The Guide to Best Practices in PREMIUM ONLINE VIDEO STREAMING

Part 3: Steps for Ensuring CDN Performance Meets Audience Expectations for OTT Streaming

In this third installment of "The Guide to Best Practices in Premium Online Video Streaming," we explore key requirements to ensure CDN performance meets the growing expectations of broadcast-scale audiences.

Consumers expect the same or better experience from their premium online video service as they receive from traditional TV services. It is not enough to deliver exceptional service if it can't be sustained consistently for each viewer. The bar on performance and consistency for streaming live and on-demand video requires that online content providers get the most out of their content delivery network (CDN) partner(s).

Let's explore phase three:
Steps for Ensuring CDN Performance
MEETS AUDIENCE EXPECTATIONS
FOR OTT STREAMING.

Setting Performance Requirements
for CDNs

In assessing CDNs, online content providers should first determine if the provider can consistently produce the desired viewing experience for the range of devices being targeted. Performance must be maximized across both fixed and mobile networks.

A study conducted by Akamai and Sensum measured viewers' physical reactions to streaming video content at varying quality levels. The study revealed that buffering and low picture quality caused viewer engagement to drop by 20%, and happiness to fall by 14% along with a decrease in the viewers' focus.

Content distributors can avoid such negative consequences by establishing a set of KPIs that their CDN provider should report and for which it should be held accountable. Any set of indicators should include minimum thresholds for bitrates and rebuffering. For situations where video is being downloaded rather than streamed, download speed should be considered. In addition, the percentage of successful client server requests – or success rate – should be measured.

Standard fare should be a guarantee of at least 99.99% fulfillment and a rigorous internal approach to measuring performance and managing against the established KPIs in order to achieve the broadcast levels of reliability and consistency that end users expect.

Rock-Solid
Redundancy

End-user experience is often limited by the weakest link in the workflow, whether that is an origin that is generating errors, an authentication system that can cannot handle the load, or a dynamic ad insertion solution that is taking too long to respond. CDN users should evaluate redundancy capabilities and available options for graceful fallback and degradation.

Dual origins are recommended to provide a redundant source of content, and mechanisms should be in place that select the best-performing origin with automatic failover between origins. The capabilities should also be in place to set aggressive timeouts on the forward path to origin and quickly retry requests to handle transient errors. Finally, the CDN should be able to load share across origins.

The CDN should act as a circuit breaker when integrating with third-party systems such as dynamic ad insertion. In cases where ad insertion is taking too long or an error is generated, for example, the CDN should ensure the continuity of the stream by inserting a static ad or returning an undecorated manifest to the end user.

There are many other potential points of failure in a complex workflow, but expectations should be that the CDN provider can help handle these issues. They should have experience from working with many other customers across similar environments and possess both expertise and technical solutions to mitigate end-user impact.
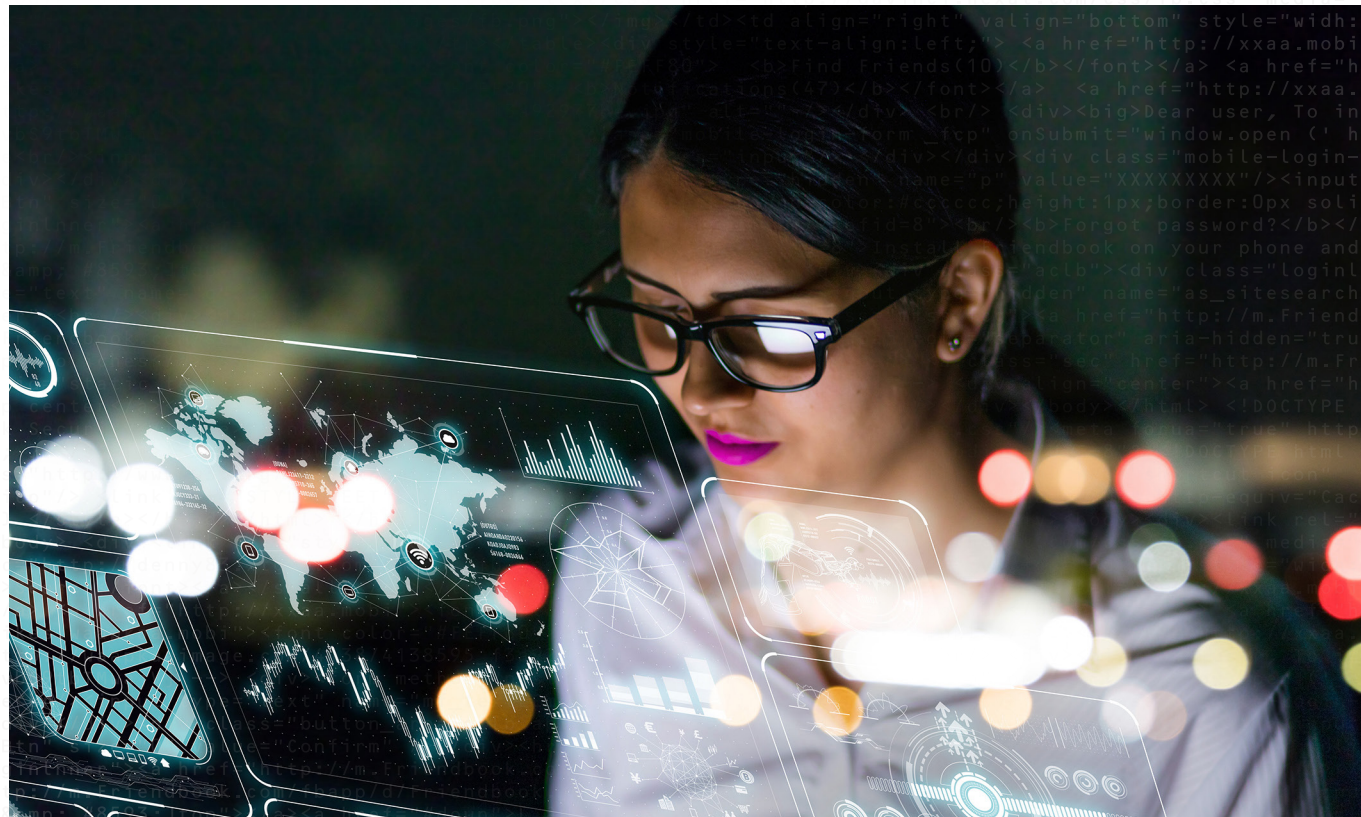
CDN
Reach, Resiliency, and Scale

The ability to achieve the above thresholds depends on many factors, including CDN architecture, reach, functionalities, and robustness. First and foremost, CDN edge locations must be positioned in close proximity to targeted end users.

A highly distributed architecture helps ensure that content can be delivered consistently and reliably through ISP networks, bypassing the bottlenecks at centralized peering locations. Deploying a distributed platform; establishing relationships with myriad network providers; and developing software that can accurately and consistently map end users to servers based on location, performance, and real-time network conditions are a bare minimum to delivering the high-quality experience that users expect today.

Capacity is necessary to accommodate scaling requirements for major events and ongoing expansion of streaming traffic to an ever-growing number of users worldwide.

Required
Advanced Functionalities

Caching

While caching is a basic CDN feature, caching high-value streaming video requires great agility at scale. For live content, CDNs must be able to cache for specific, short durations enabling all users to access the stream at the segment starting point. For video on demand (VOD) content, CDNs must be able to manage huge libraries of content with a long tail that is rarely accessed and a subset of assets that are highly popular.

Flexible content-handling rules that enable fast purge and fast configuration deployment are basic requirements. But CDNs optimized for high-value streaming must be able to support enhanced functions in connection with ancillary aspects of content delivery, such as special promotions or changes in offerings. Users should be able to "prewarm" the network to ensure greater origin offload at launch, while using a time-based rule to trigger delivery at the precise moment of launch.
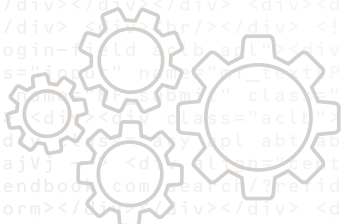
Manifest Manipulation

Content providers can use manifest manipulation to offload complex functions that help drive revenue and meet viewer expectations. Custom manifest files can be created for each viewer, allowing providers to dynamically apply advanced logic at the edge of the CDN rather than early in the content preparation phase, providing greater flexibility for those with complicated workflows. This helps enable personalized streaming experiences based on factors such as device type, network conditions, and geographical restrictions. CDNs can also work in tandem with ad-decision systems to enable dynamic implementation of advertising on a per-user or per-region basis.

Security

CDNs play an important role for OTT distributors that need to protect their premium content against unauthorized viewing. As a best practice, CDNs should support end-to-end transport layer security (TLS) for all content to enable secure transport of content, as well as personalized token authentication mechanisms to restrict access to authorized users and to prevent link sharing. Content-targeting solutions should be available to enforce geographic rights, and these solutions should include mechanisms to detect and block virtual private networks and proxies that are often used to circumvent rights protections.

Utilizing Advanced Protocols

In a recent live streaming event with more than 10 million concurrent viewers, Akamai observed more than 50% of traffic over IPv6. The company's tracking data shows IPv6 traffic in seven countries now exceeds 15% of Internet traffic. While IPv4 remains dominant, the percentage of IPv6 traffic has reached a point where CDN support for the protocol is essential. CDNs must be equipped to support dual stack by delivering both IPv4 and IPv6 traffic. This requires implementation of IPv6 routing capabilities across the CDN core and the ability to perform address translation at edge facilities connecting with any local network infrastructure that doesn't support IPv6.

Delivering High-Quality Streaming Using Akamai's Globally Distributed Intelligent Edge Platform

Once video content is prepared, content providers can rely on Akamai's Adaptive Media Delivery to distribute high-quality, consistent video streaming to end viewers on any device, anywhere. The solution is optimized for adaptive bitrate streaming to provide a high-quality viewing experience across the broad variety of network types – fixed or mobile, at varying connection speeds. The solution reliably delivers prepared, pre-segmented HTTP-based live, linear, and on-demand streaming media, supporting delivery across today's popular streaming formats including HTTP Live Streaming (HLS), HTTP Dynamic Streaming (HDS), Microsoft Smooth Streaming (MSS), Dynamic Adaptive Streaming over HTTP (DASH), and common media application format (CMAF).

Adaptive Media Delivery is built on the Akamai Intelligent Edge Platform, a globally distributed cloud platform comprising over 240,000 servers deployed in more than 1,700 networks and 130 countries around the world. Akamai delivers daily web traffic reaching more than 30 Tbps and record traffic in excess of 65 Tbps. When a streaming service or event must succeed, many of the world's most successful brands turn to Akamai's Adaptive Media Delivery to provide superior scalability, reliability, availability, and reach.

Akamai combines the latest streaming video technologies, advanced caching, manifest manipulation, and optimized network settings along with intelligent mapping, protocol optimizations, and more to deliver high-performance video resulting in high-quality streaming for large global audiences.