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Influencing broadcasting as we know it

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Writing this as the snow falls heavily in the UK, it seems incongruous to think that March is the month in which we get the first glimpses of spring and the signs of better things to come. It's more or less the same in the multiscreen industry as we are now seeing the first signs of those technologies that will be unveiled at NAB (watch this space next month for our focused look at what may happen there) in April and deployed in the rest of the year.

If there are discernible trends to emerge so far – let’s forget the corporate slugfest between the major media owners attempting to buy each other – they mostly centre around streaming and building a business on acceptable quality delivery. In 2018 among the key trends will be multiscreen OTT viewing, hyper-personalisation and a stamping out of latency-related streaming issues. Making a business from broadcast-quality video content over IP networks needs three elements: high-quality bit rate, high reliability with near-zero delay, and reasonable cost. To date there are very few companies able to successfully address these criteria. But as we show this month, breakthrough technology is emerging. And it needs to.

As we have been saying all year, 2018 has to be when the burgeoning multiscreen services really turn the dial in terms of monetisation. They are now perceived as mainstream offers and the challenge is cash generation. For those looking at advertising as the principal funding method, this could well be the time when monetisation emerges as the key technology to optimise sales.

This month we will look at streaming quality and advertising technology plus cloud-based security for services, the use of open source software and one of our regional focuses, this time on the very interesting Middle East region.

We hope as ever you enjoy what we have to offer.

Joseph O’Halloran
Editor, Rapid TV Everywhere
Markets can become extremely demanding very quickly. Advances that are seen as exciting and novel at first are soon taken for granted and consumers become intolerant of anything less than perfect quality.

Take, for example, over-the-top (OTT). Last year, according to research from Conviva, global viewing of streamed OTT content doubled to 12.6 billion hours, while Netflix added 24 million new subscribers over the year. Yet, these days any hint of poor performance due to network latency or buffering makes viewers impatient and ready to turn off – or turn on to a different content provider. In addition, viewers are no longer satisfied to only watch on a conventional TV at home. The expense of downloading mobile data previously prevented them from viewing content away from home on mobile phones, laptops or tablets.

Now, the rise of 4G and the emergence of 5G and the diminishing cost of mobile data means people’s expectations of what they can watch and where have been raised further. Viewers are also no longer happy just to watch video on demand, they also want to be able to live stream major...
At the moment, if someone is watching content on smart phones or tablets on the train in Europe, they are still probably watching YouTube or catch-up TV. However, in places such as Japan and Korea it’s becoming quite usual to watch live sporting events or concerts away from home on mobile devices and in real-time. It seems likely that this expectation will soon be spreading.

**The quality question**

Yet, now that watching live streamed content on a mobile device is beginning to take off, the quality question is becoming more acute. As a result, these are the reasons that many broadcasters and operators are having to rethink the way they deliver content streams to their customers as OTT live streaming is highly demanding on bandwidth. You can imagine the scenario – it’s the FIFA World Cup Final this summer and it goes into extra time. Millions of viewers are already watching the match but now millions more want to live stream it too. Any operator will struggle to deliver each stream at the best possible quality and with as little latency as possible.

For this reason, if they wish to continue to drive the OTT revolution, operators must reassess their infrastructure. Some may be using unicast technology. However, this means that if they want a million subscribers to be able to watch the same live match or concert, they need to send the stream a million times. In other words, unicast is not very scalable and puts a huge strain on network bandwidth.

Consequently, when it comes to a multiscreen service, many operators are now considering multicast technology for adaptive bitrate (ABR) protocols in a managed network. Using this technology, one million subscribers will have the same impact on the network as one subscriber. From the operator’s point of view this means sending the signal only once, which saves a huge amount of data bandwidth on a mobile network so everyone can achieve a similar quality experience.

This is because the ABR protocol enables the signal to adapt according to the size of screen on which the broadcast is being watched. The larger the screen, the higher the quality of signal is needed to accommodate the extra size and additional pixels. However, it doesn’t make sense to deliver a 4K quality stream to someone watching on an iPad or a smartphone and it’s an inefficient use of bandwidth capacity.

Nevertheless, there is still one more barrier to overcome. No operator uses fibre or DSL only. They are all working across a number of different networks. In fact, the current trend in the market is around consolidation, which means that many operators end up with a network using different media including mobile. Some multicast ABR technologies are not compatible with all transport methods.

Any live streaming service making use of multicast ABR technology should be compatible with LTE broadcast, so providing one content delivery transport that goes across all networks including the 4G LTE mobile network.

The good news is that this also improves the quality of the live streaming for the viewer. They can now expect a smooth stream regardless of location or viewing device. They can even change the network they are using in the middle of streaming.

For the operator it provides a way of future-proofing their service – enabling them to work across multiple networks and preparing them for the rise in mobile viewing. It’s estimated that the live video streaming market is set to be worth more than $70 billion by 2021. Multicast ABR is also highly scalable which means an operator is never limited in the number of viewers it can accommodate without threatening quality of delivery.

At the moment, multicast ABR technology is not widely used across the industry. This means operators have a window of opportunity to get ahead of the inevitable rise in live streaming over LTE networks.

Viewers are becoming increasingly sophisticated and expect the right technologies to be in place to deliver the quality of service they have come to expect. They are not interested in the complexities behind the technology – only that they have a continuous and consistently high standard service and that they don’t have to miss watching that last minute win-or-lose penalty because of bandwidth failure. Multicast ABR is the perfect solution to keeping these viewers happy while also making life easier for the operators behind the scenes.
At Verimatrix, we live mostly in the realm of video distribution, securing video services from threats like piracy, redistribution, and copyright violations. We also have solution to add analytics, measuring the details of technical delivery and audience interest. Both functions, security and analytics, have been available in cloud form for some time. But recently, interest has spiked.

What has changed? Why is the cloud transition compelling now? In the past, our customers would talk about an undefined future in which some administrative functions, but probably never all video delivery, would be handled in cloud environments. Now, the conversation is about how and how soon. Our view is that several things changed.

Many video creation and contribution workflows moved to the cloud. These functions play to the cloud’s strengths: project work, with uncertain scale and duration; quick adoption of new technologies and techniques; and economics tied to usage. And, once a critical mass of content is stored and available
in the cloud, there’s no benefit to expense and complexity formerly needed to bridge the contribution and distribution worlds.

In the old model, video content is encoded, encrypted, uploaded to a satellite, downloaded to a cable head end, decrypted, decoded, re-encoded, and re-encrypted. In the new model, the video content is encoded, encrypted, and stored in the cloud, where it can be delivered to cable head ends simply by exchanging encryption keys and URLs – and in many cases, delivered direct to consumers in the same way from the same platform. The savings, in infrastructure, labour, and workflow risk, can be enormous.

Another change is the proven scalability of adaptive bit-rate (ABR) systems. Cable and IPTV systems have depended on broadcast or multi-cast models for efficient video delivery. Why send out 100 million unique streams when we all watch the same sporting event? And the mantra, even from leading CDN providers, has been that large scale unicast delivery would break the internet. The success of Netflix, Amazon, Hulu, and other OTT services tells the story. Video has gone ABR, and the internet isn’t broken.

Look at the launch of the AWS Media Services, based on AWS Elemental video solutions: it is now offering an integrated suite of services that makes it easier to host the complete video workflow in the cloud.

The final change is about visibility. In the past, pay-TV operators have had a strong bias in favour of capital investment rather than operating expenses. Financial analysts (and as a result, executive bonus plans) tracked EBITDA as a core performance measure, explicitly ignoring capital expenditures. In a new environment, where long term subscriber trends are uncertain, it may be more difficult to sponsor large multi-year capital projects. If fewer households will subscribe in the future, or if households will drop some set-top boxes in favour of tablets and phone screens, it may be attractive to rent cloud infrastructure as and when needed.

Security in the cloud

As a provider of revenue security, cloud security is a highly significant trend because it brings together a number of other themes that have become increasingly visible.

In response to the security challenge posed by Ultra HD content, as set out by MovieLabs in particular, the industry has moved towards hardware-based roots of trust in client hardware to replicate the level of revenue protection long taken for granted in operator-owned set-top boxes. In line with the migration to the cloud, there is now a growing movement away from such boxes directly under operator control to retail devices purchased by the consumer.

This move towards commodity retail devices is strengthening the call for the kind of software based cloud-native renewable security, especially in the light of the high-profile Spectre and Meltdown vulnerabilities that have shown up at the hardware level.

This has emphasised the importance of instilling security right across the whole value chain starting with the hardware and then running through renewable security. After all a root of trust is a misnomer if it has vulnerabilities that mean it cannot after all be trusted.

Benefits of secure analytics

In parallel with rise of the cloud there has been fast growing use of advanced analytics to drive many aspects of video content production, management and distribution, including QoE monitoring, recommendation and personalisation. Analytics is intimately connected with content security because that is the source for a lot of valuable data about entitlements and user actions. By the same token a lot of analytics data itself is highly sensitive or confidential and needs protecting against eavesdropping attacks to ensure privacy.

As both sets of functions move to the cloud the boundaries between them are dissolving further as they become increasingly inseparable. The two together also reinforce security monitoring in the cloud, which is becoming essential to provide early warning of impending attacks as well as enable fast response to the intrusions that inevitably will occur occasionally no matter how strong the perimeter defences are. That way any damage can be limited and locally confined.

With change comes new opportunities. We are excited about this new phase in the video services industry and look forward to helping our customers and partners successfully make the shift.
OPEN FOR BUSINESS IN A MULTISCREEN WORLD

Access to an essentially free code base is dramatically reducing software development costs in terms of development cycles, due to system reuse. Yet, warns Access global product director, Robert Guest, there are numerous questions around the short-term benefits of open source.

The open source movement has radically transformed software development – and has had a global impact across all business sectors, including the media and entertainment industry. The ability to access a vast array of software modules and the underlying source code has enabled software developers to utilise common functionality, and focus on innovation and value added services. Today, most embedded platforms are developed using Linux, an open source operating system and compiled using the open source gcc compiler. Open communications protocols such as a TCP and IP power the Internet, and OpenSSL is another open source technology widely used to provide security.

Yet, where open source undoubtedly provides increased potential for innovation, there are a number of pitfalls that engineering teams and operators need to recognise to ensure that short-term benefits of open source don’t turn into long-term problems. The fundamental expected benefit of access to an essentially free code base is dramatically reduced costs in terms of software development cycles, due to software reuse. However, the flip side is that highly skilled developers, with a wide knowledge of the adopted modules, are required to build successfully deployable solutions. These are an expensive commodity – and if outsourced, then knowledge can easily be lost.

After initial development, a major underestimation can be the cost of maintenance, such as ensuring that the software remains functional for the product lifetime as new standards are required, security patches are released, underlying APIs change and new features are added to essential modules. This requires a long-term commitment to the software lifecycle.

Another challenge revolves around integration, code testing and documentation. In the highly diverse modern environment, ensuring that the application developed works across multiple target devices and operating systems is a major endeavour. This requires an additional ongoing commitment to testing, and well-defined and executed QA processes. Validating managed set-top boxes is no longer sufficient, with consumer devices such as smart TVs and media players for OTT services now in the mix. Adding the iOS and Android ecosystems for value added second screen services; the number of operating systems versions and potentially sub branches can easily run into the hundreds of combinations. The ability to test all these groups requires a significant investment.

Yet these challenges are not insurmountable. Adhering to standards and working with experts around field proven foundational
elements can help reduce the burden. This is an area that organisations such as DTVKit, a UK based not-for-profit organisation that is collaborating across the consumer electronics industry, can help service creators and consumer electronics manufacturers to deliver production-ready DVB software, which is continually developed to meet evolving standards and enhance features. DTVKit provides an innovative, shared source approach enabling it to continue to evolve the software solution with partners, while still providing open access to source code to enable custom modifications. With the addition of technologies such as Access Twine for media redistribution, remote access and IoT services, and the Access NetFront browser family for portable UI development based on HTML5, HbbTV 1.5, HbbTV 2.0.1, BML and/or Hybridcast, developers can deploy compatible solutions across Linux, iOS and Android environments. Utilising a commercial partner for fundamental building blocks ensures that, as the target platform and software environments evolve, the key technology components are updated, enabling operators and service developers to focus on the key value for their customers – the video service.

This approach of combining standards, deployed technology, deep industry expertise and leveraging open source where appropriate allows developers to benefit from the stability of a code base that has been tested for interoperability, whilst still enabling service innovation and certification. Operators also benefit from the ability to reduce costs for commodity components and increase flexibility through the benefits of open source, with the reassurance that key elements adhere to industry standards and are backed by expertise, new feature development, ongoing updates such as security features, and bug fixes.

The market trend towards more hybrid services that mix over-the-air linear and IP based streaming, plus value added on-demand services, shows no sign of slowing down. The industry needs reliable broadcast focused technologies blended with browser based application environments for service creation to ensure operating system neutrality and the greatest cross platform compatibility. Similarly, as consumers widely adopt second-screen devices to enhance their viewing, operators need a proven and open method to continue to innovate and create services for the upcoming IoT-enabled, content everywhere era.
High-quality, long-form content continues to shift from being consumed via traditional multichannel video programming distributors (MVPDs) and set top boxes, to a range of connected devices that deliver video over IP. This shift in consumption habits is creating a pool of IP-enabled inventory, which is monetised differently than traditional TV. An example of data underlying this trend comes from MoffettNathanson, which reports that in Q3 ’17, linear video services lost 872,000 subscribers while virtual MVPDs, like SlingTV, added 962,000 subscribers.

For a TV ad-buyer at a media buying firm, the targeting afforded by IP is exciting, but the workflow and measurement conversation may be unfamiliar. A lot of this growing pool of inventory is created using server-side ad insertion (SSAI) and the video ad tech ecosystem is under pressure to come together to make this opportunity valuable for the networks, distributors, and buyers who increasingly want to transact programmatically.

SSAI is known for being a valuable way for content owners to achieve improved reach across devices, counter ad blocking, and provide users with a more seamless viewing experience. What is exciting is how the broader ad tech ecosystem is enabling the technology to deliver from a revenue perspective as well.

MediaWorks, a leading broadcaster in the use of SSAI, was able to realise a 35% lift in available ad inventory. It began reaching connected living room devices and older mobile devices with stitched streams. It started beating ad blockers on desktop web. Additionally, MediaWorks found that reducing the errors and buffering...
that comes with client-side ads, and delivering a seamless, ad-stitched stream, drove a 14% lift in time spent viewing per session, which created even more available impression volume.

Critically, the video and ad tech ecosystem enables content owners like Mediaworks to monetise its video inventory however it wishes. If a broadcaster relies on selling its inventory programmatically, whether in a PMP or leveraging a range of SSPs or exchanges, there may be some education and adjustments required to optimise fill rate and yield in an SSAI workflow.

The good news is that the buy-side is excited about SSAI inventory because it’s overwhelmingly available on big screens via connected TVs and consoles and in premium content because the more mature broadcasters and service providers have been the early adopters.

Who is solving for what?

If the critical parties in an SSAI workflow are reflected by the diagram above, the purpose of industry bodies like the IAB TechLab is to drive alignment across them in support of the broadcasters of the world.

Alignment is needed in the verification of inventory sources and video impressions that are coming from SSAI services. Vendors that have been whitelisted by programmatic technology companies ensure that inventory from customers is recognised as valid for bidding. Companies like SpotX are also taking the step of explaining to DSPs and buy-side ad serving companies that the beacons they will be getting, as ads are delivered, often come from the server rather than end devices and are following the required protocols of those buy-side partners.

Kevin Schaum, Advanced Solutions Group senior director at SpotX, has previously stated: “We’ve spent the past several months solving the complexities of combining programmatic technology with server-side ad insertion. We needed to make sure DSPs have the ability to buy and report on SSAI video inventory, so we’ve had a ton of communication with our DSP partners explaining how SSAI inventory will be sent to them in OpenRTB and the technical requirements for ingesting tracking events sent from SSAI servers.”

DSPs are able to utilise device IDs, IP addresses and geo-data to target audiences across SSAI inventory. Any other targeting parameters needed to optimise bid prices (and fill rate) can be passed via key value pairs in the ad request, just as is the procedure in a client-side scenario.

Another item that needs attention is the amount of live inventory coming online -- whether from a linear 24x7 scenario, or any number of live event use cases, such as sports. SSAI+SSP workflows support things like podding, competitive separation and other requirements of linear. With live sports, there is a concern around scale and the step of either conditioning DSP bidders for a massive influx of requests when 500,000 concurrent viewers hit the two-minute warning of an NFL playoff game or finding a way to stagger requests going into an anticipated break. Thoughtful SSPs are coordinating with the demand side about ways to avoid overspend with many simultaneous requests and honour desired frequency capping targets.

Next steps

Another area of problem-solving falls in the realm of the IAB. For example, the promise of VAST 4.0 to accelerate progress further includes benefits like Universal Ad ID, which help stitching services like Brightcove SSAI know that it has already seen and transcoded a piece of creative before, somewhere in its system.

With VPAID not supported in SSAI, the importance of VAST 4.0’s ability to separate the video ad file from the sidebar of instructions for measurement and other player-side activities is also important. We’ve already seen the power of being able to deliver viewability metrics from providers, such as Moat and Integral Ad Science, when that is a requirement in a desktop SSAI scenario.

The future

For SSAI to be adopted, in all scenarios where content owners and distributors want to use it, the ecosystem needs to be aligned.

The buy-side needs to get what it want in terms of targeting capabilities and analytics.

The sell-side needs to be able to have high technical performance and high business performance. It needs sufficient demand (interested buyers, buyers that can handle scale) and it needs to be able to implement SSAI easily.

SSAI will be the right answer for a high percentage of premium inventory in the future. We counsel our customers to think of it like this (vs. client-side):

With the support of ecosystem pillars like SpotX and the IAB we will see a future where this combination of reach, targeting, and user experience delivers a big payoff.
Most news and developments in the Middle East broadcast sector were eclipsed last year by beIN Sports being pulled off the air in several of its key markets in the region over the summer, the sportscaster finding itself caught in the crossfire of a political dispute with ramifications far greater than either sport or TV. This red herring aside, there are lots of other signs that the TV market in the Middle East sector is thriving.

Much of the recent history of the pay-TV sector has seen providers broadly following the strategies of their Western counterparts. They have targeted high-end segments of their respective markets with a premium offering featuring the top series, movies and sports rights, along with product offerings (HD, DVR, VOD etc) aimed at making that premium content enjoyable in the most premium way possible.

What operators globally are now grappling with is the fact that there is a ceiling for people willing to pay $100+ a month for a pay-TV service – and Middle Eastern providers are finding that that ceiling is particularly low. Even markets with large GDP per capita mask a divided population, and there just aren’t enough people in the market willing to pay this kind of price to make, say, the 30-50% penetration seen by big European operators achievable in the Middle East.

Content rights
Acquiring content rights is also a much more complex balancing act than it is in more ethnically homogenous markets. Increasing content costs are hitting all operators hard, but it is particularly challenging in the Middle East, where operators must provide the newest content from Hollywood, and “local content” – which in itself is a misnomer in the region. Egyptian content is different.
from Emirati content. People in Jordan have very different viewing habits to people in Yemen. The large South Asian and Filipino immigrant populations in many parts of the region means buying content for these audiences, too. And then there’s Turkey and Korea – two countries whose content, particularly soap operas, travels exceptionally well in parts of these regions. Buying for this many audience segments is not cheap.

How to harness the market
And piracy? Most observations on the Middle East tend to focus overwhelmingly on it, so I won’t here, but: it exists, and it is a problem for providers. So far, so negative. But this is a market where, among the customers we have worked with, at least, people watch about 6-8 hours of TV a day, compared to 4-5 in Europe and the US. It usually pays to be in a sector where people are avid consumers of your product. So how can operators harness this?

Predictably, the answer is OTT. This is probably the case for all operators globally, at some point, but will happen more quickly in the Middle East. It is a mobile-first market – especially among millennials. Smartphone penetration is high, and many people don’t have credit cards and the lack of friction that mobile payments can provide naturally favours OTT. And network infrastructure often does not support fixed line services.

We already see these trends play out when we look at data from the market. Most Western operators have used OTT for two strategic reasons: i) as a way to increase the appeal of their core services, and keep their most valuable customers, and ii) as a way to win new customers who have never been in the market for a full price pay-TV service with all the bells and whistles. We see many more customers in the Middle East who are top-tier subscribers, but who use OTT instead of VOD, PVR and other more ‘traditional’ pay-TV services. These subscribers tend to skew slightly towards smaller cities and towns, so our assumption is that infrastructure availability is driving these choices. Some homes don’t have broadband speeds that support these services.

All of this means that OTT will not only thrive, and that we will see a greater divergence between what Middle Eastern services look like, vs their international equivalents. We’re already starting to see this divergence when we compare services like iFlix and Netflix. Netflix has claimed that more engaged members of its audience in developing markets are those that watch more content via connected TVs or streamers – as is the case in its other markets. And all the most popular content is Western, unsurprising given its content library.

iFlix – made in Asia, but launched in the Middle East, and arguably engineered much more with the Middle East in mind – is very different. Its most engaged audience, and most of its audience in general, watch on phones, and do so using the lowest bitrate possible. This tends to happen even in markets where mobile data is inexpensive, and when people are watching on HD phones – because this quality is ‘good enough’. And local content rules. The most popular content on the iFlix service is local, even though Western content is available on the platform. A lot of classic movies from Indonesia, for example, are difficult to find on BitTorrent.

This latter point is particularly relevant for the Middle East and perhaps speaks to a truism that really does apply globally – that any service that can provide a better experience than piracy will eventually win out. Middle Eastern operators may just have to work harder to find that edge.

“The most popular content on the iFlix service is local, even though Western content is available on the platform”
Live streaming presents an opportunity for media organisations to satisfy viewer demand for content anywhere, any time and on any device, and also offer a cost-effective alternative to traditional video contribution methods. To live stream broadcast-quality video content over IP networks with low start-up delays and no glitching, media organisations need a solution that can support high-quality bit rate, high reliability with near-zero delay, and reasonable cost. However, no live streaming solution to date has been able to offer all three. Today’s solutions all require trade-offs, with customers able to achieve only two of the three at best.

Traditional distribution systems require expensive and specially provisioned infrastructure to avoid degrading play-out quality, such as dedicated terrestrial fibre networks with high quality of service to ensure low latency and low packet loss, or more costly satellite feeds. These solutions are not available on demand and can require large capital investments and long lead times. Also, the linear feed format is difficult to customise and integrate with file- and cloud-based workflows.

Commodity internet
Commodity internet, on the other hand, is pervasive. It’s available everywhere, even at short notice. It’s inexpensive compared to dedicated circuits. And it’s ‘always on’, meaning customers have 24/7 access; no permissions or check-ins required. It’s also inherently bidirectional, which makes it easy to send a return feed in addition to the primary feed.

However, IP-based video transport solutions, such as those that use forward error correction (FEC), peer-to-peer distribution and ‘inverse’ CDNs, have failed to provide the universal quality and near-zero delay experience of dedicated fibre networks, or the predictable reliability of traditional live satellite transmission. This is because they cannot guarantee in-order arrival and sustain high bit rates over long distances. Commodity networks such as WAN, internet and wireless have inherently higher round-trip time and packet loss for which today’s solutions require adding significant latency or costly workarounds.

Traditional TCP-based approaches like adaptive bit rate (ABR) streaming over HTTP can work well for distribution, but induce significant latency, often resulting in lower quality video and a diminished user experience. ABR is also operationally complex, requiring all video sources to be encoded into multiple bit rates with additional storage and encoding costs. Traditional FEC is highly bandwidth inefficient and introduces additional latency. Even with the most efficient error correction coding, live point-to-point delivery requires up to 25% more bandwidth, is significantly delayed, and reliability is dependent on network conditions. Aspera FASPStream has been designed to be the first open video transport solution capable of five nines (99.999%) reliability, highest-quality live streaming over commodity Internet WANs with no buffering, no glitching and negligible start-up delay. It’s agnostic to video type, encoding and format, and supports live video, growing files, and adaptive bit rates from transcoding workflows and media servers.

Such an approach to delivering broadcast-quality video streams from the venue to the production facility in real time enables new workflows once thought impossible. Creative teams can begin working on a live capture feed from a remote location – across the country or around the world – while the event is taking place, without the delay of a file-based workflow. Editing, transcoding, packaging, and other downstream workflows can start immediately, significantly shortening the production cycle and enabling media organisations to immediately monetise their assets.

Furthermore, it is now possible to eliminate the need for expensive, proprietary backhaul infrastructure, transport and distribution, and to reduce the cost of remote productions. By lowering production costs, media companies can create and deliver targeted content for new audiences. We see the ability to deliver high-quality video over commodity internet as an industry breakthrough that changes the economics of video contribution.