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Ecommerce Infrastructure



Your homepage is like the front door to your online store — it should be inviting and easy to update with fresh products, announcements, and resources that resonate with your customers. Just like changing your door decor, keeping your homepage updated is key to maintaining an appealing online presence.

But an attractive storefront only gets you so far. If what's behind the scenes — like the speed, functionality, and user experience — is lacking, visitors will quickly leave. This disconnect between appearance and functionality can hurt your business, no matter how polished the homepage looks.

To avoid this, merchants need to embrace digital transformation. By adopting marketing automation, AI, and strengthening ecommerce infrastructure, you can create a more efficient, secure and scalable online store.

At the core of this transformation is your ecommerce infrastructure. It’s the backbone that supports everything from system integrations and payment gateways to customer management and uptime reliability.

What is ecommerce infrastructure?

Ecommerce infrastructure represents the core framework that makes online sales possible, bringing the efficiency needed to run your ecommerce system and process orders online. At its heart, this system combines the hardware, software and tools that allow retailers to sell goods online and track sales from start to end.

The setup spans from the homepage that buyers see to the backend systems that process payments, manage inventory and implement security measures. In a perfect world, this framework operates as one.

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Components of an ecommerce infrastructure

A healthy IT ecosystem is a complicated network of disparate parts working as one. Ecommerce platforms have additional components and APIs unique to your business needs.

Web server architecture.

Web servers store data and enable users to access your website. They host websites, manage operating systems, store content and send data to users. They are the backbone of content management systems and the overall customer experience.

API management and integration.

Modern ecommerce platforms rely on various third-party integrations, and effective API management ensures smooth communication between services, e.g., payment gateways, shipping services and marketing tools.

Comprehensive shipping and order fulfillment solutions.

These are relatively unique to ecommerce companies. A robust shipping and fulfillment solution is complex and involves integrations with multiple systems. However, the result means that products are delivered quickly and sales are completed.

Efficient inventory management systems.

It's important to know what the business has on hand and when new products must be ordered — something that realistically can't be done manually. A well-integrated inventory management system pays for itself by maximizing warehouse and storage costs.

Database management systems.

Ecommerce companies have numerous databases and software applications that can become massive the more consequential the company becomes. Having a central solution that manages, optimizes and retrieves data quickly and efficiently keeps sites moving and customers shopping.

Shopping cart systems.

Friction in the shopping cart experience can mean the difference between making a sale and not. A quality solution that provides transparency around shipping times and total cost can improve conversion rates.

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Secure and scalable payment processing.

Limiting the ways customers can pay reduces the chance of completing a sale. Having a payment service provider that makes it easy to securely pay how they wish increases revenue. Any solution should meet industry security standards and be able to scale up during heavy traffic times.

Reliable backup systems.

Backups are an insurance policy. You hope you don't have to use it, but you'll be thankful to have it if you do. Backup solutions protect you in case of malware, ransomware, or even human error.

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Common ecommerce infrastructure roadblocks

Building an IT ecosystem is highly complex, not to mention the unique aspects of ecommerce that bring different challenges. These are common roadblocks that can slow your project:

Integration challenges with other systems.

An ecommerce website is typically integrated with multiple other SaaS systems, from payments to logistics to social media. Sometimes, these systems work harmoniously together, and everything works as it should — and sometimes, they don't. For instance, a payment system might not sync properly with your inventory management system, leading to discrepancies in stock levels.

Developers must find workarounds and patches to get everything working when this happens.

Scalability issues.

If a site succeeds and experiences customer and traffic growth, it must have infrastructure capable of load balancing to meet that demand. The alternative is an ecommerce website that's slow, unresponsive, and makes it harder to complete sales.

Technical debt.

Builders have a saying: Measure twice, cut once. This sentiment applies to technical debt. Making compromises for short-term gain is like stacking code on top of outdated code. It will catch up with you, and fixing subpar code will become expensive the longer it goes untended.

Technical debt can also lead to bugs, crashes and poor performance, impacting customer satisfaction. As your website's business operations expand, paying attention to compounding technical debt will reduce these negative impacts. That's why you want to audit your ecommerce infrastructure regularly.

Security challenges.

Security challenges are a critical concern for online businesses, as they involve protecting sensitive customer data and financial transactions.

The evolving nature of cyber threats and the potential consequences of security breaches make it essential for ecommerce platforms to address these challenges effectively through strong firewalls and security standards.

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Issues with payment gateways.

Payment gateways that have issues accepting payments encourage customers to visit your competitors. All gateways should take multiple forms of payment, meet industry security standards, and reduce friction in the checkout process.

Complexities of global ecommerce.

Omnichannel selling across borders can be complicated, with laws and taxes varying from country to country.

Best-in-class payment and logistics solutions can remove some of the challenges. However, business owners and leaders still need resources fluent in global ecommerce to help shepherd the business through the process.

Supply chain management issues.

Supply chains are highly complex systems, with multiple parts reliant on each other to operate effectively. An issue with one can impact all. If you're a manufacturer, this goes double. Having an optimized and efficient supply chain is vital.

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Maintaining an ecommerce infrastructure

It's not enough to just build a foundation. Ecommerce infrastructure requires constant updates and maintenance to ensure the site operates efficiently. Having resources, both in-house and outsourced, is essential.

Schedule routine infrastructure checks.

An ecosystem should have end-to-end real-time monitoring to perform regular health checkups. If hardware is near failure or two pieces of software aren't interacting correctly, these checks will catch them before they negatively impact performance.

Necessity of a backup system.

Hope for the best, but be prepared for the worst. Scheduling regular backups will protect web pages in case of emergency.

Maintain compliance with ecommerce regulations.

Laws and regulations related to ecommerce, payment, and other associated functions are in constant flux. From security to privacy, online stores should ensure that their tech stack meets all pertinent standards.

Manage unexpected downtime.

Downtime is deadly to an ecommerce platform, but it's something that could happen. Having automation processes in place to react to an emergency will reduce the time the site is down.

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How to choose the proper ecommerce infrastructure

Recommendations from other merchants regarding ecommerce infrastructure serve as a starting point. Review sites provide additional insights. However, nothing surpasses understanding your unique requirements and conducting your due diligence.

Identify your business needs.

Different ecommerce infrastructures serve various business models, so analyzing your requirements remains crucial. Examine your business size and growth goals, and prioritize scalability, security or speed.

Assess scalability requirements.

Your infrastructure should grow alongside your business. Seek load balancing, auto-scaling and cloud-based infrastructure to handle traffic spikes and accommodate expanding product catalogs.

Examine security features.

Security plays a critical role in infrastructure selection. Seek PCI DSS compliance, strong firewalls, encryption, real-time threat detection, and automated patching to safeguard transactions and protect customer data.

Review integration capabilities and API support.

Seamless integration with third-party software is crucial for a functional ecommerce platform. Verify your infrastructure supports API-first architecture to connect with payment gateways, inventory and order management systems and other tools.

Prioritize performance and speed.

Website performance impacts user experience, particularly during high-traffic events. Consider Content Delivery Networks (CDNs) and caching strategies to guarantee quick load times and enhance mobile responsiveness.

Analyze budget and cost considerations.

Cost implications shape infrastructure decisions. Compare upfront costs against cloud-based pay-as-you-go models and calculate the total cost of ownership, including maintenance and

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updates.

Review support for unique use cases.

When your business spans multiple channels or countries, your infrastructure must accommodate these needs. Seek solutions incorporating different sales channels and managing global requirements like numerous currencies and tax laws.

Evaluate vendor reliability and customer service quality.

Select a vendor who demonstrates reliability and exceptional customer support. Research technical support availability and confirm the vendor's experience with businesses matching your size and industry.

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BigCommerce can support your ecommerce infrastructure

A partner ecosystem should help you innovate and succeed without limits. That's why we only include best-in-class ecommerce technology providers, designers, developers and marketers to fill any gaps you may have in teams, time or tech.

Trusted cloud infrastructure and scalability.

Hosted within Google Cloud Data Centers in the US, BigCommerce handles all your scaling needs behind the scenes. From server updates and patches to load balancing, you can focus your energy on growing your business instead of managing servers. Even during peak seasons and flash sales, your store stays lightning-fast with plenty of backup power ready to handle sudden traffic spikes.

Google Cloud's built-in multi-layer shields and round-the-clock guards protect against threats. Each store gets its own secure data vault, helping block cyber attacks so your site stays online no matter what.

Security and compliance measures.

Rest easy knowing your customers' payment data is secure. As a PCI DSS 3.2 Level 1 certified platform, we meet the highest safety standards in online payments. Our vigilance saves you time and money by simplifying compliance while keeping your shoppers' data locked down.

With BigCommerce, you can focus on growing your business while we handle the complex work of keeping it secure.

Your business deserves bank-grade security, so we've earned PCI DSS 4.1 Level 1 Attestation of Compliance, ISO/IEC 27001:2022, ISO/IEC 27701:2019, ISO 22301:2019, ISO/IEC 27017:2015, ISO/IEC 27018:2019. This gold standard proves our commitment to keeping your store safe through constant testing and updates to stay ahead of new risks.

Seamless API integrations and customization.

You can build your new functionality with an API architecture that allows developers to create custom solutions to complex problems. Experience remarkable flexibility, allowing for custom checkout solutions, inventory management, and integrations with third-party tools.

Regardless of how complex your infrastructure setup is, we can help you tailor a solution together. It's like having the keys to a powerful tool that can adapt to your unique needs, giving you the control and power to shape your online store as you see fit.

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Headless commerce for flexibility and customization.

Piggybacking on our API-driven architecture is our headless commerce capabilities. You have the flexibility to create custom, cutting-edge user experiences. Within the headless commerce platform lives a powerful middleman, allowing complete control of the frontend without affecting mission-critical functionality.

Your marketing team can update web copy and upload product images, and the inner workings of all your infrastructure remain untouched. Merchants can plug and play custom storefronts without the risk of anything breaking.

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The final word

While it may not be as flashy as the customer-facing parts of an ecommerce website, the underlying infrastructure that powers it is critical for long-term success. The backend systems — from database servers to API integrations and security protocols — form the foundation for smooth operations, scalability and reliability.

Being thoughtful and looking years down the road will set ecommerce stores up for success now while also future-proofing the site. Smart architectural decisions made early on can prevent costly overhauls and system migrations down the line.

Significant resources — financial and human — should be spent to set up a healthy and effective IT ecosystem.

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FAQs about ecommerce infrastructure

Can legacy systems be integrated with a modern ecommerce infrastructure?

Yes, you can integrate legacy systems with a modern business infrastructure. Integrating legacy systems with modern ecommerce platforms allows the ecommerce business to leverage existing functionalities and data while taking advantage of advanced features. This integration can be complex. It requires careful planning and execution but is feasible with the right approach.

What are the advantages of a good ecommerce infrastructure?

Scalability: A robust system empowers businesses to scale smoothly, handling higher web traffic, more extensive product lines, and growing customer needs. These capabilities will prove vital during peak sales periods and flash deals. Cloud systems enable you to scale up or down without significant hardware costs. Better Security: A solid system incorporates critical safety features like banking-level rules, data protection, network guards, and current updates. This reduces the risk of data leaks, fraud, and cyber threats, protecting business and customer data. Improved Performance and Runtime: A robust system ensures that ecommerce sites remain fast and responsive, reducing load times and enhancing customer satisfaction. Features like load balancing, CDNs, and real-time monitoring maintain website performance during peak times. Seamless Integrations: A well-built infrastructure integrates smoothly with other business tools, like payment systems, shipping tools, CRMs, and sales platforms. This eliminates busy work and provides firms with one place to manage vital tasks. Cost Efficiency: Cloud systems help organizations slash expenses by eliminating the need for big hardware spending and upkeep costs. Firms can implement a pay-as-needed plan, purchasing only the tools they require when they need them.

What factors should I consider when choosing between cloud-based and on-premise ecommerce infrastructure?

There are several factors to consider when deciding between the two. While most businesses seem to have some operations functioning in the cloud, others prefer to manage hardware and software with a dedicated IT team. The choice depends on budgets, growth stage and business needs. Here are factors to weigh: Cost: Cloud-based solutions require an ongoing subscription, whereas on-premise solutions require a significant upfront investment in software, hardware, and IT staff skilled in maintaining and upgrading your infrastructure. Control: With a dedicated IT team, you ultimately control the on-premise infrastructure, which gives you free rein on customization. You are limited by what the cloud solution provider allows, so choose wisely. Scalability: How much monthly traffic does your website attract? Are your products seasonal with

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known traffic spikes? The answers will determine if you would benefit from the superior scalability cloud platforms offer or the less flexible on-premise option. Your IT team must buy and configure additional hardware to ramp up. Time to Market: Cloud solutions can be deployed quickly, allowing for faster time to market. On-premise infrastructure typically takes longer to set up and configure.

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