

Solutions brief

Optimizing a Multi-CDN Infrastructure for Performance



Introduction

A multi-CDN infrastructure has become a standard practice among large content providers and media networks, particularly streamers - this architectural strategy yields better resilience from downtime and outages, enables global scalability, and helps customers enjoy the best possible user experience.

A multi-CDN strategy delivers the key benefit of redundancy (you can think of this as a diversification of risk): with multiple content delivery networks in play, an organization can strategically route delivery paths to sidestep outages, bypass local bottlenecks, and deliver content quickly and with the highest fidelity, thereby reducing the associated risks and costs of downtime. When an organization runs their multi-CDN infrastructure efficiently and effectively, they can guarantee uptime, and can deliver content via the fastest possible route to their customer. Even in an environment where one CDN is strongly preferred for performance reasons, for example, other CDNs can provide peak offload and basic backup on demand. A collective win for both the organization and the customer.

While this approach is neither new nor novel, organizations still struggle to effectively and accurately measure and optimize their CDN performance, thereby limiting their ability to strategically allocate traffic across different CDNs, or make improvements to their processes. Effective use of a multi-CDN approach requires detailed and real-time information about each of the CDNs within the architecture, and the capability to make decisions and work with those CDNs based on access to real-time **actionable** data.

Running an effective multi-CDN architecture is hard! As a strategic partner in the multi-CDN space, Fastly sees firsthand the lack of strategy, accuracy and insights most organizations still grapple with across their complex multi-CDN environments. Orgs often fly blind, making decisions based on poor or inaccurate data, and therefore miss out on enormous cost and performance optimization opportunities. Fastly helps our customers bridge the data and knowledge gap of poor traffic insights, serving as a strategic partner to any multi-CDN infrastructure.

Below, we lay out our reasoning for how optimizing your multi-CDN infrastructure strategically can yield enormous performance benefits across your org and for your customers. So, whether your organization currently operates on a multi-CDN architecture, or you're considering adopting it, keep reading to see how Fastly can be your strategic partner, across vendors and decisions. Yes, even for traffic with other CDNs!

Why multi-CDN

If you already operate within a multi-CDN architecture, then you undoubtedly understand (and already benefit from) its benefits and advantages. Networks can often fail from either mechanical outages or cyber attacks, necessitating a means for lessening downtime risks. When you operate on a multi-CDN infrastructure, you can strategically redistribute traffic to other CDNs within your architecture, so you have no downtime and no degradation to user experience or content delivery. This approach is important for large streaming organizations, where even moments of downtime can be disastrous.

A multi-CDN approach is important for enabling an organization to deliver content to the end user, while also ensuring the highest quality of experience. Orgs enjoy dynamic routing capabilities, which allow the selection of the most performant network, in real-time, based upon its localized performance and capacity. Much like a GPS routes a driver around an accident or traffic on their daily route, a multi-CDN approach helps an organization ensure their content is never stuck in this 'traffic'.

While all of these benefits make a multi-CDN strategy an obvious asset to any organization, how you optimize and manage that architecture is the secret to your success and the ticket to increasing performance.

Why not multi-CDN?

Fastly acknowledges that there are valid arguments for opting to not operate on a multi-CDN architecture.

Multi-CDN:

- Adds complexity
- Requires multiple vendors
- Can have cost implications when managed poorly
- Can be seen as a nice-to-have; when a primary CDN is down, traffic is not blocked - it is still delivered, just at non-CDN performance levels

While all of these multi-CDN 'cons' can certainly give an organization pause, they are all easily overcome with the right strategic partner and strategy in place.

The challenge of multi-CDN

The greatest challenge of a multi-CDN architecture is its complexity and the difficulty in both managing and measuring its success (and weaknesses). Operating a single CDN effectively can be challenging without the right strategic partner - adding additional CDNs into the equation only multiplies this complexity.

Also, some legacy CDN vendors discourage multi-CDN with complex setup or excessive proprietary technology in their integrations. This often leads to excessive professional services costs and vulnerabilities when they go down - increasing the barrier to adding other CDNs.

With end-users expecting the fastest and highest quality content, any lags in delivery, poorly loading pages, or unsatisfactory user experiences easily result in loss of viewership, customers, and reputation. An organization cannot afford to operate within an un-optimized CDN architecture.

Multi-CDN carries with it various challenges; lack of visibility into quality of experience (QoE) issues, inefficient routing across the multi-CDN deployment, and a lack of visibility into vendor platforms. Organizations that rely on multiple CDN vendors for their content delivery need real-time actionable visibility into how they should route content as efficiently as possible, given current circumstances. With messy architectures or lack of cohesive strategy, this requires the help of a third party, whether that is one of the CDN providers themselves, or an alternate organization that offers multi-CDN services.

Often, we find customers lowering traffic allocations or making misinformed decisions based on misconfigurations or bad data. This results in unnecessary and costly alterations to their delivery strategy. We see customers mistakenly identifying performance degradations where there are none - from errors in reporting on poor telemetry.

Ultimately, without a complete handle on your architecture (or a partnership with someone who CAN manage it), you are doing your organization a great disservice from a performance and cost savings perspective:

Ask yourself, does your org have a strong grasp on:

1. The complexity of multiple CDNs?
2. Config errors?
3. Required technical expertise?

If not, a partnership with Fastly might be the answer...

What good multi-CDN optimization looks like

Any multi-CDN optimization effort needs to have the following outcomes and capabilities:

- Cost reduction — With a variety of bandwidths, latencies, and prioritizations available through content delivery networks, content publishers need the ability to shift between low cost, low-priority traffic, and high-cost premium bandwidths.
- Real-time switching — Based on analytics, content should be able to be switched between content delivery networks, even mid-stream, without any degradation in quality of experience.
- Traffic customization for devices — Traffic destined for laptops should have the ability to be configured differently than traffic for phones or smart TVs.
- Easy, comprehensive analysis — Content providers should be able to do A/B testing and the troubleshooting necessary to isolate incidences
- Configure traffic by content type — Any Multi-CDN solution should allow rules that deliver video traffic and web traffic separately, so the two media types can be prioritized by cost and performance requirements.

How Fastly can help

Fastly is uniquely equipped to serve as your strategic partner in optimizing your multi-CDN architecture for performance. All of our largest customers are multi-CDN; over the years, we've found they often lack a strategy for how to measure their CDNs' performance, and how to allocate traffic across different CDNs. We have successfully partnered with many of them, yielding enormous performance benefits.

We sit with our customers and help analyze and evaluate their set up and identify any 'gotchas'. We've seen it all - making it easy for us to help you measure the quality of your users' experience, and provide the visibility you need in order to make informed content routing decisions. Fastly can help provide you with the visibility into local networks, using the context of performance metrics your organization cares about and measures itself against, and help you to make strategic improvements to your architecture - giving you visibility you need.

To get the most out of a multi-CDN strategy, an organization must have visibility into content delivery problems, have low-latency bandwidth enabling them to deliver content at lightning speeds, and the visibility required to make real-time decisions. With multiple vendors, each with their own reporting and dashboards, getting a single source of truth upon which to make necessary decisions can be nearly impossible. If issues can't be identified in the moment, and appropriate

Fastly is intently focused on delivering the best possible performance and uses both proprietary and 3rd party data for benchmarking and assessment. [Google CrUX](#) data provides worldwide perspective, including TTFB (Time to first byte) measurements on sites globally, and Fastly is [invariably the higher performer](#) in this data.

countermeasures taken immediately to resolve them, then an organization is at serious risk of losing out on the performance benefits they should enjoy from multi-CDN.

Fastly can help provide you with the visibility into local networks, using the context of performance metrics your organization cares about and measures itself against, and help you to make strategic improvements to your architecture - giving you visibility you desperately need. Multi-CDN with Fastly as primary and another as hot standby is often the better approach.

CDN chaining with Fastly

If your organization has a multi-CDN strategy, you can still significantly reduce your egress cost and origin load by placing a CDN with great request collapsing capabilities between your origin and other CDNs.

Let's say you use three CDNs - this means at least 3x the data load on your origin which also results in 3x egress cost for you (you have to seed out to each CDN separately). That is if your CDNs have perfect request collapsing capabilities and only one request is served out of your origin to feed all of the POPs of the target CDN. In reality, this number is much higher due to poor implementation of request collapsing in some CDNs.

You should consider placing a single CDN (like Fastly) between other CDNs and your origins to effectively work as a single large shield for your origin. This is called CDN "chaining". By tackling your multi-CDN architecture with a go-between CDN you can enjoy enhanced observability. The intermediary CDN and its associated support teams can help serve as a buffer for issues and provide insight into your entire ecosystem.

Fastly is proud to have one of the best request collapsing implementations in the industry with the lowest possible amplification factors to reduce your origin load and cost. In fact, a recent study found that Fastly customers saw an ROI of 189%* when moving to us for their CDN - a staggering number.

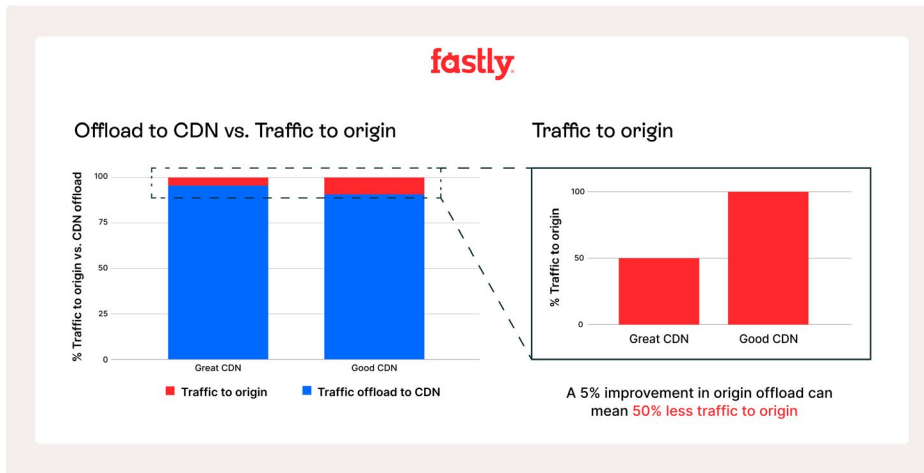
Fastly's CDN chaining offering is called media shield...

Fastly Media Shield

[Fastly's Media Shield](#) mirrors your origin server, taking all requests from the multiple CDNs in your architecture, and serving (responding to) all requests from cache. Essentially, it blocks your origin from being overloaded by redundant requests or an onslaught of requests during traffic surges. Media Shield collapses like requests into a single request to help with origin offload. Think of this service quite literally as a shield; Fastly helps to protect you and your origin, keeping you up and running smoothly.

And this shielding yields big savings: our recent origin [offload report](#) shows how "A 5% improvement in CDN offload performance can mean a 50% load reduction at origin". From only a slight offload improvement, you could be saving a ton of time and money.

Using Media Shield, video on demand and live-content publishers can have fine-grained control over the routing of content and work with multiple CDNs, helping them optimize their usage of the networks, and decrease traffic requirements.



You can learn more about advanced origin offload in [this report](#).

Event calendar with Fastly

At Fastly we carry massive percentages of large event traffic, across the globe. This means we have incredible insight into current and upcoming events, with the capability to predict poor or overloaded days for content delivery. We host events so large that they have regional effects- and we want to be able to educate the market on this! We can offer a consultative role in event planning with our internal blackout calendar.

Conclusion

Without the required technical expertise, internal resources, and bandwidth, navigating a multi-CDN infrastructure alone is making organizations lose out on precious performance optimization benefits. Partnering with a strategic partner, like Fastly, can help unravel the complexity of managing multiple vendors. Our position as a trusted player and adviser in the space can help you feel secure in your journey to optimizing performance- let us help you, help yourself!

Forrester disclosure to include in footer:

*As of December 31, 2022 . A commissioned study conducted by Forrester Consulting on behalf of Fastly, July 2023. Results are based on a composite organization."