

REPORT REPRINT

Multi-CDN usage grows as video streaming and online gaming thrive

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The two companies have worked together for some time developing a video-based LMS for clients. However, we believe the deal opens Paylocity up to offer video tools for recruitment, hiring, performance management and communications, as well – further extending its suite to address a broader set of needs relevant to the employee experience.

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Introduction

The use of a multi-CDN – that is, multiple content delivery networks (CDNs) operated in consort – has become a best practice for large-scale events such as Olympics streaming or the launch of the Disney+ video-on-demand service. A multi-CDN provides a hedge against network mishaps, and lets the content owner fine-tune performance and cost. Perhaps most interesting is that the CDN players themselves are building products around the concept, having accepted the reality of multi-CDN usage.

In this report, we outline the reasoning behind multi-CDN implementation, explore the mechanics behind it, and provide an overview of the vendors in this space.

451 TAKE

What's interesting here is the way CDN providers have come to accept multi-CDNs, which potentially siphon revenue away to competitors. But they also give multiple operators a share of business in major events such as the Disney+ launch. Moreover, while core CDN services – video delivery and large-file download assistance – aren't truly commodified, they can be gotten from many vendors at high levels of quality. A multi-CDN is appropriate even for events that aren't Olympic-sized – major video game releases, for instance. The trend is strong enough that some CDN providers are getting into the act. Fastly markets one of its products to multi-CDN uses, and Verizon Media has begun selling a multi-CDN service to its streaming customers.

Separately, a cottage industry has sprung up around multi-CDNs, ranging from fully managed services to specialized performance monitoring. While demand for these services should be on the rise, the multi-CDN market is, by definition, a fraction of the CDN market, and some large content owners have had the wherewithal to assemble and manage multi-CDNs on their own. Multi-CDNs have proven popular, but it's yet to be seen whether they represent a strong stand-alone business opportunity.

Why use a multi-CDN?

A multi-CDN simply involves having multiple CDNs available, sending traffic to whichever one is optimal at the moment. Initially, multi-CDNs were utilized to address larger performance concerns, such as an entire CDN going down. CDN maturity is such that a crash is unlikely, but now content providers are beginning to pay attention to performance in the margins – the variances in response time, connectivity and other factors from minute to minute across geographic locations.

Factors for using a multi-CDN can go beyond performance. Cost is a consideration, since CDNs charge by the amount of traffic they carry. Another possible consideration is geography. While all the large CDNs are 'global,' some have a stronger presence than others in certain countries or regions. In these cases, the customer might prefer to tap a local CDN rather than one whose nearest node is farther away.

Any large video event is probably using a multi-CDN. Major sporting events are an obvious example, as every Olympics or World Cup serves more internet-streaming viewers than ever before – including more mobile streams, where performance is more likely to be sketchy. When video-on-demand service Disney+ launched, it used a multi-CDN comprising at least five commercial CDNs, according to network monitoring vendor Kentik.

A multi-CDN can also be useful for large file downloads such as video-game updates, which have become major network traffic events. Pre-coronavirus, Akamai's highest reported traffic peak came not from a sporting event but from a new release of Fortnite.

Viewing habits and COVID-19

As the novel coronavirus ravaged the globe, millions of people began working remotely, taking online classes and/or streaming media content, bringing network traffic to an all-time high. 451 Research has discussed the impact of COVID-19 across numerous technology sectors and the crucial role that datacenter operators play in 'keeping the lights on' for many companies and organizations. CDNs have been under added pressure and have managed it well, partly because, like the core of the internet, they were built to accommodate surges in traffic. Coming into 2020, we were expecting to see multi-CDN usage increase in general. The new bandwidth requirements of social isolation might speed that process.

The effect of social isolation is particularly easy to see when it comes to online video. According to Kagan (a media research group within the TMT offering of S&P Global Market Intelligence), 52% of US adults report they are spending more time watching free online video (YouTube, for example) than before the coronavirus. Disney+ had 54.5 million paid subscribers at the start of May 2020, outpacing the company's original projection of 60-90 million viewers by 2024. That is clearly due to social isolation; the drawback is that some of those subscribers could churn away as life returns to normal.

Technology

A multi-CDN service consists of three pieces: the CDNs themselves, performance monitoring and a load balancer that decides which CDN is appropriate and directs traffic there. Vendors offer these pieces to different degrees (see below). Some large customers have also opted to build their own multi-CDNs, using third-party and/or in-house performance monitoring combined with an in-house load balancer.

The CDNs can be provided by the customer (usually a content owner or broadcaster) if it has existing contracts with multiple CDNs. Alternatively, some services have arrangements to effectively wholesale the services of multiple commercial CDNs. It's also possible to combine these scenarios, of course.

Performance monitoring provides some of the criteria for deciding which CDN is 'best.' Cedexis, Conviva and NS1 are well known examples of companies that provide this data specifically for the multi-CDN use case.

The load balancing step is the multi-CDN's active ingredient, usually switching between providers by having DNS direct traffic to the CDN of choice. The decision logic can be extremely simple – sending nearly all traffic to CDN A and 1% to CDN B as a backup, for instance – or complex, taking into account costs, CDN contract details and fine-grained performance analysis. This analysis can be done per individual user. In some cases, the decision is made at the beginning of a video stream or software download, and the session sticks to the chosen CDN until the end.

More modern approaches let the traffic change CDNs midstream; we believe this is how multi-CDNs are applied for most major sporting events. Midstream switching requires a more sophisticated setup, because the decision and the switching must happen without impacting the viewer's experience.

CDN operators

For the companies that run CDNs, the multi-CDN is a give-and-take proposition. Customers pay based on the amount of bandwidth they use, which means a multi-CDN spreads the wealth. Then again, in the case of a major service like Disney+, the multi-CDN creates an opportunity that more than one CDN can win. Either way, CDN providers have embraced the reality of the multi-CDN by now, and some have been strategizing use cases and business models around the concept.

Fastly proffers a multi-CDN use case where its platform becomes the alpha CDN, in a sense. That is, the other CDNs treat Fastly as if it were the origin server for the content. Fastly then consolidates the CDNs' content requests, reducing the amount of traffic that goes to the true origin server. This is an extension of a well-known concept called origin shielding, and could theoretically be done by other CDNs. Fastly officials say they targeted the technology at the multi-CDN concept early on, making its implementation well suited for this use case. Moreover, Fastly notes it can offer visibility across the collection of CDNs in use, providing a holistic view that could otherwise be difficult to obtain.

Verizon Media launched a multi-CDN managed service in the fall of 2019, available to its existing video-streaming customers. Verizon Media acts as a load balancer, assigning a video stream to one of multiple CDNs at the start of a session (the company plans to launch mid-session switching soon). Verizon Media has its own analytics tool to determine which CDN to use at a given time. Customers can apply this to their existing CDNs to use with this service; alternatively, Verizon has contracted with multiple major CDN competitors and can add their services, wholesale, to the multi-CDN.

Vendor landscape

Below we list some of the major players in the multi-CDN space. The list is not intended to be exhaustive, but more a starting point for understanding the competitive landscape.

Cedexis is arguably the best-known vendor in this space, although the company has been relatively quiet since its acquisition by Citrix. Now known as the Citrix Intelligent Traffic Manager, Cedexis provides real user monitoring (RUM) based on JavaScript tags placed voluntarily on web clients worldwide. The result is a crowdsourced picture of network performance. Citrix ITM also offers a multi-CDN load balancer and related functions such as a multi-CDN cache purge.

Conviva specializes in performance monitoring. Through software development kits for all the major streaming applications, Conviva gathers insight on the customer's real-time experience, focusing on metrics such as the time it takes for a stream to start. Conviva's Precision tool provides a list, via API, of which CDNs are preferred at a given time, but Conviva does not offer a load balancer itself. The choice of 'best' CDN is based on granular policies set by the customer. Conviva was founded in 2006, and claims to process 150 billion streams per year.

NS1 is known as a DNS provider, but also offers multi-CDN through its Pulsar load balancer, which made CDN routing decisions for the 2020 Super Bowl. Pulsar uses data collected by NS1 from multiple CDNs, and can also act on QoS data from technology partners. NS1's web-based portal lets customers set load-balancing policies based on parameters such as real-time performance, cost of service, or contract commits.

Mux provides the tools for running a full video platform online, letting customers use APIs to handle details such as video encoding and storage – and content delivery, using a multi-CDN consisting of Fastly and StackPath.

DLVR was founded by Mike Gordon, a cofounder of CDN operator Limelight Networks. DLVR monitors CDN performance by sending heartbeats of video to the networks. These are not viewed by end users; rather, DLVR uses them to monitor the quality of the playback experience.

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Peer5 is best known for peer-to-peer CDN technology that can extend the reach of a traditional CDN. The company has added a managed multi-CDN to its portfolio, consisting of 12 CDNs.

Constellix offers a DNS-based load balancer as well as performance monitoring including RUM. Constellix was launched in 2013 by the founders of DNS Made Easy, which started in 2001; both are subsidiaries of Tiggee, a Reston, Virginia-based software developer and consultancy.

Mlytics is a Taiwanese startup that offers both performance monitoring and multi-CDN load balancing.

Edgeware is a Stockholm-based OTT TV platform that also offers a multi-CDN load balancer.