Delighting streaming media audiences at the network edge

Customer experience is the key differentiator for streaming providers
Overview

Over the past few years, disruptions to the media and entertainment industry have fundamentally changed audience behavior. Video on demand (VOD) has completely upended traditional content distribution models, as original content booms.

Cord-cutting is at an all-time high as major broadcast networks enter an already crowded market with streaming services of their own. When the COVID-19 pandemic hit forcing billions of people around the world to shelter-in-place, video consumption went through the roof adding additional strain to existing infrastructures.

Despite already enormous and growing audiences, competition to capture market share is fierce. Content owners struggle to differentiate their offerings amidst a sea of live and on-demand options. The customer experience (CX) is becoming the new arena in which content providers will compete for the hearts, minds, and most importantly, the eyeballs of the world’s consumers. There is no room for errors, broken streams, or sub-par experiences, which can often be attributed to legacy video delivery workflows.

Fastly is purpose-built to address these concerns, with the ability to deliver an outstanding customer experience for live streaming and on-demand content. In this brief you will learn about the critical delivery challenges facing streaming media companies today, and how Fastly can support modern video workflow requirements to meet your expectations and those of your customers.
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Zero patience for mediocre experiences

Driven by the familiarity of cable television and fast internet connections, it’s no secret that today’s online audiences have come to expect fast and low-latency delivery. Competing with social media, particularly with the immediacy of Twitter, has proven especially challenging for digital broadcasters. More than 84 percent of mobile device owners in the U.S. and 75 percent in the UK use their phone or tablet while watching live TV, which means that real-time scores can arrive on your mobile device ahead of the big screen. Even when phone notifications are silenced, audible cheers erupting at the neighbor’s house can alert streaming video consumers that the stream is behind the content delivery curve.

As a result, digital broadcasters are continually looking for ways to deliver media that can be experienced in near real time. However, ultra-low latency transport is not commonly supported by legacy video workflows, in particular content delivery networks (CDNs) that utilize a push model, as they require a certain ingest size before initiating delivery.

Creating highly responsive experiences are best accomplished at the network edge, closer to the viewer, where optimized use of cache delivers content and responses with the smallest possible amount of delay. It also requires efficiently caching API responses, such as metadata for frequently updated content, which is an area where legacy CDNs come up short due to an inability to instantly and programmatically invalidate cache.

Achieving scale is often costly and inefficient

Global sales of 4K ultra-high-definition televisions are forecasted to reach more than 120 million units in 2020, leaving every reason to believe viewers will increase their demand for Ultra HD content in the very near term. When it comes to live streaming and VOD, this will require new workflows, insights, and significantly more capacity. The sheer amount of bandwidth required presents a significant technical challenge for content providers dependent on legacy CDNs. While workarounds exist, such vendors often struggle to intelligently reallocate available bandwidth or deliver the processing speeds required to meet demand at scale.

Furthermore, demand for content (both live and VOD) is often so high for large-scale events that bandwidth requirements can quickly exceed the capacity of any single network. Simply purchasing more bandwidth from a single vendor isn’t a viable option. Stitching together multiple CDNs has become an increasingly common solution, but it’s not without its challenges.


“4K TV and UHD: The Whole Picture,” IHS Markit.
When executing a multi-CDN strategy, it can be difficult to decide how best to distribute traffic between CDNs. This, in turn, can lead to a greater load on the origin, thus driving up infrastructure and requiring additional IT resources. Dealing with multiple CDNs can also lead to loss of mission-critical visibility into Quality of Experience (QoE), since logs and stats are different for each CDN provider. Lastly, it can be expensive and difficult to gauge exact needs so you can end up paying for more bandwidth than you need.

**Slow viewer authentication impairs customer experiences**

The majority of streaming media services require authentication to grant access to on-demand libraries and live content. Any such process must be responsive and allow immediate access. Unnecessary delay presents a high risk of lowering customer satisfaction, putting continued customer engagement at risk.

Because of their outdated architecture, legacy CDNs are unable to authenticate subscribers at the edge. Every validation request needs to go back to the origin for a query, which adds considerable latency to the experience.

**Growing privacy and security concerns**

Digital broadcasters are a prime target for cybercrime and are particularly at risk for distributed denial of service (DDoS) attacks. Extortion, hacktivism, and even simple vandalism are more often than not the motivation, and even the desire to block a single news story could be a powerful motivating factor as well. While large-scale CDNs can help absorb a targeted DDoS attack, too often older CDN architectures struggle to filter out malicious intent in cache or across network layers, where security protocols are most effective. Updating security rules is also generally a manual process that often requires the involvement of professional services, leaving significant and precious time from discovery to resolution.

VOD providers continuously struggle with the illegal playback of content, particularly through the use of virtual private networks (VPNs) that allow users to bypass restrictions in prohibited regions or where service is not available. Lost revenue for content owners is aggravating, but the larger issue is often the exposure to litigation by copyright holders and other legal entities if media is illegally viewed or not owned. As legacy CDNs don’t commonly have the capability to detect VPNs, preventing playback in restricted regions is not guaranteed.

Why Fastly?

Fastly is an edge cloud platform that enables you to provide great online streaming video experiences—quickly, securely, and reliably. Getting content to your audience as quickly as possible, we process, serve, and secure your live and on-demand content at the edge of the internet, as close as possible to where it’s consumed.

Fastly’s edge cloud platform was built with features that forever changed how streaming media is delivered. Today, leading media and entertainment companies such as Spotify, Atresmedia, and New York Times use Fastly as their content delivery and security backbone, enabling them to keep visitors engaged with great experiences across any device or platforms. The following Fastly capabilities are particularly beneficial for streaming media:

Performance at scale

Fastly’s edge cloud platform is built for performance. With a multi-terabit-per-second capacity network, we scale instantly to meet the most demanding video and streaming needs.

The Fastly network can easily accommodate traffic spikes without the need to modify your infrastructure. Our single global network can scale instantly to meet your traffic needs, and our load balancing is designed to support massive scale and near real-time rule changes. The cloud-based, Layer 7 load balancer allows you to define content-aware routing decisions while ensuring instant convergence and failover. Unlike DNS-based solutions, you get immediate and granular control. We also provide improved performance and cost savings over application delivery controllers (ADC), especially during flash traffic.

“During the last general elections in Spain, we multiplied our traffic expectations, and we also doubled our previous rating record with the final of the Champions League. Fastly’s response was spectacular. We were pleasantly surprised.”

– Carlos Santos
VIDEO PLATFORM MANAGER
ATRESMEDIA
For companies needing to support sustained large-scale video or live streaming traffic, Fastly Origin Connect offers dedicated bandwidth with one or more Private Network Connections (PNI) between your origin and Fastly Origin Shield POPs. Traffic is sent across these secure private paths rather than going over the public internet, significantly reducing latency.

For VOD content, Fastly’s on-the-fly packaging (OTFP) delivers a faster overall viewing experience. In real-time, content is packed in any frame rate and any resolution. Best of all, since we only package what’s actually needed, viewers can start playback immediately.

**Implement new standards on your terms**

The underlying architecture of Fastly’s edge cloud platform is radically different from legacy CDNs. Utilizing a pull – rather than a push – model means our platform is format-agnostic. We simply distribute the data, and you as the content owner maintain full control over the content delivery rather than waiting on a vendor to support new formats. This ensures efficient delivery and allows viewers to get the best possible experience. For example, Fastly was able to support HTTP3, QUIC, and Apple Low-Latency HLS as soon as the specs were released.

The primary benefit of a format-agnostic approach is that it frees you from specific requirements normally imposed by your delivery chain, such as an encoder pushing specific formats or segment lengths. In other words, a pull model allows you to continuously experiment and optimize on your terms.

**Reaping the many benefits of Multi-CDN**

The need for redundancy and available bandwidth frequently necessitates combining multiple CDNs in order to successfully deliver live or VOD content. Fastly’s Media Shield optimizes multi-CDN deployments while reducing the total cost of ownership (TCO) of video streaming. Enterprise-class customers can configure CDNs to use Media Shield as the origin, then configure Media Shield to point to network infrastructure.

With Media Shield, you can continue using your existing CDNs as you normally would while taking advantage of our platform to significantly reduce your origin traffic, boost performance, and gain critical visibility. We use highly efficient request collapsing and

“By enabling us to cache smaller video segments and instantly purge outdated content, Fastly’s CDN helps us deliver streaming events that are closest to being there live. Fastly also has very low latency, which shaves off several additional milliseconds as compared to alternatives.”

– Sung Ho Choi

CO-FOUNDER

FUBOTV
origin shielding to ensure that multiple simultaneous requests across all CDNs result in only a single request to your origin server. This can decrease the number of requests your infrastructure needs to process by several orders of magnitude, and help save on egress costs. You can expect to see performance gains as well, as Fastly is architected to cache high volumes of content at the edge for extended periods of time. This gives popular and long-tail content a higher likelihood of being served from cache, thereby reducing both startup times and playback interruptions. And given where Media Shield sits in the stack, you can maintain visibility across multiple CDNs, removing a common area of concern when using more than one CDN to deliver content. You can even attain glass-to-glass visibility by combining our near real-time logs with player-side data in your data store.

“Thanks to Media Shield, we have managed to reduce the cost of access to origin by 60%.”

– Carlos Santos
VIDEO PLATFORM MANAGER
ATRESMEDIA

Instant and actionable insight

While not exclusive to multi-CDN environments, the importance of having insight across the content delivery chain cannot be overstated. Integrating products from multiple vendors increases the risk of losing visibility into the quality of delivery. To make matters worse, with traditional CDNs you often have to wait extended periods of time before receiving enough data to be able to analyze evolving situations and react. With Fastly, log files are delivered in near real-time—not hours, not even minutes - giving you visibility into critical QoE metrics such as network stats, response time, and caching status.

Our log stream is compatible with over two dozen popular logging endpoints including Splunk, Sumo Logic, and BigQuery, and can be used for visualization, alerting and further analysis to quickly identify root cause issues and continuously optimize your traffic. We also integrate with multiple video measurement and analytics tools, including Conviva, NPAW and Mux, allowing you to monitor the status of your video delivery services in real time.

“Since integrating Fastly into our technology stack, Brightcove has increased video delivery performance at a global scale while also enhancing visibility metrics and streaming experiences.”

– Charles Chu
CHIEF PRODUCT OFFICER
BRIGHTCOVE
Authentication at the edge

Within the media and entertainment industry, paywalls have long been used to gate content not fully sponsored by ads. However, traditional paywall implementations can cause delays for customers, working against your efforts to minimize delays and create great user experiences. Paywalls implemented in a similar fashion, but at the network edge, dramatically improve response time and ensure any transactional video on demand (TVOD) purchases or access to gated live events are handled closest to the viewer and in the most unobtrusive way to secure the transaction.

Fastly allows you to move authentication to the edge of the network for increased performance and security, enabling you to authenticate cached responses and grant viewers immediate access to content libraries. Edge authorization tokens can be generated within your application, relieving your origin of repeated requests and granting access as fast as possible. And, the flexibility of the Fastly platform enables you to easily extract your preferred authentication solution, including the use of JSON Web Token and OAuth.

Enhanced security and privacy

DDoS attacks are one of the most prevalent online cybersecurity threats facing video traffic. Fastly’s high-bandwidth, globally distributed network is built to absorb DDoS attacks, as our entire network acts as a DDoS scrubbing center. We allow you to respond in real time, filtering malicious requests at the network edge before they get near your origin, so you don’t sacrifice performance for protection.

Media companies are also under threat of malicious attacks designed to compromise web servers hosting sites and apps used to surface content to consumers. Fastly’s web application firewall (WAF) solution protects you against threats such as injection attacks, cross site scripting, and HTTP protocol violations. Built on our powerful edge cloud platform, it provides protection without any significant performance impact, as only origin-bound traffic is analyzed, filtered and blocked.

When it comes to geographically-restricted content and identifying illegal mirror sites, you can use content targeting to identify user locations and prevent delivery in unauthorized regions or restrict certain devices from playback. You can even detect VPN usage and block those streams as well.
Committed to your success

Fastly has gained a wealth of expertise delivering some of the world’s largest streaming events. While our platform allows you granular control and visibility, we’re there to support you every step of the way with a variety of support offerings. Fastly’s world-class support includes help directly from our engineers via chat and in-depth technical documentation. We have solutions packages designed especially for our media and entertainment customers such as Live Event Services that provides experienced engineers to assist with monitoring, alerting, and troubleshooting complex issues throughout your event. With an overall customer satisfaction rating (CSAT) of over 95%⁵ for the past three years running, we pride ourselves on our relationship with our customers.

Don’t let a legacy CDN limit your vision

Your CDN should not impede your efforts to deliver top-notch live and on-demand video experiences to your customers. As you set out to architect and build your content delivery platform, be sure to evaluate the practical challenges a legacy CDN will impose.

Fastly offers edge cloud solutions that will help you deliver the ultimate customer experience across any number of platforms and devices. To learn more about how we can support your streaming video strategy, contact Fastly at sales@fastly.com.

⁵ As of December 31, 2019.