BEYOND BROADCAST

#1:20

An e-Magazine From Edgeware About Next-Gen Online TV Delivery

THE NAB SHOW ISSUE:
WHAT DOESN'T HAPPEN IN VEGAS...

edgeware

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May 2020
An e-Magazine From Edgeware
About Next-Gen Online TV Delivery

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WELCOME TO BEYOND BROADCAST!

I hope this message finds you safe and well. Like many sectors, the media industry is currently going through a period of unprecedented change. And along with every business in it, we've needed to adapt quickly to the challenges of government lockdowns, remote working and the uncertainty that's hit all aspects of the market.

We understand this isn't easy. Broadcasters, content owners and online TV providers have no choice but to respond to these changes, but doing so comes with potential risk. It emphasizes the importance of remaining in constant dialogue with customers and partners – albeit without being able to meet in person. Providing support in a business environment hit by hesitancy and disruption is essential, even when conducted remotely. After all, it's customer input and demand that drives innovation forwards. Despite a lot of things being put on hold, this doesn't need to be.

While it's important for online TV providers and broadcasters to emerge from the pandemic stronger and in better shape, it's just as important to deliver an unbeatable viewing experience during it. The interest in fine-tuning networks and making sure services are working and performing well is certainly growing.

All of this is what has largely determined the content of our first Beyond Broadcast issue. Check out the article by our CPTO, Johan Bolin, to find out the steps TV providers can take to protect and improve QoE during the pandemic.

And of course, we weren't able to meet at NAB Show this year, but our show plans have not been put on hold. Alongside our virtual demos, we've encapsulated the online TV trends and topics that would have no doubt shaped our discussions at the show in this issue – from multi-CDN delivery to tailor-made content.

So, sit back, stay safe and take a look to find out what would have happened in Vegas…

Karl Thedéen
CEO, EDGEWARE

edgeware
TV Beyond Broadcast.

#1:20

ACKNOWLEDGE, ADAPT AND ACT: ENSURING QOE DURING THE COVID-19 PANDEMIC

From the very beginning, the practice of watching TV has been a form of escapism. Putting the stress of daily life aside to get lost in a football match, a compelling drama or a factual documentary is how viewers have grown to love TV. In the process, they have also challenged TV providers to deliver new and better content as their tastes and viewing habits have evolved.

*By **Johan Bolin***

The COVID-19 pandemic has built new hurdles for the TV industry to overcome, including productions coming to a halt, a shortage of live sports content, and a reduction in advertising revenue. But what it won't impact is the importance of TV as a source of entertainment and a means to 'escape'. In fact, with people staying indoors and having more free time, the need to be entertained has risen in value.

According to research conducted by Nielsen, staying put in our homes can lead to a 60% increase in the amount of content we watch. At the same time, the number of people using video-on-demand (VoD) platforms is growing, as demonstrated by Netflix's increase in subscribers and subscription revenues for Q1. People are turning to TV more frequently to be entertained – and escape the mundane everyday. And not just during prime time. Thanks to greater accessibility and the plethora of devices to watch content on, people are streaming both live and on-demand content over the internet 24/7.

AN EVOLVED CHALLENGE

With more audiences picking up the remote or open their streaming apps during the COVID-19 pandemic, pressure is mounting on TV providers to fill their services with compelling yet relevant content – all while ensuring quality of experience (QoE) is maintained. Although this isn't exactly a new challenge, TV providers are suddenly being faced with a surge in internet traffic, CDN usage and network pressures when delivering their content.

But, by actively acknowledging viewers' changing needs and behaviors, adapting to the dynamic content delivery environment and acting upon delivery issues before they become known to the viewer, TV providers can protect and improve QoE. So, what steps do TV providers need to take?

ACKNOWLEDGE

While entertainment remains at the core of TV's purpose, the pandemic has also reminded us all of how it can be used to inform and educate the public. TV is a trusted and reliable medium for delivering important information and more people are now tuning into televised news bulletins, with 67% of worldwide internet users watching more news coverage than they were before (Statista).

Considering the growing need to inform and educate audiences, inserting public safety messages into streams has emerged as an important capability.

By Johan Bolin
CHIEF PRODUCT & TECHNOLOGY OFFICER, EDGEWARE

However, most TV platforms don't have the technology in place to insert emergency announcements into ongoing on-demand streams. As an industry, it's our responsibility to make this technology available – and to do so quickly.

In addition to acknowledging the changing picture of TV usage during the pandemic, TV providers also need to acknowledge the issues these changes can present, particularly when it comes to QoE.

QoE issues should be dealt with on a per-user basis – not based on an average – due to the inherent fragmentation of the internet. Viewers are on different devices, connections and ISPs, so it would be inaccurate to make conclusions based on average values across large samples. By keeping a close eye on QoE issues on an individual basis, TV providers can better acknowledge who's experiencing problems and identify common patterns in a more efficient manner. This ensures that when the time comes to act, the right solution is deployed.

To do this, it's vital to have technology that granularly filters the high variation of QoE data and tells you what to look for. Manually searching for QoE issues can be overwhelming and risks missing out on unexpected patterns. The technology, therefore, needs to be highly intelligent to help you classify which problems you can do something about and which ones you can't.

ADAPT

The pandemic has moved faster than the world imagined, meaning TV providers need to remain agile and adapt to the dynamic content delivery environment. Adopting aggressive protocols to push people out of bandwidth when it's stretched thinly is not a solution. During these circumstances, TV providers shouldn't rely on someone else to shape the streams or decide how their content should be delivered. They need to take control of content delivery in a way which is effective, easy and respectful to others. After all, the internet is a shared resource and anyone who uses it should be mindful of others using it at the same time. One way to do this is by employing the latest codecs and encoding techniques, such as HEVC and VP9, to get the most out of the content.

But as CDN usage increases, it becomes more difficult for the content to reach the viewer seamlessly in the first place. If CDN capacity is a bottleneck during peak viewing periods, TV providers can use their own CDNs either via public cloud infrastructure, or by establishing a dialogue directly with the ISPs. Alternatively, using multiple CDNs can optimize content delivery by selecting the most optimal delivery path to reach the viewer.

With fine-grained delivery control and the ability to both select the optimal delivery path and shape bit rates where needed in real time, TV providers can better manage their content delivery to minimize – and be aware of – the impact it has on users' QoE.

STAYING PUT IN OUR HOMES CAN LEAD TO A 60% INCREASE IN THE AMOUNT OF CONTENT WE WATCH

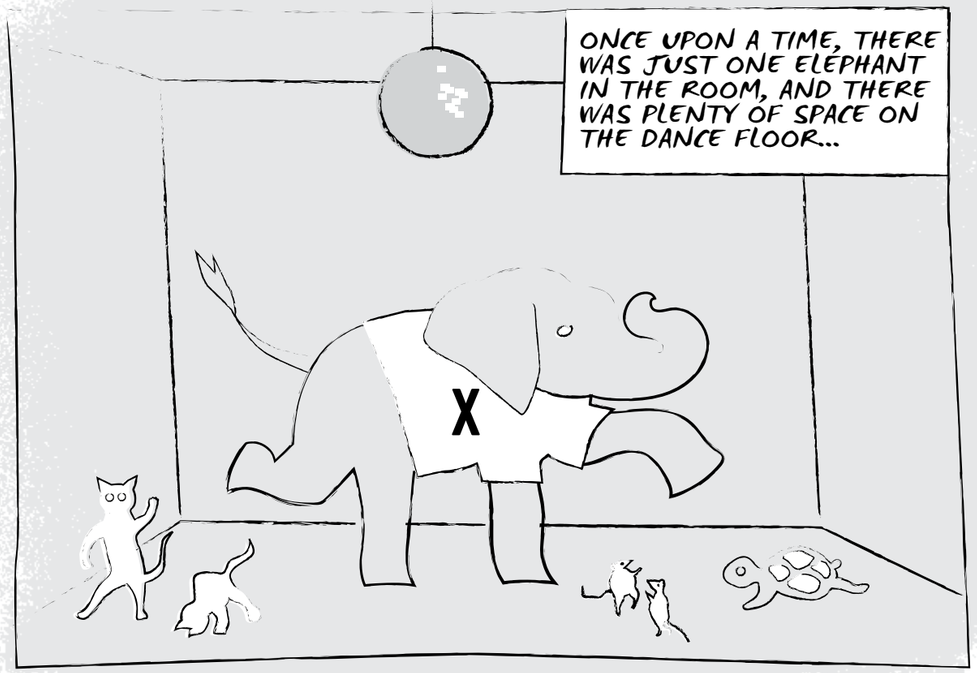
ACT

After acknowledging both QoE issues and external influences, and adapting to new pressures by adopting the most effective content delivery strategy and technology, TV providers can act upon them with confidence. It's simple: having the right mechanisms in place allows TV providers to act quickly.

No longer can TV providers rely on simply being proactive; they must now move much quicker to be more responsive and reactive to the situation at hand. The internet won't be less crowded in the future and the importance of TV won't go away, so the time to acknowledge, adapt and act is now.

THE ELEPHANT IN THE ROOM AND THE BATTLE ON THE DANCEFLOOR

By Johan Bolin
CHIEF PRODUCT & TECHNOLOGY OFFICER, EDGEWARE



For a few years now, there has been an elephant in the room of the TV market, and that elephant is called Netflix. But it's no longer just one elephant. Other heavyweights have also come along such as Amazon Prime and Hulu. Lately, and not missed by anyone, this small gang just got company from another couple of elephants.

During the last few months we've been bombarded with announcements from new elephants. Big global streaming TV providers such as Disney and AppleTV have been launching their streaming services bundled with attractive offerings including high profile TV series or popular device subscriptions. For example, Disney launching Star Wars series Mandalorian, and AppleTV bundling with an Apple device purchase. HBO Now and NBCs Peacock have announced their entry as well. So, now we have a herd of elephants!

As the room is getting more crowded, it is starting to turn into a noisy disco or club. So, when the non-elephants among us show up on Saturday night to pull off some slick streaming moves, surrounded by these not so slick elephants, you need to be fast and agile and you need to be able to navigate your way around the darkness and the smoke. Because if you're not, it's not only that you might have your toes stepped on. You risk becoming a bumper sticker on a shaking tail of an elephant. Being successful and impressing the audience is all about quickly identifying the free spaces and owning them. What am I trying to say here, you might ask?

THE DANCEFLOOR

Think of the room, the disco or the club as the internet. It consists of ISPs with access and core networks aggregating the traffic and interconnecting this with

other ISP networks, using internet exchanges, transit or peering. Internet exchanges are relatively cheap but limited in capacity and best effort. Transit on the other hand offers guaranteed capacity, but at a high price for both parties. Peering can often be better but requires relationships and agreements between both parties and can be politically challenging to settle. This is how the internet started and how it is still today.

With the internet's popularity growing, its symmetrical architecture didn't fit well with the content intense services offered there, which have asymmetrical traffic flows. A click on a web page, such as starting a VOD stream, often renders a huge downstream traffic flow.

To manage this, CDNs were introduced as an overlay infrastructure compensating for the asymmetry. CDNs are essentially caches and streaming servers that moves content and bandwidth expansion closer to the user, resulting in infrastructure savings and a better user experience.

But, CDNs use the same means to get traffic into the ISPs as ISPs use to interconnect, meaning internet exchange, transit or peering. In some cases, they may also have servers hosted inside the ISP's networks. A good example of the latter is Netflix, who's Open Connect servers are hosted inside many ISP's networks. As a matter of fact, most popular internet services today are delivered from CDNs and not from interconnected ISPs.

You can see the shared internet and the CDNs as a big dancefloor; the place where the show takes place and where stars are made.

THE ELEPHANTS OF TRAFFIC

Video streaming represents a large portion of all traffic on the internet – often estimated to be some 80-85%. For a long time, Netflix has had an impressive share of this. With the increasing number of new streaming services, there will be even more video traffic originating from a handful of sources. This traffic will enter the ISPs through peering, some through transit and a little via internet exchanges from CDNs. In the ISPs the traffic from various services will be added to the video traffic from the hosted CDNs and share the same core networks on the way out to the users via the access networks.

In the end, the quality of the user experience will depend on aspects such as how crowded the CDN caches and streaming servers are, how and where the streams got into the ISP, the capacity of the core network, what kind of access network is used and how many users are sharing the same connection? Since all these big streaming services are relying on the same, to a large extent shared best-effort infrastructure, they will impact each other.

THE DANCING

The elephants obviously count for the sizable traffic that these services represent on the internet. But what about the dancing? Why aren't these animals just finding a spot and staying put?

Well, these giants are moving for a couple of reasons. One is simply that while these heavyweights might not have a problem with their size, they have a problem keeping it. The size of each elephant is constantly changing, depending on who has a popular show, if there is a local or global live event, or a Christmas campaign attracting a lot of new users. And they could also be moving to reduce their costs and/or to optimize the quality of experience (QoE). Finally, some moves are outside the intentions, e.g. when CDNs are reaching their capacity limits, traffic will be moved around to load balance across servers and interconnect interfaces.

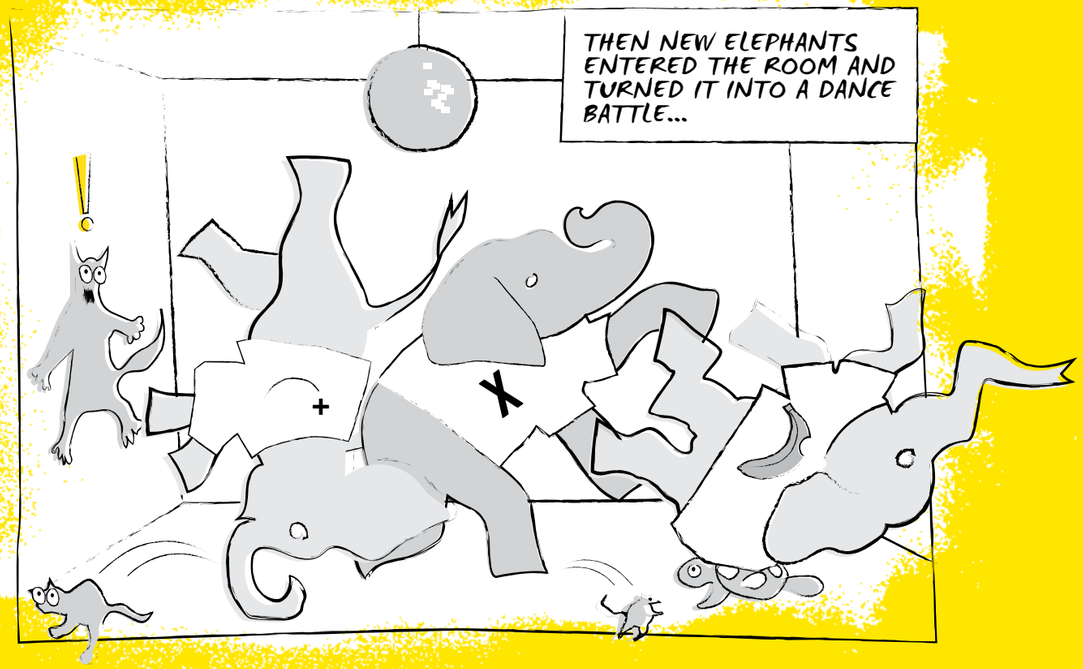
And when this moving happens, you don't want to be in the wrong spot.

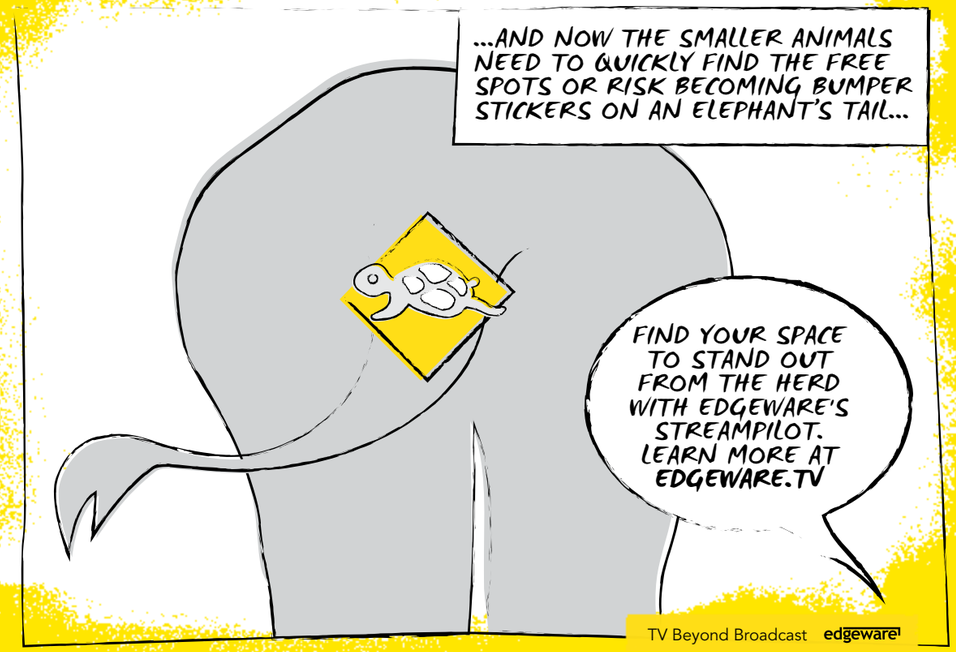
NAVIGATING IN THE DARK AND THE SMOKE

If you want to be someone, you better be on the dance floor. Surrounded by the dancing elephants, the question is if you have the skills and tools to be successful? Do you have the tools in place to know if your users are suffering from availability or rebuffing issues, or are you waiting until you learn about your problems in social media?

If you have the tools, do you know if the problem is the CDN caches melting down, crowded peering interfaces or over loaded ISP networks? Do you have visibility to see if there are better routes for your streams to avoid the most crowded spots? Would moving to another CDN help out? If you can see this, do you have the means and skills to move?

There are a lot of things for TV providers to consider, especially right now during the COVID-19 pandemic where streaming traffic is particularly high. Striking your best moves on the dancefloor has quickly become more challenging. Read on to explore the key internet issues that impact the viewing experience and how you can best navigate them to dodge the dancing elephants.





THREE KEY INTERNET ISSUES THAT IMPACT THE VIEWING EXPERIENCE

By ***Johan Bolin***

The internet has completely disrupted the TV and video market, transforming how and where we consume TV content. Central to this shift has been the symbiotic relationship between changing user behaviors and the internet's growing capabilities. As network capacity improves, users change how they use the internet, which in turn means more investment has to go into further infrastructure development.

What's more, the pace of change has been significant, which has placed a huge amount of pressure on the technical infrastructure – along with the streaming services that have to be able to provide a quality viewing experience.

But optimizing the quality of service on an internet-based streaming service is not about trying to control the internet. It's about understanding the possible bottlenecks and sources of disturbances, as well as having the tools in place to solve these issues if they appear. So, we've taken a look at three common internet issues and how they can impact a streaming service. We will start looking at the very last – or first, depending on perspective – connection to the end device and then work our way into the network step by step.

1. WIFI

WiFi is the default access method in a home network for mobile devices such as phones and tablets, but also laptops and various streaming devices connected to TVs. This means we can assume that a significant share of all content streaming takes place via WiFi over the last few meters.

These issues follow two quite different patterns. One involves a static throughput limitation as a consequence of radio propagation aspects, resulting in the player selecting a lower bitrate profile than would be expected from the ISP broadband subscription the WiFi router is connected to. For example, a customer who runs a broadband test from their wired desktop computer or laptop located close to the WiFi access point should get a good throughput, while the Chromecast device located between a metal TV-screen and a concrete wall will select a lower bitrate.

Another common WiFi issue is packet drops, occurring as a result of radio interference. This kind of disturbance typically appears in bursts, resulting in re-buffering since the throughput temporarily goes down as the network cannot deliver the requested bitrate. The user sees the dreaded "spinning wheel", while the client keeps trying to relaunch the content until the "bursty" interference disappears.

2. MOBILE NETWORKS

There are several similarities between the streaming issues experienced via WiFi and on a mobile network, primarily because both are based on radio signals. However, the patterns of these issues can be quite different.

Mobile users can be categorized into two different use cases. The first is a "fixed" use case, but using a mobile network. This could be either a Fixed Wireless Access connection, where a home router uses a mobile network as the "last mile" connection, or a mobile device like a mobile phone. In the first case, which is rather static, we are likely to see two kinds of mobile network related issues. One is a constant throughput constraint that is evenly applied on all devices that are connected to the same router, while another involves a relatively slow-moving pattern of degrading bandwidth. This comes as a result of mobile being a shared medium, meaning the capacity of the radio cell can become congested during certain hours of the day as many users are served by the same base station. What these disturbances have in common is that they are characterized by several devices in a household, attached via the same router and hence with the same IP address, all experiencing similar issues at the same time. And in the congestion case, capacity is shared between even more users in the same network and location.

The "real" mobile use cases, i.e. those involving a user on a mobile phone, can be affected by an additional issue related to mobility. For example, when using a streaming service while commuting on a train, the radio conditions will change as the distance between the device and the base station varies (in simple terms the bandwidth decreases as the distance increases, depending on whether it is 3G/4G/5G). It will also change during handovers from a less congested to a more congested base station, or even from a 4G to a 3G network.

These challenges, typically resulting in varying bandwidth and an increase or decrease in bitrate, follow a faster pattern than the static congestion related to "time-of-day" variation. They are also relatively unique to each specific user, rather than occurring as a shared pattern for several devices.

3. PEERING/INTERCONNECT

The internet functions as many different networks that are connected to each other. There are different ways to connect, such as via a best effort internet exchange, via a transit provider or via peering. Video streams are typically delivered via a CDN, and the most common way for a CDN to connect to an ISP (especially larger ISPs) is via peering.

Peering capacity is a scarce resource, often associated with both commercial and political interests, with the result that streaming from one CDN in to an ISP via a peering interface sometimes maxes out. There are a few typical indicators that this is the root cause of a problem. To start with, it typically impacts all users in an ISP being served be the same CDN. It also tends to follow a certain pattern – such as happening at the same time every day or week, or in line with a specific event like a big football game or an iOS update.

Since peering is an agreement between two parties – and in the case of video streaming, between a CDN and an ISP – one way of figuring out if the problem is peering related is to check the streaming from the same CDN to other ISPs, or the streaming from another CDN to the same ISP. And, if you have the capabilities, it's also worth checking how the situation changes if you switch the allocation of streaming from different CDNs.

These are just some of the challenges that service providers and network operators are coming up against in today's rapidly evolving world of content streaming. When it comes to quality of service, broadcasters and OTT providers have a lot to think about.

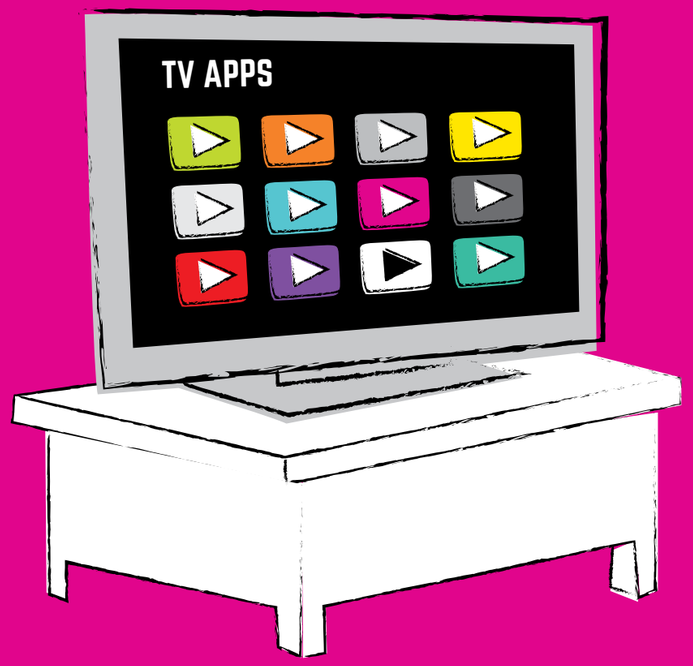
Johan Bolin

CHIEF PRODUCT & TECHNOLOGY OFFICER, EDGEWARE

Content customization, personalization and

THE PARADOX OF DIGITALIZED TV

By ***Johan Bolin***



By Johan Bolin
CHIEF PRODUCT & TECHNOLOGY OFFICER, EDGEWARE

It's no secret that the momentum behind the OTT TV market is showing no signs of slowing, which is what should be expected. Internet and on-demand simply offer a superior user experience, range and quality of content, as well as outstanding video quality.

Viewing habits are continuing to move towards on-demand streaming services where viewers are in control of what they watch and when they watch it, with younger generations now growing up considering internet the only relevant platform for video entertainment.

For example, the number of UK subscriptions to TV streaming services such as Netflix and Amazon Prime overtook those to traditional pay television for the first time in July 2018 – primarily driven by millennials and gen Z – highlighting the shift that is taking place.

However, despite more and more viewers switching off from linear TV, OTT platforms and content providers are coming up against some significant challenges. They now face an ongoing battle to ensure that their content can attract new customers, while being able to retain existing customers in an increasingly competitive landscape. This competition isn't just coming from OTT natives. Traditional broadcasters are also getting in on the act, adopting OTT delivery models in an attempt to meet customer demands.

And, while the rush towards internet-based distribution models continues to grow among all actors, driven by the vison of a user-centric fully on-demand and interactive ecosystem, there is also a paradox emerging.

DECISIONS, DECISIONS

The wide range of different streaming services and the rich catalogues of titles available introduces something that in psychology is referred to as Decision Paralysis. This is when the brain gets overwhelmed with options and alternatives, so the user instead choses nothing and walks away.

This is a new challenge introduced by OTT TV. And it is a risk not only for each content provider or broadcaster, but for the industry as a whole. Viewers not watching TV means they decided to do something else, most likely on the internet where there are many options.

Ironically enough, the traditional linear TV model did a decent job in avoiding this. Yes, there were fewer alternative options available, but turning on the TV was still a pretty lean-back and relaxed way of watching. There wasn't as much content, but you could still typically choose between entertainment, drama, a documentary, or sports.

In fact, according to the Nielsen Total Audience Report Q1 2019, there is a phenomenon starting to arise where users, after attempting to decide what to view on one of many on-demand platforms, end up turning on the good old traditional TV just to get out of the paralysis. Similar observations have been described in several recent articles and conferences.

This is not because there is a lack of content on the on-demand platforms, or that users don't want to be involved in selecting what kind of content to view. It simply means that there is a gap between the expectation of a lean-back experience and the user interaction flows and formats of today's on demand platforms.

The most common answer for how to address this is with recommendation engines, although there are a couple of challenges associated with that. For example, while it typically does bring down the number of presented options to choose from, it still requires the user to actively make a selection. Another challenge is that it generally only works with VOD assets and not live content, so it does not give the user quite the same lean-back experience as "just turning on the TV".

The desire for an experience more similar to the classical way of consuming TV becomes clear when you ask the users. According to research we carried out with YouGov of more than 6,500 adults across the UK, USA, Hong Kong, Mexico and Spain.

The research also found that 68% of consumers would be interested in content aimed at their local area and content aimed at their age group would appeal to 64% of people. If that's not enough, 68% said they would be more likely to watch a traditional TV channel if programming was more tailored to their personal preferences.

This clearly illustrates that there is a demand for content that can be adapted to fit the preferences of different audience segments. Whether it's related to age demographics, regional programming or fans of different sports teams, consumers recognize that having access to customized content can provide an enhanced viewing experience.

And, while viewers generally don't appreciate commercial breaks, advertisements are more accepted and perhaps even appreciated if they are personalized. Globally, more than two-thirds (67%) of respondents said they would be more engaged with TV adverts that were aimed at their personal interests, with this trend being higher among younger demographics.

TIME TO GET PERSONAL

With an evident demand for content personalization, the good news for providers is that with OTT TV comes the ability to create more tailored or theme-based content and channels.

Recent advancements in the technology infrastructure of Dynamic Ad-Insertion offer a glitch free broadcast-like viewing experience, even when the ads are personalized. Significant steps have also been taken by many OTT TV providers to improve both the user experience and, perhaps more importantly, boost revenues.

Although there has been a gap between the personalization of content powered by recommendation engines in the VOD portals, and the lean-back experience of linear broadcast TV, this is about to change. With the evolution of TV Playout to more OTT First solutions, new technologies enable Live and VOD content to be stitched together and presented as a traditional TV Channel, while at the same time being personalized. These channels could consist of content that is selected based on viewers' interests or demographic, enabling the development of new innovative campaigns and offerings to attract new users and create new revenue streams. The combination of personalization served as a curated flow of content gives the viewer the option of a fully lean-back experience, while also opening up opportunities for entirely new concepts.

This is particularly effective for live events, where temporary virtual channels can be built around the main attraction. Let's take a sports match as an example. Complementary content can be stitched into the main programming to let fans follow their favourite team both before and after the match.

Marrying the personalization possibilities from on-demand with the valued lean-back aspects of traditional broadcast is unlikely to be the final and ultimate way of packeting TV in a fully digitalized way. I hope it is not, as there is much more to be done. But it certainly is a new tool taking us one step further on the journey.

To learn how Edgeware solves this problem, download our Virtual Channel Creation Solution Brief.

WITH AN EVIDENT DEMAND FOR CONTENT PERSONALIZATION, THE GOOD NEWS FOR PROVIDERS IS THAT WITH OTT TV COMES THE ABILITY TO CREATE MORE TAILORED OR THEME-BASED CONTENT AND CHANNELS.

89% of viewers would be interested in watching TV content aimed at their personal interests.

68% of viewers would be interested in content aimed at their local area

68% of viewers would be more likely to watch a traditional TV channel if programming was more tailored to their personal preferences.

SOURCE: YouGov research in partnership with Edgeware, 2019

IMPROVE YOUR RELEVANCE WITH REGIONALIZED ONLINE CHANNELS!

– without adding extra playout, encoder and storage capacity

By ***Andy Hooper***

Many broadcasters are used to producing regional versions of their main channels, where news and weather (for example) vary by broadcast locality. The basic model is well established. Typically, national channels destined for localization have segments defined where the regional content is "spliced in", depending on the local area. Within Sweden for example, viewers who are based in Stockholm can watch a tailored version of a national channel that shows more content related to their city compared to viewers watching elsewhere. And as TV evolves, viewers who have grown used to this level of regionalization on certain channels will expect this to be replicated across all platforms and on all screens.

The 'splicing' has typically taken place in central broadcast facilities. The issue is that increasing the number of regional variations requires greater investment in production, encoding, storage resources and, depending on the distribution channel, broadcast spectrum.

Outside of public service broadcasting obligations, this poses something of a challenge, as the 'value' of a regional channel is inherently less (in terms of advertising reach) than a national channel. Yet, as broadcasting and TV distribution moves increasingly online, the possible applications for channel variations start to multiply. Regional weather and news, along with interest-based, content-based and advertising variations, are all possible, but creating them by investing in the traditional broadcast playout facility won't pay back.

Each of these channels taken in isolation occupies a relatively small niche, but in aggregate all regional channels together offer significant upside in reach. So, is there a way to produce regionalized channels in a way which is cost effective?

REDUCE THE PRODUCTION COST AND LET REGIONALIZATION REALLY TAKE OFF!

Edgeware's online TV origination system includes the Virtual Channel Creation solution, which has been conceived and developed to make the universe of customized channels available to broadcasters and content owners at realistic cost levels per channel.

Virtual Channel Creation is built on content stitching technology, which enables the stitching of channels in the segmented content domain prior to packaging into ABR formats for internet delivery. Way beyond a simple playlist function, Virtual Channel Creation results in the creation of a new dynamic manifest with each stitched piece of content indistinguishable from the others. With no change to the broadcast playout capacity, Virtual Channel Creation enables broadcasters or content owners to stitch together content from different sources to create new 'virtual' channels.

For content that varies by region – such as regional news or weather channels, or market-specific advertisements typically sharing national programming – the solution cuts costs by reducing playout, contribution, encoder and storage capacity needs. And, because of the API-driven nature of the Virtual Channel Creation solution, the option of creating new channels becomes computational rather than manual – opening up a new universe of possibilities.

HOW CAN ENCODER AND STORAGE CAPACITY BE MORE EFFICIENTLY USED?

In the broadcast model, regional channels take up a full 24×7 encoding resource and one full channel in the broadcast spectrum on the EPG, meaning the national content is encoded and stored multiple times. This storage obligation multiplies if the offer includes live-to-VOD / catchup or time-shift applications.

With Edgeware Virtual Channel Creation, national content only needs to be encoded and stored once. Regional content can then be stitched into the national channel in the IP playout from the origin to create each full regional channel. As a result, encoder needs are reduced. And if catch-up (Live to VoD) is required, the benefits multiply, as each unique piece of content is stored separately, and the channel is re-created on demand in the outgoing packaging process.

LOWER BITRATE OPTIONS BRING DOWN ENCODER AND STORAGE COST EVEN FURTHER

If this suits the application, lower bitrate variants of the regional content that is stitched in can be enforced at channel creation time. This reduces the encoder and storage capacity needs even further, while not noticeably impacting the quality for the viewer.

Use cases demonstrate a 95% encoder capacity saving for national channels and an 89% encoder saving for regional channels when using the option to use a lower bitrate variant for the regional channels.

IMPROVE YOUR RELEVANCE TO END USERS WITH REGIONALIZED AND/OR PERSONALIZED CONTENT

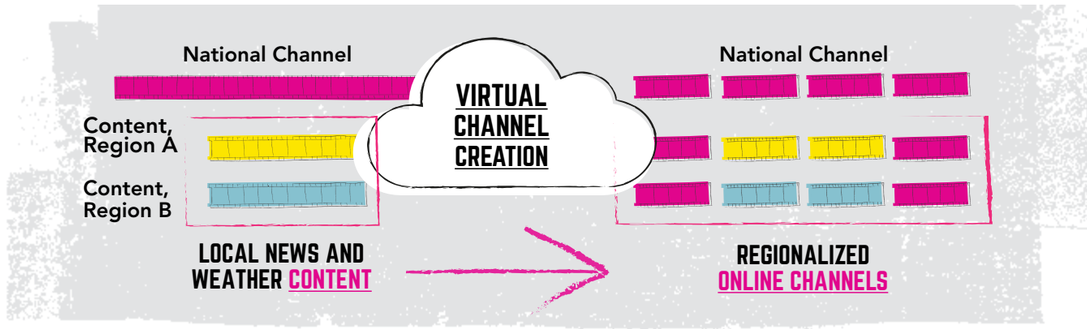
Creating theme-based channels around live events and pay-per-view is a way to increase viewing time and relevance for the end viewer. This is yet another use case for the Virtual Channel Creation solution and opens up unlimited possibilities for new innovative programming. Examples can include the concept of 'fan-channels', creating channels that address certain demographics or regions during big online music and/or sports events. The Virtual Channel Creation solution provides an easier and more cost-efficient approach to developing new revenue-generating TV services.

In addition, the Virtual Channel Creation technology sits before the final packaging step, which makes it possible to package virtual channels into all adaptive bitrate formats including Microsoft Smooth Streaming (MSS). Despite declining as a format at a global level, Smooth Streaming remains an important format in many markets and the Edgeware solution is unique in its ability to insert regionalized ads for Smooth devices.

The content stitching technology used in Virtual Channel Creation can also be used to efficiently manage restrictions in content distribution rights. Content distribution rights can include restrictions based on geographic region or TV delivery platform. By inserting replacement segments, programs or providing a blackout solution, the distribution rights can be fulfilled. The Edgeware solution supports this even for time-shifted content.

CONCLUSION

Virtual Channel Creation gives viewers an enhanced and more bespoke online TV experience with programming that is tailored to their home region or demographics. This makes the content more relevant and opens up the option of stitching content together in new and innovative TV service offerings, thereby increasing the value of broadcasters' content.



TAKING CONTROL OF YOUR OTT CONTENT DELIVERY

This article was first published in TVBEurope

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As consumers increasingly opt to get their TV through OTT services distributed over HTTP-based CDN networks rather than traditional packages, many service providers now need to use multiple networks to deliver their content. Ovum predicts that spend on CDN services will grow from just under $11 billion in 2018 to nearly $16 billion in 2023. This upsurge is because multi-CDN environments provide increased reach, redundancy and flexibility around peak traffic. So having a choice of CDNs to use becomes critical to ensuring fast, buffer-free streams that meet viewers' increasingly high standards.

There are, however, some very real issues when distributing TV content over the internet in a multi-CDN environment. The quality of the OTT TV delivery, for example, is left in the hands of the CDN provider. Content distributors, therefore, have limited visibility and no means to instantaneously fix any potential issues that may arise during the streaming session.

So what are the key challenges facing OTT TV providers and how they can be overcome?

LIMITED CONTROL AND MEASUREMENT OPTIONS

By relying on multiple third-party CDNs rather than having their own CDN infrastructure, OTT TV providers are losing overall control and insight of the end user experience when streaming media.

In OTT streaming, the vast majority of decisions are negotiated between the client and the CDN. This means that even the service providers themselves are outside of the decision loop. The client autoThis is all made even more complicated by the fact that each CDN comes with its own features and capabilities. Because these are not standardised, there is a risk that one CDN's capabilities cannot be provided by another. This makes it difficult to create one overall control functionality that works independently of which network is delivering the content.

LIMITED OPTIONS TO IMPACT THE SERVICE QUALITY IN REAL TIME

A multi-CDN approach typically involves relying on third-party CDN services, rather than distributing the content over a fully managed network. This means broadcasters and content distributors are in the hands of the CDN provider when it comes to acting on potential problems with the quality of the TV service.

The issue is that they lack instant access and the ability to act on key session data. This can include bitrate, the timing between segment requests, the type of device used, the video format and performance data from all delivering CDNs. As a result, a potential service complaint could easily end up in an SLA review, but won't be resolved during the ongoing TV show. This will heavily impact that customer's quality experience and may put them off from using the service in the future.

So, the ability to proactively identify potential drops in performance and manage the OTT TV delivery in real time – before a potential quality issue arises – is very limited.

These two challenges highlight some key questions for content providers. Firstly, is there a way to gain visibility into their customers' QoE without having to integrate with the client devices? And secondly, is there a way to control OTT TV content delivery across multiple CDNs even if they don't own and manage the CDN infrastructure themselves?

HOW CONTENT PROVIDERS CAN TAKE CONTROL

The good news is that the answer to both of these questions is yes.

In today's age of OTT TV where QoE is one important success factor, content providers have to find a way to take back control of the delivery of their content and gain visibility into the QoE without having to go down the client integration route.

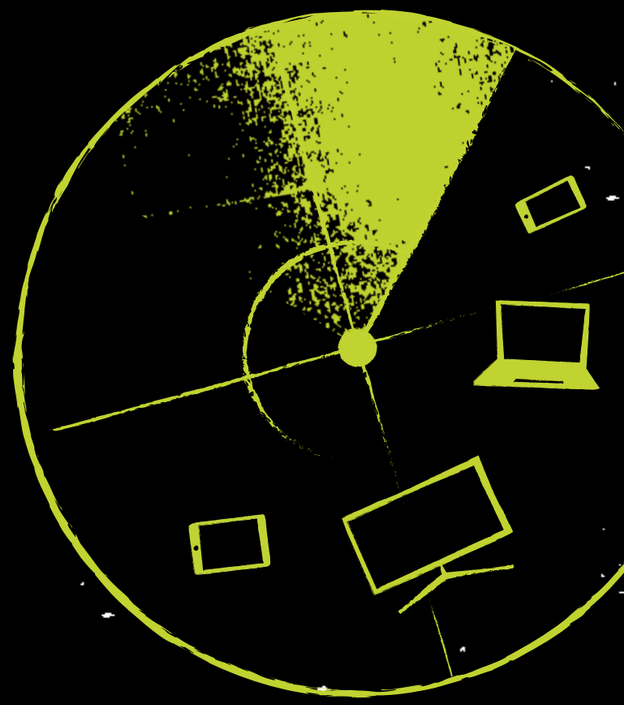
One of the most effective ways of doing this is to introduce a control plane-based model that can, in real time, select the optimal delivery on a per-segment granularity, independent of both client and CDN.

Such a model can provide a new level of control when it comes to multi-CDN delivery and bring content providers back into the loop, between the client and the CDN. Sitting in the control plane allows the content provider to orchestrate the delivery of streamed media and decide – at a granular level – where each segment request should be directed, i.e. which CDN should deliver it.

Giving content distributors independence towards both CDN providers and clients for both features and quality, thus avoiding any complicated client integration, is a strategic position to be in. Every segment request can be measured and should a problem occur, the session can be moved to another CDN to overcome it. What's more, the common denominator for the sessions experiencing a problem – whether source, client, geography or content related – can be quickly identified and actions can be taken for other clients in that same group.

This approach would also enable content distributors to act in real time before a drop in quality impacts the subscriber's viewing experience. And it means that it won't end up in an SLA review a month later.

Providers have to be prepared to take control of their TV delivery in multi-CDN environments as the move towards OTT content continues. A control plane-based approach can put the control back in their hands. It gives them the power to switch, modify and terminate sessions in real time, and avoid dependency to clients or CDNs to deliver the best possible service and experience to their viewer



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