to do a lot. The problem is that even if WordPress can do a lot, it still can't do a lot very well. WordPress sites with a lot of robust functionality can quickly become brittle messes of plugin hell. Impossible Foods is a company that was struggling with just these sorts of challenges with their original website.

Impossible Foods, famous for their meat-free Impossible Burger, has been experiencing rapid growth since their founding in 2011. The first Impossible Foods website featured static content pages with limited functionality. The Impossible Foods teams had to reach out to a contracted developer anytime they needed to change content, code, or copy.



Their products locator functionality (which helps people find out where to try the burger) wasn't getting updated frequently enough. That was causing them to miss out on potential revenue and new customers. They knew they needed a new website that would support their growth.

The Impossible Foods website 2.0 integrates Contentful, Shopify, Gatsby, Airtable, Mapbox, and many other services into a best-in-class website that delights multiple stakeholders. Contentful and their module-based page building system allows non-technical users to update and author the pages they need. An integration with Shopify allows their B2B customers to order point-of-sale and point-of-purchase materials. The recruiting and support teams' software integrates seamlessly into their careers and faq pages. Their locator map is constantly updating from an Airtable data source that tracks where Impossible Burgers are sold. This makes it easy for people to find where to try or buy their burgers. The new site has directly impacted measurable marketing metrics. They have increased unique users by 61%, sessions by 62%, pageviews have increased 92%, and locator visits by 26% compared to the same quarter a year prior. Furthermore, their new website allows them to continue to grow and diversify their product offering. It will allow them to internationalize the site as they enter new markets and expand their e-commerce offerings as they get closer to selling direct-to-consumer. Above all, the new Impossible Foods website allows them to foster a culture of testing new ideas and learning quickly, one of their core values.



# 61%

**61% increase in unique users to the Impossible Foods website**



# 92%

**92% increase in page views on the Impossible Foods website**

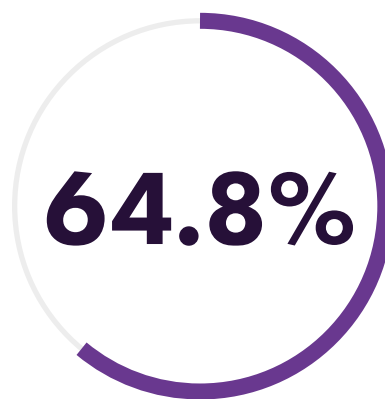
## Leverage modern tools like React and GraphQL

E-commerce companies are increasingly building their sites using modern development tools like React and GraphQL. This makes it easier to build an amazing user experience while keeping developers engaged.

If it can be said that ‘software is eating the world’, then it could also be said that ‘React is eating web software development’. Over the last couple years, React has taken over web development and popularized an intuitive API for building user interfaces. React’s community is extremely active and there are many powerful and well-maintained React-related libraries that handle all sorts of things like testing, maps, user authentication, chat, and more. The **2018 ‘State of JavaScript’ survey report** found that 64.8% of developers had used React and wanted to use it again. StackOverflow’s 2019 developer survey found that React was the most-loved framework in use. React has drastically improved web development and most developers enjoy working with it. Gatsby builds upon React’s strengths and helps React developers build faster apps, embrace PWA functionality, SSR, and more. The Couch, a web development agency, has fallen in love with React and Gatsby and what it allows them to do for their e-commerce clients.

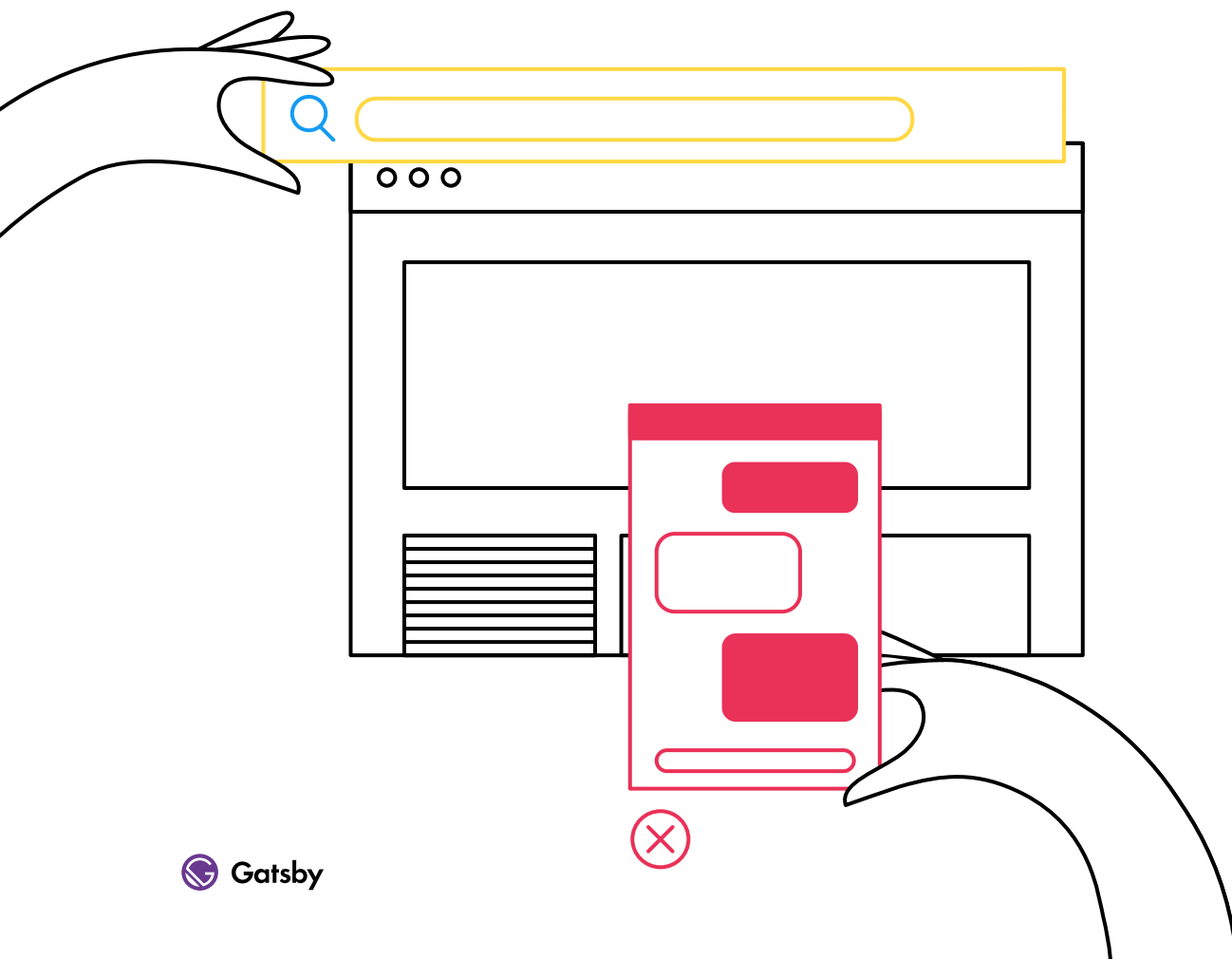
**When Prima, an L.A.-based Cannabidiol (CBD) oil company, chose The Couch for their new site**, their focus was on providing educational materials to their customers to help them better understand CBD. In addition to e-commerce, the site would need to include extensive written content and imagery, including 40 pre-written articles, a glossary, and a recipe collection. “They came to us with a flood of content—something we’re not really that used to,” said Kevin Green, Co-founder and Lead Engineer at The Couch.

Faced with a content-heavy project, Kevin considered his options.



**64.8% of developers  
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Rather than entrusting Prima's content to a monolithic CMS—and risk slow loading times and an unhappy development experience—Kevin's thoughts turned to a more modern solution: "Knowing this was going to be a super content- and image-heavy site, I wanted to build it static from the get-go." By serving Prima's content as static HTML, Kevin knew he would dramatically reduce the site's loading time. His positive experiences with Gatsby on three previous production sites made him confident that it was the right tool for the job: "It's hard for me to go any other route at this point. If I can go static, I'm always going to go static, and Gatsby's going to be one of my top choices indefinitely." After years of building projects with traditional tools like Docker and WordPress, Kevin experienced a dramatic productivity boost after switching to Gatsby and the headless ecosystem. Using Gatsby and a combination of various microservices, Kevin can now build sites with complex functionality in half the time he used to: "I built a large system with countless modules, multiple content models and search functionality that's already prepped for e-commerce...that's something that used to take me double the time."



The Prima launch was a big success and the site is now enjoying healthy traffic and organic growth thanks to enthusiastic supporters on social media: “They were thrilled. They’ve gotten a super warm reception,” Kevin reported. In particular, users have noticed that “the site is super fast and the experience is really smooth”—no small feat for a content-heavy site like Prima’s. After initially launching with its educational content only, Prima’s product line has been added to the site this spring, powered by Gatsby’s e-commerce integration with Shopify.

Shyamal Ruparel, a Developer Advocate at Contentful, summed up the modern web developer’s needs quite succinctly, “ We don’t really want to develop in WordPress or Drupal UI-kit anymore. We want to develop in React and Vue. We don’t want to use the out-of-the-box forms or search. We want to use things like Algolia for search and Auth0 for auth because these services have emerged as best-in-class.

“ **The traditional full-stack CMS does everything, but not a lot of that well. When we’re working for clients or for a company that wants to distinguish themselves, we don’t want just a generic website. We want something that stands out.**

## Static pages improve security

A website hack can be seriously damaging for an e-commerce company. This damage can include lost revenue (due to being offline), loss of brand trust and reputation, and legal challenges associated with stolen customer payment or personal data. Static sites make it easier to build safer e-commerce sites.

The attack surface (on a website) is the complete set of vulnerabilities or entry points that exist in that system. Server-hosted sites that use a monolithic CMS have several prominent attack surfaces. First are the servers, which need to be constantly patched and updated to remain secure. Next are the plugins. Plugins are very easy to install but much harder to maintain (and keep secure). Tens of thousands of WordPress sites are taken offline each month by plugin hacks. Next are the login/admin pages (e.g. /wp-admin), which are susceptible to brute-force attacks. Finally, there are attacks like SQL injections and XSS attacks. The dynamic nature of server-hosted monolithic CMS sites makes them more vulnerable to attacks than static sites.

Static sites feature no server-side scripting and they are served on a CDN with read-only access. Static sites are not invulnerable (e.g. from things like a DDOS) but they are inherently more secure.



# Conclusion

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We are in a new era of e-commerce development. E-commerce developers, agencies, startups and product teams are using new technologies like the JAMstack, CDNs, PWAs, dev tools like Gatsby, CMSes like Contentful, and several other leading-edge tools to make e-commerce sites easier to use, more fun to build, and better converting. The companies who are willing to experiment and innovate with these new technologies stand to increase their conversion rates, delight their customers, beat their competition and ultimately grow their revenues. Gatsby makes it simple to leverage all the best practices and patterns to build a modern and high-performing e-commerce website.

If you'd like to learn more about using Gatsby and take your e-commerce site to the next level, learn more at [gatsbyjs.com](https://gatsbyjs.com).