



TECHNICAL BRIEF

Don't Let Your CDN Get in the Way of Your Continuous Development Needs



Introduction

Today's software developers are writing and deploying code more quickly than ever before, propelled by increasing consumer expectations and an engineering culture that thrives on solving interesting challenges quickly. Just as Waterfall release models gave way to Agile development practices, we are now seeing the emergence of continuous integration and delivery (CI/CD) methodologies, with DevOps and WebOps teams as the primary drivers.

The use of CI/CD is not exclusive to traditional software development and can be leveraged to expedite all aspects of your digital business, empowering both developers and non-technical teams alike. Whether you're a software-as-a-service company updating application logic, a digital publisher posting content to meet editorial cycles, or an ecommerce company executing a flash sale, integration and delivery must be automated and instantaneous to consistently achieve business objectives. Only by accelerating application and web delivery cadences can you meet real-time business, service, and marketing requirements.

The benefits of CI/CD are not limited to business enablement. Another key driver is network security. Your Network Ops teams must constantly monitor the threat landscape, provide insights into application vulnerabilities, and quickly release security updates as needed. CI/CD is the fastest and most reliable way to deploy such updates.

Content delivery networks (CDNs) are widely used to increase web and mobile performance, however legacy CDNs are black boxes that hamper the implementation of CI/CD. As a result, there is a perceived trade-off between the real-time visibility and control needed for CI/CD and application performance across web and mobile platforms.

Fastly changes all that. Fastly is an edge cloud platform that supports CI/CD by extending your infrastructure to the edge, thereby enabling DevOps teams to keep pace with both engineering innovation and the needs of the business. With Fastly integrated into your development environment, you can maintain high-performance web and mobile applications while automatically testing and delivering new content on a continuous basis.

What is CI/CD?

Continuous integration is the process of completely automating code commit and test practices, thereby avoiding a manual workflow that is inefficient and subject to human error. Newcomers to CI may be daunted by the potential error risk associated with frequent code integration. However, CI actually reduces error risk. By integrating code with a common source on an ongoing basis, errors can immediately be isolated, avoiding time-consuming troubleshooting at a later stage.

Continuous delivery goes further. CD is the process of automatically delivering code to a staging or production environment as soon as it's ready to ship. This allows you to deliver updates to your users faster, while creating a feedback loop for continual review and inspection. CD provides instant visibility into how a feature works in the production environment, whether packages install correctly, and whether the delivery process is working as expected.

What is CI/CD?

CI/CD allows products and services to keep pace with engineering innovation and eliminates restrictive release windows that can suffocate responsive business practices. A production-like environment promotes calculated risk management, as any errors can be quickly identified thanks to structured releases. For innovative companies, this development format can ensure a competitive advantage by giving creative technologies a head-start on the rush to market.

Here's how:

- **Accelerate the software release process.** Faster incremental releases allow you to continuously identify new customer use cases that may influence future software updates. You can also discover issues along the way rather than waiting to a complete release, at which point multiple bugs may be intertwined and thus harder to detect and address.
- **Quickly respond to user interaction.** Marketers conducting multivariate testing to see which offers resonate best with customers, ecommerce leaders running algorithms to predict propensity to buy, and digital publishers prioritizing content based on readership activity — all gain the ability to respond quickly to user interaction.
- **Rapidly update content.** For example, a digital media company can push out multiple content releases daily without degrading user experience through added latency
- **Improve security.** DevOps teams can rapidly release bug fixes in reaction to newly exposed security vulnerabilities and provide instant protection for applications and web properties.

Why legacy CDNs get in the way

Legacy CDNs are black boxes that disrupt the CI/CD process by removing control, agility, and transparency of code at a critical part of the development cycle — end-user engagement. Hence most CTOs are resigned to the fact that to gain control over real-time CI/CD they need to sacrifice end-user performance.

Legacy CDNs lack a number key capabilities needed to support CI/CD:

- **Instant configuration.** Pushing configuration changes or rolling back to previous versions require Professional Services involvement and are subject to aggregated release queues that force customers to wait an indefinite amount of time for the CDN to propagate their changes globally.
- **Source code management (SCM) integration.** Without a means of self-testing code to catch preliminary errors before they become integrated, you must wait to merge staged code in the 'push to production.' This runs the risk of deploying configuration errors without the option to retract them for prolonged periods.
- **Instant invalidation.** Requests to purge stale content or bad code are typically put into an aggregated purge queue, with no way of knowing how long it will take to execute or when it has been resolved. Purge times range anywhere from five seconds to several minutes and there are limits to the number of purges that can be requested per second.
- **Full control via application programming interface (API).** A limited or nonexistent set of APIs prohibits the automated integration between CDN and other software tools.
- **Real-time visibility.** Logs are typically provided in batch format, so it's impossible to monitor performance and get instant feedback.

Embrace CI/CD with Fastly

As an edge cloud platform, Fastly is changing popular perceptions of what a CDN can do. We recognize that forward-thinking CTOs want to locate logic and deliver functionality at the edge to improve application and web performance at a reduced cost. The Fastly platform is designed to meet these requirements while also affording DevOps teams greater control and real-time decision making.

Granular control at the edge

Fastly publishes content to the edge in real time, providing the functionality, speed and scalability to support your CI/CD process. Thus Fastly becomes a highly configurable development tool you can rely on as part of your internal technology stack. Now you can push a configuration change at the edge and see it in production in seconds. If errors occur, you can invoke immediate rollback with version control. You can also instantly purge stale content and bad code, and simplify the process with surrogate key purging, which allows users to purge all related content with a single invalidation request.

For example, suppose a digital publisher needs to make a factual correction to a story or even gets a Digital Millennium Copyright Act (DMCA) takedown notice. Management is livid and demands that the problem be resolved immediately. With a legacy CDN, it may take hours to make and propagate the correction — during which time the publisher remains exposed to potential legal, financial, and credibility ramifications stemming from the error. Alternatively, with Fastly integrated into their platform, the company would be able to make the correction using existing workflows and reflect the change within 150 milliseconds.

Fastly also beats legacy CDNs to the punch when it comes to rapidly updating content. Let's say the digital publisher pushes out news articles as events unfold, frequently and unpredictably. All file names are changed with each release to prevent stale content. With legacy CDNs, readers must download everything, every time — including unchanged content. With Fastly, the publisher can connect with the content system via API, take advantage of granular content structures, and push only those elements that change.

Risk reduction

Fastly offers comprehensive packages for SCM implementation and makes it possible for developers to commit code on their terms. This capability contributes to a disciplined commit process by reducing errors and conflicts while minimizing redundant or non-viable work.

With Fastly, it's easy to set up a staging service with full platform capabilities so that a feature can be tested before being rolled out to the production service that handles actual end-user traffic. There is no limit to the number of Fastly accounts, services, or environments you can implement to align to your development-to-production automated workflow.

A case in point: an online travel company built on Drupal needs a new site for one of its development teams. The DevOps team would like to duplicate the existing rules to ensure consistency across their sites, but they don't want to clone the master branch of their code on GitHub for fear of accidentally introducing legacy code into their production environment cache. Rather than initiate a manual process that can introduce error, the company could call the Fastly API from their CI vendor to automatically pass the existing production rules to the new development site.

We maintain a directory of open source clients written by Fastly and our customers in various frameworks, including Ruby, Python, Perl, Scala, Go, and Node.js, that execute this and other Fastly services. As a result, an increasing number of Fastly customers are integrating Fastly into their Git flow and automatically pushing code to testing, then out to a cloud storage provider, as well as Fastly, once the tests pass.

Our customer GOV.UK wrote and [open sourced a Ruby application](#) that connects Fastly with their Jenkins continuous integration tool and propagates any necessary configuration changes via the Fastly API. By combining Fastly's ability to upload new configurations through the API with regular CI they were able to keep the process of integrating with a CDN and maintaining accountability as easy as if Fastly had been part of their local infrastructure.

Terraform by HashiCorp is another example of a customer that wrote a script to automate the integration between their product binaries stored in Amazon S3 and Fastly. They wrote an internal command line interface (CLI) application in Go that calls on APIs to upload new code releases to S3, generate the HTML and JSON files for publication, and purge selective content. This functionality extends to Terraform's customers, enabling them to similarly automate Fastly and Terraform on S3.

By making Fastly part of your production environment, you can effectively reduce CI/CD risk and ensure end users have consistent, uninterrupted access to current content.

Real-time visibility

Fastly's real-time streaming logs and stats are critical for realizing CI/CD benefits. They allow you to monitor your site's performance and troubleshoot issues as they happen. You can also add conditions around logs, such as receiving alerts when broken links are detected. Fastly logs can be streamed to almost any major logging endpoint, including syslog servers, logging-as-a-service providers (like Sumo Logic, Papertrail, or Logentries), and cloud storage providers (like Amazon S3 or Google Cloud Storage).

Similarly, our real-time and historical stats can be monitored from our analytics dashboard to gauge the health of your systems. You can see stats on percentage of requests per second, hit ratios, errors, miss latency, and global traffic profiles, including traffic spikes and instability. These insights can be particularly valuable during high-traffic events; if there's an issue with your infrastructure, you can quickly identify and fix it, while continuing to serve content to your users.

Not only do we have better visibility than we've ever had before with Fastly's real-time dashboard and real-time syslog, but the Fastly dashboard has become one of our primary indicators that there could be an issue with our platform.



Dale Neufeld, Director of Technical Operations, Shopify

With real-time visibility of app performance and security events you can optimize your platform for a responsive development environment and a better end user experience. For example, the Guardian uses Fastly's log streaming feature as an early warning system to detect issues after changes are deployed on their site. They stream logs to S3 buckets, then parse the logs for robot activity to see if any changes to the site have affected search engine or social bots. Similarly, iHeartMedia monitors and analyzes fine-grained traffic detail by configuring Fastly's streaming logs to pass through Amazon Lambda and into New Relic.

Real-time logs and performance stats also provide better visibility into application vulnerabilities. Since Fastly operates at the edge, we can defend against malicious traffic before it hits your origin, including DDoS attacks. Using this information, we enable you to update and instantly deploy changes to your VCL that will block any security vulnerabilities.

Finally, user feedback is critical for identifying use-case hiccups and determining value. The true value of user information stems from the ability to monitor and analyze user data in real-time. Through real-time logs and stats, Fastly provides a direct line to customer usage and platform health.

Workflow integration via API

Fastly was founded with an API-first approach that makes it easy for our customers to integrate our services directly into their workflows and make them part of their stack. Customers can make any change to their service from either the Fastly control panel or API, including instant configuration changes and invalidation. They can also pull real-time analytics and historical stats from within the API.

With Fastly we can do automated deploys. We commit our VCL into our GitHub repository, then the project gets built and tested in TeamCity and an artifact drops out at the end. That artifact gets unzipped, and the files get pushed out to Fastly. You couldn't do that without having the Fastly API. And someone doesn't have to manually upload twenty files to a browser to make a change. The Fastly API is important so that we have a traceable history of the changes that we've made and we can hook it into our continuous integration.

The Guardian logo, featuring the words "The Guardian" in a bold, serif font.

Matthew O'Brien, Software Architect, the Guardian

Cost savings and efficiencies

With Fastly, you can stop losing valuable engineering time waiting for changes to be implemented. Here's how the typical change process looks on a legacy CDN: First you prepare the new configuration, then have it checked by the CDN vendor's professional services team, then push it to production and wait for it to propagate. Then, if it doesn't take (a common occurrence), push it again. Next you must wait to get a batch of logs. If something broke in production, you will need to roll back the configuration, which can take hours.

This whole process can easily take the better part of a day. Not to mention that potential issues in production will negatively impact end-user experience while you have no visibility on how long it may take to resolve the problem. That means lost productivity and frustrated end users. But even the best case scenario for the legacy CDN is a multi-hour all-hands-on-deck endeavor with no visibility into deployment status. Needless to say, this scenario does not align with CI/CD principles.

Now let's look at the same process with Fastly. With Fastly, you can easily create new services, make configuration changes on the fly, and automatically pass validated configuration settings from development environment to production without human intervention. The configuration propagates instantly around the world. You can confirm that it deployed and see live traffic stats and logs instantly. If a change is needed, you can roll back in mere seconds. That's the power of an edge cloud platform. It's how Fastly enables savings in time and money that can yield competitive advantage, improve customer satisfaction, and directly benefit your bottom line.

We're not just deploying once a month during a maintenance window — we're deploying all the time, pushing new software several times a day. When we make a change that's going to impact our edge tier, we have to be able to see results immediately. With other vendors, we'd have to wait twenty minutes to an hour for changes to go through. Fastly lets us see results instantaneously, all over the world.

Nic Benders, Chief Architect, New Relic



Empower business stakeholders

By automating business processes with Fastly, the business side no longer has to make one-off requests to IT, saving time for IT and empowering business stakeholders to manage their own initiatives. You can write simple scripts into existing platform workflows that automatically call the Fastly API to make immediate changes as the content on the platform is updated by non-technical stakeholders — for instance, executing a flash sale or changing content and its associated URL.

Fastly has released several plugins and extensions that enable such functionality on popular ecommerce and digital publishing platforms. Marketers using our Magento extension are able to make changes to their site from the Magento dashboard that are instantly reflected on Fastly. Similarly, editors using the Fastly module on Drupal can publish and update articles with the confidence that their changes will be instantly reflected across Fastly's global network without having to involve IT.

Our website is very heavy in terms of images — and those images are a part of our brand — so it's critical that we serve content in a matter of seconds. The images are changing constantly and are related to the most recent articles, so we wrote our own API as part of our deployment process for posts. When the editors send new images, we call the API from Fastly and immediately push the new content — it updates our servers immediately. We couldn't do that before, and we love that.

Harry Guillermo, Senior Developer, Fast Company



Easy to integrate

Fastly is easy to integrate into your CI/CD workflow. Customers can simply send a request to Fastly from any programming language or make a raw HTTP request — we're language agnostic. The Varnish Configuration Language (VCL) directory in customer's code version control system contains scripts in repositories that call our API and instantly execute the VCL, updating the customer's configuration and creating a new version. We provide a library on docs.fastly.com.

With endless automation possibilities, Fastly has safeguards, such as syntax checkers, that can flag potential configuration errors before they are deployed. We also offer user-level API keys, so customers can see who modified the configuration, what changes were made, and when they were made.

The best of both worlds

The adoption of CI/CD is on the rise, allowing both engineering and non-technical teams to become more efficient and responsive. Companies with large engineering organizations that face pressure to constantly iterate should insist on an edge cloud platform that uses APIs to automate workflows and execute requests instantly — in effect becoming an extension of their own infrastructure. While switching to CI/CD can be challenging, your CDN should facilitate efforts rather than stand in your way. With Fastly, you get a high-performing edge cloud that offers greater control and real-time decision making.

Go to www.fastly.com/signup to register for a free account and try Fastly for yourself. To learn more about how Fastly can help support your CI/CD strategy, contact Fastly at sales@fastly.com.

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