Multi-CDN: Understanding real-world drivers, perceived barriers, & operational strategies
An introduction to multi-CDNs

Savvy organizations are starting to rethink how they’ve architected their infrastructure in order to transform the way they interact with their customers. In other words, they want an infrastructure that helps generate loyal customers, not social media complaints. One aspect of your company’s architecture to examine is whether to deploy multiple providers for critical layers of your technology stack. This is because adding redundancies to your infrastructure can help you create faster, more consistent user experiences. Research shows that 81% of enterprises utilize a multi-cloud strategy, and this approach is now moving beyond just core cloud computing workloads. CDNs are a logical part of your technology stack that can benefit from leveraging multiple providers.

To better understand how prevalent multi-CDN usage is in the real world, Fastly partnered with Dan Rayburn — a leading voice and analyst in the content delivery market with deep expertise in video streaming — to commission an online survey of 300+ business and technical decision makers. We wanted to directly ask the leaders tasked with making transformational business changes about the reasons they currently adopt multi-CDN architectures. The research uncovered a number of interesting findings related to multi-CDN benefits, the perceived barriers, and operational strategies. And we’ve gathered the results below to help shed light on how businesses use (or shy away from) multi-CDNs today, and why.

Multi-CDN use is on the rise, but there is still uncertainty around it in the market. Research like this survey helps surface the factors you should evaluate when considering a multi-CDN architecture for your business.

Dan Rayburn

What is multi-CDN?
In single-CDN architectures, the entirety of your site’s content gets delivered over one provider’s network. With multi-CDNs, however, you distribute your traffic across multiple CDNs, which then deliver your content over their respective networks.

Who is using multi-CDNs?

16% currently using
53% planned on deploying multi-CDNs in the next 12 months
31% no immediate plans
Based on our survey of over 300+ technical and business decision makers, one trend immediately became clear: there is significant interest in multi-CDNs. Although a relatively small percentage of respondents said they were currently using multi-CDNs (16%), over half of decision makers (53%) indicated that they planned on deploying multi-CDNs in the next 12 months. These organizations harbor an obvious, growing desire to head toward a multi-CDN architecture. The remaining respondents (31%) said they had no immediate plans for multi-CDNs.

Multi-CDN usage also varies by industry. The broadcast / entertainment industry leads the way, with 26% of these respondents currently using multi-CDNs. Gaming (23%), financial services (20%), publishing (13%), healthcare (12%), and ISP / telco (4%) round out the top six industries currently using multi-CDNs.

Benefits of multi-CDNs

We asked the audience that currently implements a multi-CDN strategy about why they do so, and what they view as the main business benefit for this setup. They identified several different aspects of multi-CDNs as most valuable: cost control (43%) and resiliency (34%) were the top two reasons listed, followed by performance (15%) and scale (8%).
Let’s examine how each multi-CDN benefit can add value to your organization in its own way.

**Cost control**

Adding multiple CDNs to your technology stack can give you more granular control over your delivery expenditure. Many organizations have pre-negotiated commitments with individual CDN providers at varying price points. Once you hit your commitment with the most expensive CDN, for example, you can simply shift your traffic to providers with lower rates. In this case, multi-CDNs serve as a tool to honor your contract terms, while reducing overall content delivery costs.

**Resiliency**

Building redundancies into your architecture using multi-CDNs improves resiliency — in essence crafting an insurance policy to protect you in case a provider has an outage or other operational issue. This helps minimize the impact of any third-party issues on your end users that you have little or no control over.

**Performance**

There are a several different ways you can optimize performance in a multi-CDN context. The first way is by geography. If a provider gets better coverage in a certain area, you can implement logic to send requests from that region to that provider. You can also segment traffic by content type. If a particular provider excels at static content, while another provider is better at accelerating dynamic content, you can route your traffic to maximize performance.

**Scale**

By distributing traffic across multiple CDNs, you can ensure that your applications will scale to accommodate even the most extreme conditions (think Black Friday and Cyber Monday traffic spikes). If you are planning a large live stream, for example, you’ll want a CDN provider that can handle the traffic. But what if your event is so massive (i.e., the Super Bowl, El Clásico, etc.) that you — and maybe even the provider — feel uneasy entrusting one CDN with the responsibility of serving that bandwidth? By spreading the traffic across different CDNs, you can ensure that your event has enough capacity to be successful.

**What obstacles are hindering multi-CDN adoption?**

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<th>Obstacle</th>
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<tr>
<td>too complex</td>
<td>43%</td>
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<tr>
<td>fully outsourced</td>
<td>23%</td>
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<tr>
<td>no budget</td>
<td>12%</td>
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<tr>
<td>no business need</td>
<td>10%</td>
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<tr>
<td>not a priority</td>
<td>7%</td>
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Despite the significant benefits of multi-CDNs, many organizations hesitate in implementing this architecture due to several perceived barriers. Of the respondents who had no plans for multi-CDNs, 43% said multi-CDN was too complex, and 23% said they fully outsource their CDNs. The remaining respondents reported that they had no budget to apply to multi-CDN (12%), no business need (10%), or that multi-CDN is not a current priority (7%). The remaining 5% said they simply don’t know enough about multi-CDNs yet to consider implementation.

Let’s review each of these topics individually to break down the real-world applications, and dispel some common myths within.

**Complexity**
The most common reason given by respondents for not adopting multi-CDNs — complexity — reveals a myth in the market: that multi-CDNs are only for the most advanced organizations. Going from single CDN distribution to a multi-CDN model can seem like an incredibly daunting task, especially since there is limited educational material and very few publicly available reference architectures. But as long as you have a reliable way to route traffic among your CDNs, it should be relatively easy to get started with a simple multi-CDN architecture, which we’ll go into in further detail below.

**Outsourced infrastructure models**
Some organizations simply do not have a need to consider multi-CDNs, since they outsource the management of CDNs to third-party online video platforms (OVPs), like Brightcove, Kaltura, and Ooyala. When utilizing this setup, the OVPs will take ownership of the content delivery workflow, meaning you no longer have to worry about how it is architected yourself. Offloading this responsibility lets you focus on your core competency.

**Budget constraints, no need, low priority, and lack of expertise**
The last four barriers to multi-CDN (budget constraints, no need, low priority, and lack of expertise) are often interrelated, signaling a lack of the appropriate resources to adopt multi-CDN. Some organizations have traffic patterns or business models that don’t require multi-CDN and some could likely benefit from a multi-CDN approach, but have higher priorities or lack the necessary organizational readiness. For businesses that would benefit from multi-CDN, lack of internal expertise or confidence on the topic can create a hurdle to adoption.

**How do you route traffic to multiple CDNs?**

Complexity was the most cited barrier (43%) by respondents who have no plans to use multi-CDNs — but in reality, implementing this architecture doesn’t have to be an intimidating project. To use multi-CDNs, you’ll need an efficient way to route your site’s traffic to different CDN providers. The three routing methods that seem to be the most prevalent among respondents are manifest (54%), player (24%), and DNS (15%) approaches. The remaining respondents (7%) used some combination of the three methods previously listed. For all of these methods, you’ll need to implement business logic that defines how to distribute traffic across your multi-CDN architecture. The main difference between these methods is where the business logic resides in your technology stack.

It’s worth noting that manifest and player routing methods focus on video content delivery, one of the most common use cases for multi-CDN architectures. And quality of experience (QoE) is important for video viewers since it is a good indicator of engagement. For the best possible experience, video needs to be reliably delivered to viewers as fast as possible. And the video files themselves are relatively large, and growing at a rapid pace with the introduction of higher resolution formats like 4K and 8K, so you need your network to scale along with it. For example, in just the past three years, the amount of video content on the average web page has gone from 162KB to over 1.8MB — which is more than a 1000% increase! Taken together, these factors make video traffic a natural candidate for multi-CDN usage.
Let's explore each routing method in more detail to determine when it can be most effective.

**Manifest**
Modern video delivery uses small chunks of video (rather than a single, large file) along with a manifest file that tells the player where to get each individual video chunk. Think of the manifest like a table of contents to help your video player find the right part of the file to load and play. To route traffic using manifests, you simply change the URLs in the manifest file itself, which changes where the player goes to fetch the video file. This gives you more granular control over which CDN provider you use, down to individual video chunks. You’ll need to choose a CDN to deliver the manifest itself, but the rest of the video traffic can be routed in this manner.

**Player**
You can also route video requests in multi-CDN architectures by dynamically making decisions in the browser’s video player. The player can make more complex routing decisions tied to QoE when compared to manifest routing. By constantly gathering real user monitoring (RUM) data, the video player can automatically choose the provider it thinks will deliver the best experience, at that time, for that user. For example, if a particular CDN encounters an operational issue, player routing would quickly detect that service degradation, and automatically start routing traffic away from that provider to other CDNs that were operating normally. All of this occurs without manual intervention from your team, making it a good routing option for companies that want to free their teams from manual video traffic distribution while boosting the end user experience.
Domain Name System (DNS)

Routing traffic at the DNS layer lets you make decisions before requests even reach your CDNs. You can think of DNS as a directory for the internet: it translates text like “example.com” to the corresponding IP address that internet servers use.

Your routing options will vary by DNS provider, but many organizations employ an approach based on simple traffic percentages or by source country. Simple traffic percentages are the most straightforward way to route traffic. Decide how you want your traffic distributed across providers ahead of time on a percentage basis, and let the DNS servers do the rest. Another method is to route DNS requests based on source country. For example, if you’ve negotiated better pricing in a region from a particular CDN provider, you can route your requests from those geographies accordingly.
Conclusion

As we’ve seen with these survey results, multi-CDN is quickly becoming a topic of interest for organizations in a wide range of industries. There are clear, tangible business benefits to deploying multi-CDNs around improving your user experience and controlling costs. And although some respondents hold the perception that operating multi-CDNs can be complex, companies are dispelling that myth by partnering with the right vendors, and effectively implementing a range of impactful operational strategies fit for their business.