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WHITE PAPER

# Understanding the Value of Consistency in OTT Video Delivery

# Executive Summary

As the video industry continues its transition from broadcast technology to delivery via IP, the need to ensure high-quality video streams, without interruption and at scale, is a priority. For all companies delivering content to consumers, failure to do so can have a demonstrable impact on revenues from both advertising and subscriptions.

OTT service providers face a challenge, however, in meeting growing expectations from viewers for a high-quality video experience on any device. Research confirms viewers expect their video to start promptly and play smoothly. Rebuffering decreases viewer engagement with the content and can result in them abandoning a stream or even a service.

Yet the video delivery supply chain is complex, and it's difficult to find the root cause of buffering. OTT service providers must ensure they work with technology partners who can help them deliver a stable and consistent video experience.

A poor-quality video experience impacts the bottom line. Akamai estimates that an average of one instance of rebuffering service. On the other hand, one SVOD provider reduced churn by 90% by improving video quality.

A number of obstacles face OTT services looking to improve the quality of the video experience, including old delivery infrastructure and the growth of live streaming, and making the case for further investment.

However, improving OTT video quality is not optional. It is a necessity if businesses are to retain and grow their revenues from subscribers and advertisers.

# Introduction: Video Quality Matters

Akamai, the intelligent edge platform for securing and delivering digital experiences, asked MTM, a research and strategy consultancy specializing in media and technology, to investigate industry perspectives around the quality of IP-delivered video streams. What do industry executives see as the challenges of measuring and delivering high-quality video streams? And what is the impact of video quality on their bottom line?

MTM spoke to senior executives from a range of premium video distributors to better understand current trends and dynamics, and to explore their views on the importance of video quality to commercial success.

The TV industry is undergoing a huge transformation in the way it delivers content to viewers. Traditional broadcast technology still dominates the current delivery infrastructure (and industry revenues), but the success of OTT services delivering both on-demand and live linear content has accelerated the transition towards IP delivery. This shift is impacting new and traditional businesses, including pay-TV platforms, content brands, and traditional broadcasters.

A key driver of this transition is consumer expectation about how, when, and where they access the content they want to see, and the quality of the video stream they receive. Premium on-demand services such as Netflix and Hulu have changed consumer expectations, even if the majority (70%) of viewing of Netflix content is now on a TV, according to the company's own research[1]. Consumers now expect the video experience delivered via IP to match or even exceed that delivered by traditional broadcast technology.

Therein lies the difficulty for companies providing content services. Meeting expectations around video quality places significant demands on a complex video-supply chain, and the stakes are high for businesses: Consumers' tolerance for degradations in video quality is low, and the risk of users going elsewhere is high.

Acquiring customers (and content) is an expensive business, so retention is top-of-mind for the technical teams responsible for ensuring that viewers receive the best possible video experience. But how is that video quality measured? What are the important metrics when measuring quality, and what is the impact on the business of not delivering consistent quality? How are audiences' expectations of video quality evolving, and what technical and commercial challenges do those expectations create for the delivery of premium video services?

This paper identifies some of the key current industry trends and dynamics around the issue of video quality in the evolving U.S. market for premium OTT video services. Akamai would like to thank all participants in the interview program, and welcomes further discussion and input from clients and industry stakeholders.

> *You only have one or two times to get someone's attention. If you don't, you lose that potential audience since there are so many more entertainment opportunities for consumers to find.*
>
> *VP, Strategy and Innovation, Multichannel broadcaster*

[1] Recode (2018), "You can watch Netflix on any screen you want..." available online here

# OTT Service Providers Must Meet Growing Expectations Around Video Quality

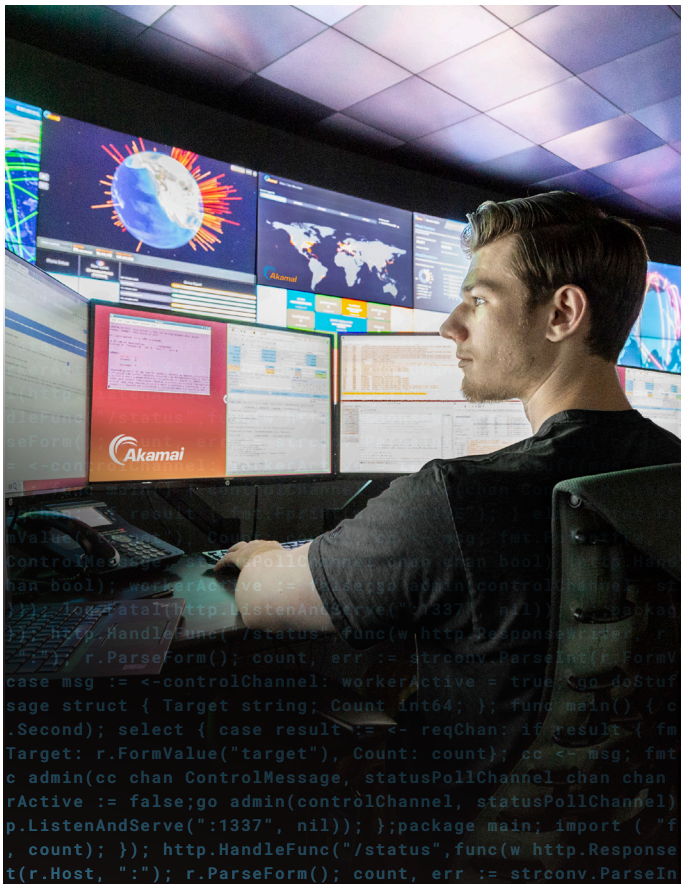
In an increasingly competitive marketplace, premium video providers are looking at various ways to differentiate their OTT services. Their options include investing in content, offering aggressive pricing, enhancing the user experience (UX), and focusing on consistent streaming quality.

*If the content is produced by a professional publisher, there is an expectation – like that set by Netflix, with video being delivered at 10 to 15 MBPS – that it should be of high quality, wherever it is viewed.*

*VP, Strategy and Innovation, Multichannel broadcaster*

The last of these is increasingly mandatory: However, while the importance of delivering a high-quality video experience is increasingly recognized, defining or measuring it remains problematic. For now, there is no definitive industry standard that evaluates the quality of the video stream experienced by the end user.

There is one KPI, though, which is the predominant measure of quality from a UX perspective: buffering, or more specifically rebuffering,




when a viewer has been receiving a video stream, but it then stops, and the video has to catch up.

*"Rebuffering ratio [the ratio between the rebuffering duration and the actual duration of video that is played] is the one we get measured against, and the one we report to our CEO on a monthly basis."*
*– Senior Manager, Major broadcaster.*

Avoiding or minimizing rebuffering is the priority for most service providers, who recognize the direct relationship between the incidences of rebuffering and viewer engagement. Viewers have little patience for rebuffering and are likely to abandon a stream or even a service altogether if the issue persists.

This connection between rebuffering and viewer engagement was evidenced further in a 2017 study conducted for Akamai by Sensum[2]. This demonstrated – using a variety of sophisticated experiential research techniques – how viewers watching higher-fidelity video streams that are uninterrupted by rebuffering are more engaged emotionally with storyline and spend

*Where we see customer engagement drop is if they're seeing that spinning wheel more than a couple of times. Our target is to keep that below 0.5%. When rebuffering is less than 0.5, 90% of sessions are completed. As soon as you get to 0.5-1% then the number starts to drop – 80%. As soon as you hit 1% you see the rate drop down to 50%.*

*Senior Manager,*
*Major broadcaster*

longer watching that content. Moreover, a higher-quality video experience – with minimal rebuffering – has positive impacts on brand perception and the propensity for viewers to recommend a particular service.

Video start time is another area that very obviously impacts the viewer's experience. It reflects a common theme – that consumers are looking for a consistency of the video stream rather than prioritizing peak quality.

*"I do think consumer expectations have changed in the time it takes to get to your first frame, but not in terms of the actual image. The page loads fast, the time to start, and the ads – quality in those three domains matters – and they are all linked to first frame."*
*– CTO, Major TV network.*

Other KPIs – such as the number of times the bitrate shifts during a video stream – are seen as less important than ensuring viewers receive as few interruptions to their service as possible. Achieving this requires an investment in people and technology that executives now consider critical for any premium OTT service.

Akamai then conducted a further study, to understand what "good" actually looks like in terms of streamed video. It commissioned Eurofins to test how Perceptual Quality (PQ) – the video fidelity actually seen by the viewer – is impacted by a series of factors, including the video device or player, the content genre viewed, the encode profile, and the network conditions typically experienced by users.

The results showed significant variation in the bitrate required to deliver a high-definition image to different devices, even when the content and the network conditions were the same. In summary, the research demonstrated the need to understand the relationship between the device, the consistency of video throughout, and the content genre – as well as network conditions – to ensure viewers receive the best possible video experience.

*Any business pays a cost for acquisition – it's the same thing for streaming. You have an obligation to make that experience as clear and smooth as possible.*

*VP, Strategy and Innovation,*
*Multichannel broadcaster*

[2] Akamai (2017), "New study: Quality of OTT video streaming experiences directly tied to viewer loyalty, service provider success," available online here

# Multiple Technical Factors Can Impact Video Quality

While the impact of buffering on a user's experience is now increasingly understood, finding the cause can be a technical puzzle. The root of the problem could be any part of a long and1 complex video supply chain that includes the ISP, the CDN, a user's connected device and browser, their Wi-Fi setup, available bandwidth, network traffic, or the temporal and spatial qualities of the content itself.

*"Delivering video is a complicated process, with many loopholes and rabbit holes that can happen with that process."*
*– VP, Strategy and Innovation, Multichannel broadcaster,*

For OTT services that include advertising, the addition of ads into a video stream, especially via client-side ad insertion, can also create issues around video restarts that impact the user experience.

*When you're watching TV, you don't see a gap between TV and ad, so the next big step for us is to make OTT more natural.*

*Senior Manager, Major broadcaster*

It is essential for OTT service providers to respond quickly to a range of issues across the video delivery ecosystem. To that end, they should

identify technology partners who have the resources, experience, and ability to help them deliver a stable and consistent video experience.

As audiences become more sophisticated, content distributors should also make sure they engage with tech-savvy users, especially when there are any issues. When customers care deeply about video quality, SVOD providers must ensure they are transparent and communicative, through blog posts and engagement with their user community.

*"We actually had an incident where we were playing with our transcoding and users got upset because it affected the bit rates. We apologized and emphasized that it wasn't an attempt to reduce quality or save on costs … We have a particularly tuned audience, who debate with our engineering staff. You have no choice but to engage."*
*– Video aggregator, CEO*

# Video Quality Impacts The Bottom Line

*Is there a link between quality and retention? Probably so. When we first started, the No.1 reason for churn, according to customers, was because of video quality and buffering. That has now improved by 90%. As we improved, it went from the No. 1 problem to immaterial.*

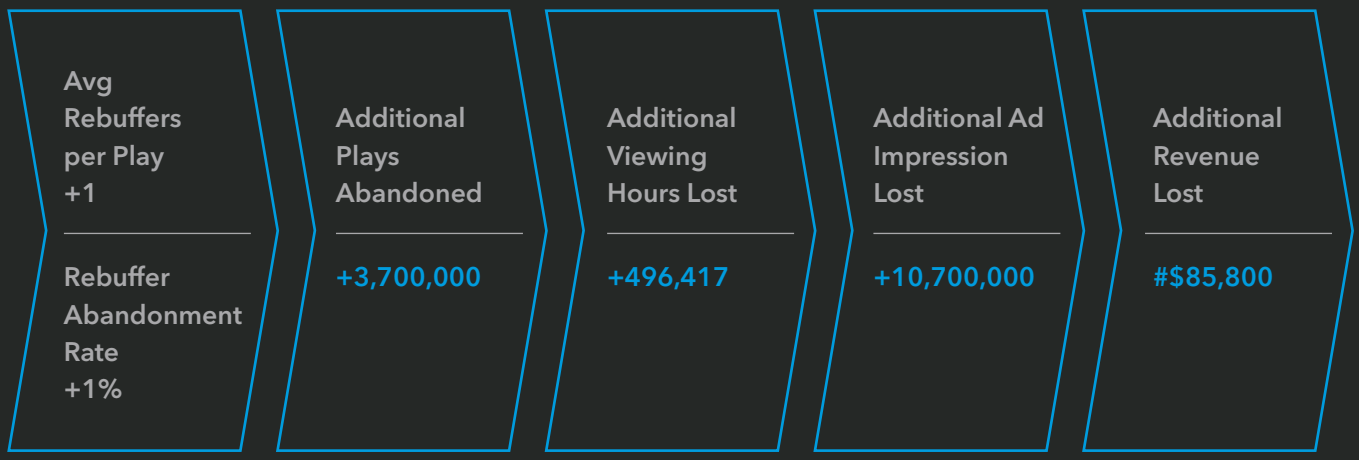
*COO, SVOD Service*

To try and quantify the business impact of rebuffering, Akamai modeled the potential loss of advertising revenue resulting from one additional instance of rebuffering. It looked at the volume of online video traffic of a leading U.S. network, which amounted to 370 million plays between June 2017 and June 2018. Based on the vast repository of video QoE data captured by its Media Analytics tool, Akamai has observed a direct relationship between rebuffering events and abandonment. Assuming – based on Akamai's data – that each instance of rebuffering results in a 1% abandonment rate, and with an average play duration of just over 8 minutes, that a single rebuffer would result in 496,417 hours lost, or the equivalent of 10.7 million ad impressions (assuming 11 minutes of ad time per hour, and average ad length of 30 seconds). Assuming a CPM (Cost Per Mille) of $8, a single instance of rebuffering could therefore result in lost revenue of $85,500.

Rebuffering can negatively impact subscription revenues, too. Executives working for premium video services see a clear link between video quality and user retention. For subscription-based services in a competitive market, the ability to deliver a consistent level of video quality has a demonstrable impact not just on user engagement but on the business's bottom line. Companies who have invested in improving video quality are seeing tangible business benefits now.

**EXHIBIT: Modeling the impact of rebuffering on a broadcaster's ad revenue**

What is the revenue impact of an instance of rebuffering on a U.S. network that had 370,000,000 plays (6/15/2017 to 6/15/2018)?




*Source: Akamai estimates, using data from Media Analytics, Nelsen eMarketer*

Understanding audiences' preferences and their attitudes about technology is essential to monetizing OTT video services effectively. Audiences make a trade-off between price, flexibility, choice, and experience, with subscribers to high-value pay-TV bundles the least tolerant of quality issues.

Audiences currently make allowances in terms of video quality for cheaper (or free) services, or for user-generated video. But such tolerance is unlikely to be sustained in the long term.

Delivering the same level of quality to multiple viewers remains a challenge given the diversity of devices and bandwidth scenarios among viewers. One distributor of premium content has responded by segmenting customers into price- and quality-sensitive categories. It offers different versions of the service, differentiated on quality.

Creating a tiered proposition, with different price points for different levels of video quality, is not an option for all publishers. It creates operational complexity and requires a sophisticated marketing strategy. But it is relevant for services who can identify a large enough segment of potentially valuable subscribers. For those viewers who invest significantly in, for example, 4K-enabled TV sets, quality is likely more important than price.

*Users who can afford a screen with high quality might not be price sensitive, but they are very sensitive to quality.*

*COO, SVOD service*

*Buffering on a $150 monthly package is clearly unacceptable. On a $9.99 OTT service it's a nuisance, but people are more likely to accept it.*

*Senior Video Technology Consultant*

*The delivery process for video is more complex than ever, while audiences are expecting TV-like quality.*

*VP, Strategy and Innovation, Multichannel broadcaster*

*We offer price plans based on the video quality delivered to the viewer. We accommodate across all the different markets – nascent 4K to limited bandwidth.*

*COO, SVOD service*

# Key Challenges Include The Delivery Infrastructure, The Shift To Live, And Investment

There is an audience appetite for receiving high-quality video streams (e.g., those delivered in 4K), and a willingness by distributors to provide it. But executives identified a significant barrier to U.S. audiences enjoying the full potential of IP-delivered video.

Services that are able to deliver 4K video to users in Asia are unable to do so in the US, given the current constraints.

*At the end the bottleneck is the delivery infrastructure. In the U.S. market, the average internet speed grows less than 1% a year. We have the oldest fiber optic infrastructure. In Asia, the speed doubles every year. Only 30% of our customers have the bandwidth to enjoy full 4K quality – and that's not the fault of CDNs, it's the fault of the delivery infrastructure.*

*COO, SVOD service*

Growth in the demand for live OTT video creates further potential challenges for those distributing and monetizing that content. The association of OTT content with on-demand viewing is becoming outmoded with the rise of live and linear IP-delivered content, such as news and sports.

High-profile live events, delivered via IP, have become more commonplace as a showcase for OTT services. The stakes are high given the value of both that content and the ad inventory around it; there is often only a small window of opportunity to get it right. In such instances, service providers need premium-level support from their technology partners behind the scenes to ensure an optimal experience for the end user.

*It's an impact on our business because our genre of films lends itself to this 4K quality. But we are lacking that last mile in terms of getting the image to the consumer's screen. It's much easier catering to a non-U.S. audience – the delivery dilemmas are completely off the table because bandwidth is better and more prevalent.*

*COO, SVOD service*

Scaling up video delivery to a large, live audience remains a key part of the challenge. For episodic content, the numbers watching that stream are generally likely to be small, but with sports and news the numbers start to add up, with all of them expecting a consistent, high-quality experience.

*"It's difficult when everyone clicks start at the same time, for a news event or an NHL deadline. A million customers pressing play at the same time – that's where the trouble is."*
*– Senior Manager, Major broadcaster*

Yet while many video distributors understand the importance of consistency to the business model, they still have to make a case for investment in the infrastructure. Amid pressure to spend more on exclusive and original content, the case for investing in the technology to deliver that content at the highest-possible quality also needs to be made.

*For companies who also offer traditional pay TV, the IP-delivered service must compete for resources with the linear broadcast side, which can cause difficulties: "The justification [for lack of investment] has always been that we don't make as much money from the digital side as the linear. And that's just because the linear has been around for a longer period of time."*
*– VP, Strategy and Innovation, Multichannel broadcaster*

*For a major college basketball tournament we're on 22 platforms, and each one of those platforms has to be a good experience, and you have to create software sets to accommodate all the streaming and stats. With such a finite amount of time, you have two days where you broadcast all teams. For those two days you make sure that all the ads are right and the streaming is OK, and if you don't then you lose a lot of revenue."*

*VP, Strategy and Innovation,*
*Multichannel broadcaster*

# But As The Industry Transitions To IP, Improving OTT Video Quality Is Not Optional

Traditional broadcast technology still dominates pay-TV revenues , and can deliver a high-quality video experience efficiently and at scale. But industry executives are now clear that the transition to IP delivery of video is under way. Legacy publishers are starting to adjust their mindset to this new reality.

Executives acknowledge that currently, the video experience for IP-delivered content is not perfect, especially for live sports and high-speed action content, where the refresh rate is an issue. But they believe it will get better as the infrastructure improves. Indeed, they argue that in time, OTT has the potential to deliver video, at scale, at an even higher quality than current broadcast technology allows. OTT services, where the infrastructure allows it, can pull from a purer image than that of encoded broadcast.

A failure to invest in improving video quality – in terms of consistency as well as peak quality – will impact the ability of video distributors to generate revenues from subscribers and advertisers. In addition, the direction of travel of the industry, not least in terms of consumer demand, indicates where the future opportunities lie.

*100% of delivery in the next 5-10 years will be over IP. Every operator in the US has been working to shift it all over to be 100% IP-based.*

*Senior Video Technology Consultant*

*Often we'll do a screening in raw 4K quality – and it looks absolutely stunning. Our ambition is to deliver this to U.S. consumers.*

*COO, SVOD Service*

*You look at the consumption patterns and the relationships viewers have with [OTT] brands and you can see there is an insatiable appetite. My biggest advice would be to do whatever you can to hire the right people and make the right investment.*

*VP, Strategy and Innovation, Multichannel broadcaster*

Akamai secures and delivers digital experiences for the world's largest companies. Akamai's intelligent edge platform surrounds everything, from the enterprise to the cloud, so customers and their businesses can be fast, smart, and secure. Top brands globally rely on Akamai to help them realize competitive advantage through agile solutions that extend the power of their multi-cloud architectures. Akamai keeps decisions, apps and experiences closer to users than anyone — and attacks and threats far away. Akamai's portfolio of edge security, web and mobile performance, enterprise access and video delivery solutions is supported by unmatched customer service, analytics and 24/7/365 monitoring. To learn why the world's top brands trust Akamai, visit akamai.com, blogs.akamai.com, or @Akamai on Twitter. You can find our global contact information at akamai.com/locations.

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Published 10/20.