

DIGITAL

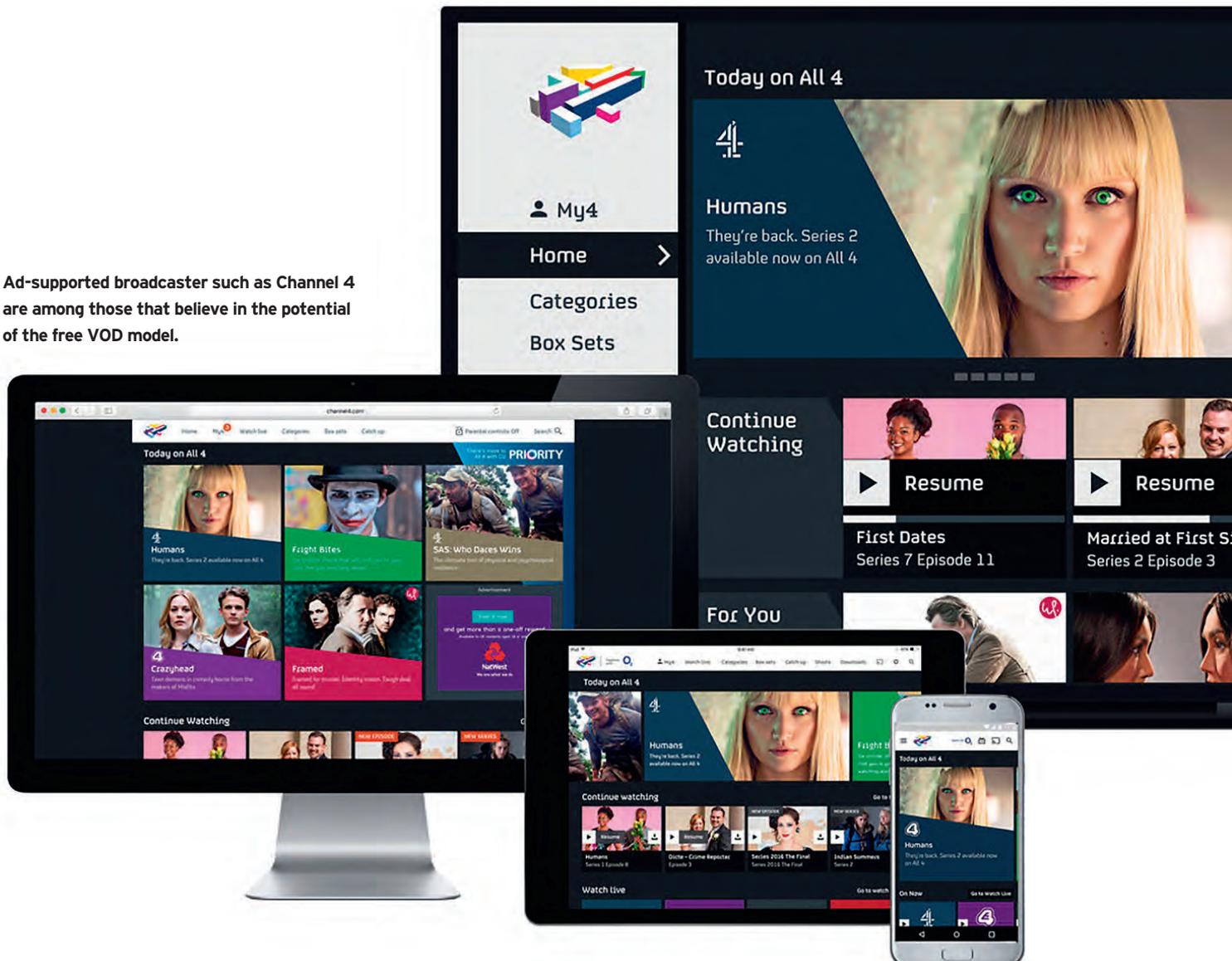


July 2019



Multiscreen & OTT Series 2019

Ad-supported broadcaster such as Channel 4 are among those that believe in the potential of the free VOD model.



The rise of the AVODs

With subscription costs mounting and the SVOD market becoming more crowded, Jonathan Easton looks at the attractions of advertising-supported video-on-demand.

When Netflix added a streaming option to its DVD rental service as an optional extra in 2010, few could have predicted that it would create the seismic shift that it did in the following years.

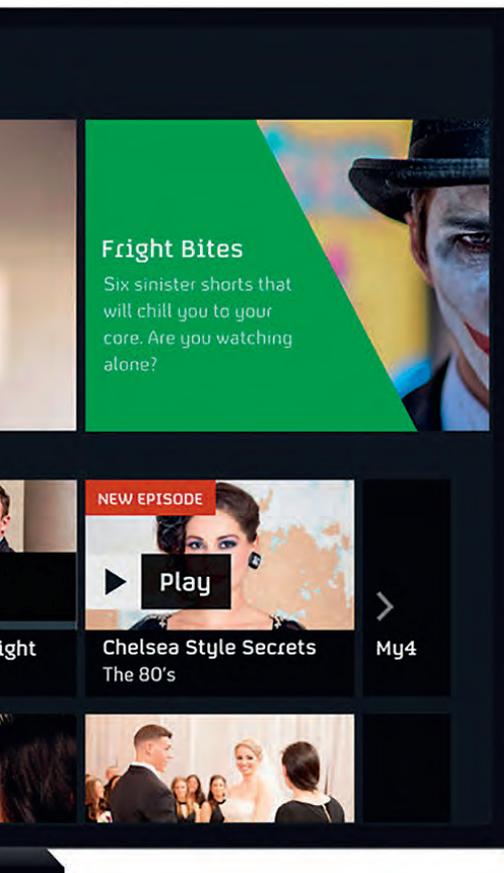
Of course, Netflix was not the first company to offer a subscription-based video on demand service. Amazon launched

Amazon Unbox in 2006, which, through various transformations and name changes, became what we now know as Amazon Prime Video.

Other 'free' VOD services have also sprung up in this time. The BBC launched BBC iPlayer in 2007 which was, ostensibly, freely available to anyone in the UK, paid for by the TV licence. Though it should

be pointed out that it only became a legal requirement for viewers to have purchased a TV licence in 2016.

In the wake of the iPlayer's UK success, similar services launched in the UK, such as ITV Hub and All 4 (formerly 4OD). Without the benefit of funding from TV licence fees, these platforms are, like their linear counterparts, free to view but



behind an information paywall and funded by advertising – AVODs. This is a model that is seeing a huge amount of interest internationally.

Safe to say that, over the past decade, the landscape of video consumption has radically transformed. Established broadcasters are looking over their shoulders at the burgeoning competition and are trying to get a piece of the action.

But for any broadcaster that wants to get ahead in VOD, they are posed with several different questions. First do they licence their content to one of the big players, or do they decide to go direct to consumers? Should they settle on the latter, what model for revenue should they follow: the free-to-view AVOD or a paid-for SVOD?

And these are the questions being asked by the entire industry amid an increasing shift to non-linear programming. According to the European edition of the 2019 Pay-TV Innovation Forum from Nagra and research consultancy MTM, 79% of executives feel that these rapidly growing OTT services present a major opportunity to become 'super-aggregators' of content. By 2024,

94% of the execs believe major platforms in European markets will carry 20% fewer linear pay TV channels than today, with VOD being the way to go.

State of play

Realistically, we live in a world where most OTT households will have one, if not both, of Netflix and Amazon Prime Video. For many cord-cutters and cord-nevers these platforms are the basis of their viewing experience and, as such, will view any new platforms as an addition to, rather than a replacement for Netflix and Amazon. Even Disney – arguably the biggest name in global entertainment – and its Disney+ SVOD is likely to live next to Netflix.

This is okay for Disney, but not everybody has the name recognition or library of Disney. And Disney only viewed launching an SVOD as viable having acquired 20th Century Fox and its back catalogue of content for US\$71.3 billion (€62.59 billion).

For Justin Gupta, head of broadcast and entertainment, UK & Ireland at Google, the market will logically divide between SVODs and AVODs based on one main key factor.

"For video platforms and broadcasters going direct to consumer, AVOD is the obvious choice," he says. "For niche content providers, SVOD makes more sense, in the beginning at least."

Though there is never a 'one size fits all' rule, Gupta's description reflects how we

This way of looking at the market then creates a huge gulf between those niche services and the aforementioned likes of Netflix, Amazon and Disney. Such a gap, as Gupta suggests, is the place where AVODs will thrive.

Despite rising in prominence recently, AVOD is hardly a new phenomenon, as Rhys Nölke, senior vice president strategy and business development at RTL Group says: "We were among the frontrunners in advertising-funded VOD offers in Europe. Back in 2007, we launched our first AVOD service in Germany, which is called TV Now today. Ever since, we have continued to expand our VOD services in all countries where we have strong families of TV channels leveraging our platforms across the Group."

There are many audiences across Europe who have only known free to air television. For them, an ad-supported model which incurs no financial cost is a more familiar and appealing proposition than paying for an SVOD. Even for those who subscribe to a service such as Netflix or Amazon Prime Video, a recent report from Parks & Associates suggested that the SVOD market has become "saturated" and that fewer viewers are looking to add another subscription.

Similarly, broadcasters want to best utilise their extensive content libraries to reach as wide an audience as possible while simultaneously maximising revenue. In this sense, removing the financial barrier

"We were among the frontrunners in advertising-funded VOD offers in Europe. Ever since, we have continued to expand our VOD services in all countries."

Rhys Nölke, RTL Group



have seen the OTT landscape take shape over its first decade or so. More specialist services which could be considered, as Gupta puts it, 'niche', are thriving.

For example, both anime platform Crunchyroll and pro wrestling service WWE Network boast over two million members each worldwide. Both have been disruptive, both serve a core niche audience, and both are subscription-based.

to entry of a subscription from audiences has the potential to increase viewership, making AVOD such an attractive model.

Viacom, while still being largely dedicated to pay TV and cable networks, is one such broadcaster that has heavily invested in the AVOD space. The company grabbed headlines in March 2019 with the US\$340 million (€298.45 million) acquisition of Pluto TV.

Zattoo brings white label TVaaS to Android TV Operator Tier market

Google has achieved significant success over the last couple of years for Android TV on the back of its Android TV Operator Tier program. TV operators have been able to tap into Android TV to deliver fast time to market, enable access to Google Play and provide the potential to deploy advanced set-top boxes at an affordable cost, while allowing them to retain control of the look and feel of their service. While Android TV for operators has simplified the business of launching a pay TV service, operators have until now still needed to source a device manufacturer to supply a set top box and also an experienced integration partner to launch the service. This potentially involves significant cost, time and complexity.

Step in multiscreen technology provider Zattoo, which is now taking its TV-as-a-service concept to Android TV, enabling operators to get to market quickly by providing a white label 4K set-top solution that relieves clients from the burden of developing and integration of a their own launcher applications. "Network operators are opting more and more for set-top boxes powered by Android TV as an alternative to Linux-based set-top boxes, so we had two main objectives. The first was to offer Android TV as a white label offering as part of our TVaaS platform.

The second was to satisfy the requirements of existing and future B2B customers," says Franziska Kleemann, Product Owner for Android TV Operator Tier at Zattoo. Kleemann says that one of the challenges operators face in getting to market quickly is to find a suitable manufacturer to not only supply their set-top boxes but also manage the entire integration effort. With a ready-to-roll white label solution from Zattoo, operators can rely on a trusted partner to do most of the heavy lifting, says Kleemann. "Operators can select a fully brand-able, 4K set-top box product from us without any need to go and find a device manufacturer of their own," she says. "They won't face the potential minefield of incurring unforeseen costs if they don't find the right partners."

Zattoo has focused on meeting the needs of most medium-sized operators and delivering a consistent user experience. "We see a lot of interest both from existing and new customers. Our product is a fully white label offering. We guarantee performance. It is part of our larger TVaaS solution with white label TV applications available to more than 15 device platforms. Operators get the benefit of our back end, hosted video headend, the CDN and new features and developments in content discovery and video-on-demand," says Kleemann. The apps available from Zattoo as part of its Android TV offering include content discovery, network DVR, restart, startover, series record and time-shift TV. "Because we are offering this as a white label service, operators can get a unified and consistent experience across all manner of big screen,web, game consoles and mobile devices."

Kleemann says that Zattoo has found a partner for the initiative that can deliver a "perfect combination" of a high-specification system-on-chip platform at "a very competitive price", opening up the market to a new range of operators that may not be as well-resourced as tier-one players.

"We have a good, strong partner with a solid roadmap that can move very quickly and efficiently," says Kleemann. According to Kleemann, that roadmap means that operators will benefit from a clear path to upgrade to next generation devices, giving them certainty that they will be able to keep up with changes to Android TV without needing to allocate lots of resources to achieve this. Zattoo is currently offering a pure IP solution, but plans to follow up with a hybrid box including broadcast tuners later.

As part of its TVaaS service – and part of the Android TV operator tier program – Zattoo has also upgraded its content discovery and VOD offering. According to Stefan Tiess, product manager of Zattoo's

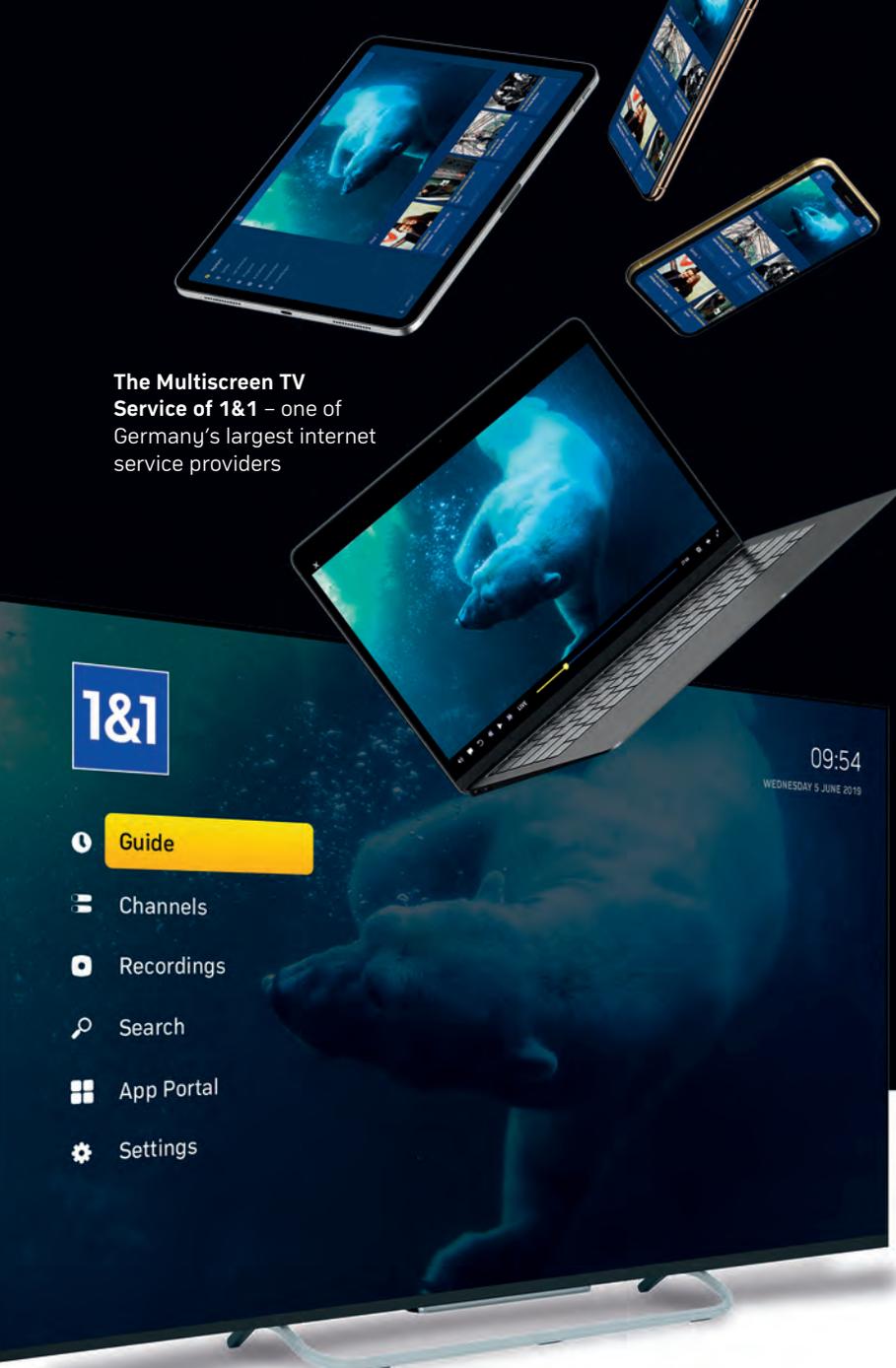
discovery squad, the first goal of what Zattoo has branded Discovery 2.0 is to enable viewers to search for and select content via a single interface across linear and non-linear channels, recordings and "all kinds of VOD content".

Second, he says, content discovery should be personalised. To enable this Zattoo has introduced recommendation based on previous viewing behaviour across all types of content that users can access. Zattoo's content discovery portal, which is powered by a recommendation system that was built in-house, taps

machine learning algorithms that are extendable across all types of content, most recently with the addition of transactional VOD and electronic sell-through content to the mix. "Previously we had distinct areas for recordings and catch-up and TVOD content that are now combined in one overarching discovery experience, allowing operators to provide their own on-demand offerings on the same page as other content," says Tiess. Discovery 2.0 is included by Zattoo in its Android TV for operators white label offering, providing operators with an additional incentive to sign up.

"We are proud to once again be an innovation leader in this industry, especially when it comes to Android TV for operators," says Nicolas Westermann, head of B2B product at Zattoo. "We are already one of the leading TV platforms for network operators in Europe and we are delighted to have formalised a partnership with one of the world's leading manufactures when it comes to Set Top Boxes powered by Android TV. We are very excited about what this new product will bring to our offering and also the experience our new Content Discovery and VOD features will provide to network operators and their end users throughout Europe and further afield."





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Right: Viacom-owned Pluto TV has over 15 million monthly users worldwide

The service, which boasts over 15 million users worldwide, is ad-driven and does not offer a premium option, unlike the likes of Hulu and ITV which let users pay a fee for an ad-free experience.

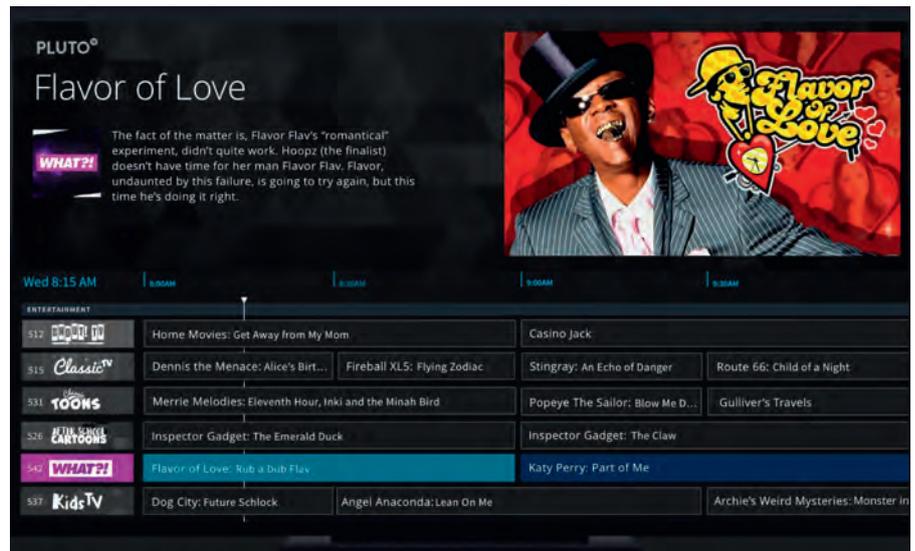
Certainly, that a company as established and the size of Viacom is so heavily invested in a purely AVOD offering shows that it is a viable option in the OTT space.

Hitting the target

Olivier Jollet, managing director, PlutoTV Europe, believes that the AVOD model presents unique revenue opportunities not available with SVOD or even with the short-form advertising offered by YouTube and social media.

“For advertisers, a non-skippable environment plays an important role and distinction for AVOD. Full screens ads are very important for advertisers especially on TV sets. The value is completely different than a video ad in a newsfeed. At Pluto TV, we offer a unique proposition to advertisers where we can create customised channels and programming blocks that use curated content to reflect a particular theme or message to targeted audiences.”

This, combined with the ‘super-



“The Pluto TV platform is equipped with opportunity to serve as a cross-promotional vehicle to market Viacom’s library and services with future ability to upsell targeted subscriptions services and products.”

The tangible results that come from the measurement and targeting of advertising are the key reasons why broadcasters are champing at the bit to create their own platforms rather than simply license their programming.

As Gupta points out, “we’re gradually moving away from the paradigm where every viewer sees the same ad break – and that’s a byproduct of how TV was

precise insight into their viewers. While broadcasters have traditionally relied on monitoring from companies including Nielsen and Kantar to see who is watching, modern internet tracking technologies – cookies – give a much fuller perspective of the individual viewer along with their habits and interests, and deliver tailored advertising that is much more relevant to them.

Jollet agrees with this, surmising: “We used to have two worlds in the advertising world. The TV budget world with a strong focus on brand awareness for the advertisers, and the digital world with a focus on conversion and engagement. AVOD platforms where most of the usage is taking place in the living room, such as Pluto TV, are bringing the best of both worlds together: TV-like inventory with the measurement and targeting capacities of the digital world.”

This is a view shared by Chris Bassolino, co-founder and COO of Zype, a video content management and video distribution infrastructure provider, and its customers include Fascination TV and Shout! Factory TV.

“For advertisers, it is a very addressable space. The platforms have access to the user bits first-party – which is great for advertisers and targeting,” Bassolino says. “For investors, at the end of the day it is a media play with a heavy reliance on ad tech and ad stack management, so making sure the platforms have a competitive advantage or scale there would be essential.”

“Full screens ads are very important for advertisers especially on TV sets. The value is completely different than a video ad in a newsfeed.”

Oliver Jollet, Pluto TV



aggregator’ aspect touched upon earlier, is the reason why Viacom invested.

“For Viacom, Pluto brings a scaled direct-to-consumer offering with opportunity to capture the white space in the ad-supported streaming market. It adds an important offering for distribution partners, unlocks their deep library of content, enhances the advanced advertising capabilities, and creates global reach using Viacom’s established international footprint,” says Jollet.

distributed, with everyone seeing the same programmes. Nowadays, as people can view different content over the internet, they can also view different ads – both in video on demand and with live broadcasts – which gives the ability to do addressable advertising, in a similar way to how ads are delivered on the web. So the uniqueness is the ability to do more granular targeting of TV adverts.”

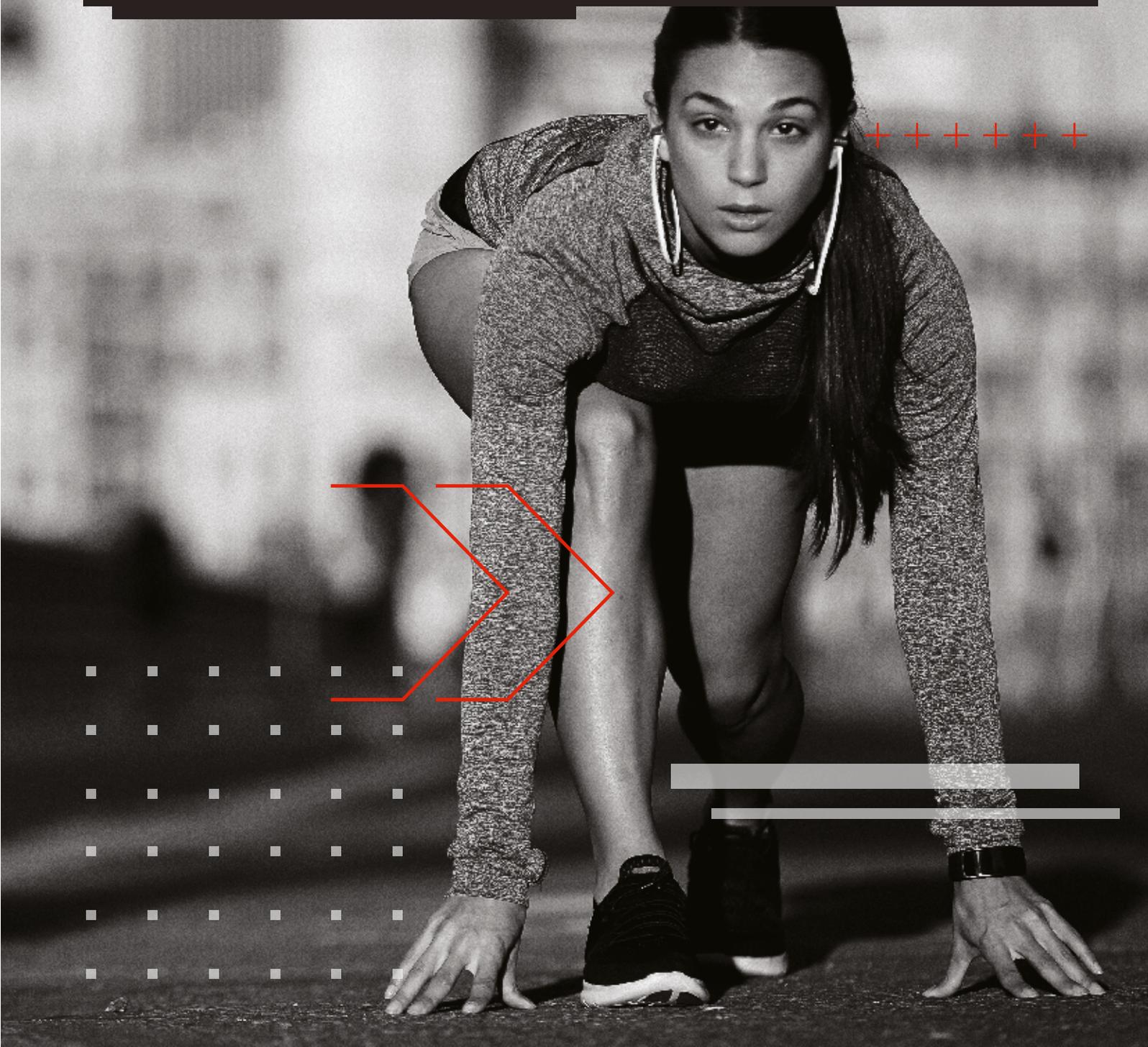
This granularity allows the operator a greater degree of controlled and

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TV Now, RTL's German VOD service, launched in 2007

"The core value proposition for advertisers speaks to a new platform that adds to the existing video advertising landscape. AVOD reaches viewers who diversify their media consumption and are viewing more and more digital content on connected devices rather than Broadcast TV only," he says.

Gupta agrees that this value proposition is of immense value to advertisers and broadcasters.

"Advertisers want to reach viewers across different platforms – and AVOD finally creates the ability for them to reach viewers on TV as well, potentially even from the same programmatic campaign. It's also much easier to do regional campaigns or target smaller niches of viewers," he says.

"It also gives advertisers the capability to start doing 'creative storytelling' and showing different creatives to the same viewer over time. One example could be for a car advertiser. The first time you show the outside of the car, the second time you show the inside of the car, the third time you show the dashboard, the fourth time you show the price and the fifth you provide a call to action to a local dealership.

"For broadcasters, you can now sell your VOD advertising across all screens in one place and use your first party data to make your ad inventory more attractive to advertisers, supporting the targeting and creative rotation use cases described above."

The personal touch

RTL has heavily invested in targeted advertising, with the full purchase of ad serving platform SpotX in 2017 and the US\$33 million (€29 million) acquisition of advertising technology company Yospace.

"With our recent acquisition of Yospace we have acquired one of the most advanced technologies for Server-Side Dynamic Ad Insertion (SSDAI)," notes Nölke. "This allows the replacement of existing commercials from a broadcast stream with more targeted, personalised advertising. Yospace's technology makes advertising on streaming services more personal, which means a better consumer experience for superior monetisation of our premium advertising inventory."



While this might sound as though the benefit to advertisers is expanding and maximising their potential reach, analysts view advertising in the AVOD space to be much more focused on the quality, rather than quantity, of views.

This is one such view held by Tim Mulligan, research director and video analyst at MIDiA Research, an analysis and insights firm focused on the crossovers between media and technology. Says Mulligan: "AVOD allows ad-supported TV content to exist and potentially thrive in the streaming era because, whereas previously TV sold itself on reach metrics such as the estimated size of its audience," he says.

"Now, AVOD is able to accurately quantify through data its audiences for advertising partners, creating better ROI and far greater accountability."

While much of the emphasis the industry places on AVOD is down to its appeal to advertisers, what should not be overlooked is how warmly the audience, and certain demographics, receive it."

Gupta says: "It's definitely the case that younger viewers are more willing to watch ads and less willing to subscribe."

Nölke agrees with Gupta's sentiment: "With video-on-demand services we generally reach younger target audiences and AVOD extends our existing TV offering with additional targeting opportunities – in a premium and brandsafe environment."

Bassolino however is less conclusive. "I think the story is still being written,"

he says. "Right now we have a whole generation of young people conditioned by YouTube to watch – and skip – ads, and a whole generation of older folks who grew up with broadcast TV and the DVR.

"It will always be a cat and mouse game, but the publishers and broadcasters that engage with great content at scale, with ads that have contextual relevance to the audience, will do well across any demographic."

Going forward, it would seem that AVOD is going to do nothing but grow. Its benefits are obvious and, save for particularly data-cautious viewers, each party wins. Viewers get a huge library of on-demand content to watch at their leisure in exchange for a few minutes of ads, distributors get their content seen by a wider audience and advertisers have a new, highly targeted way of reaching consumers.

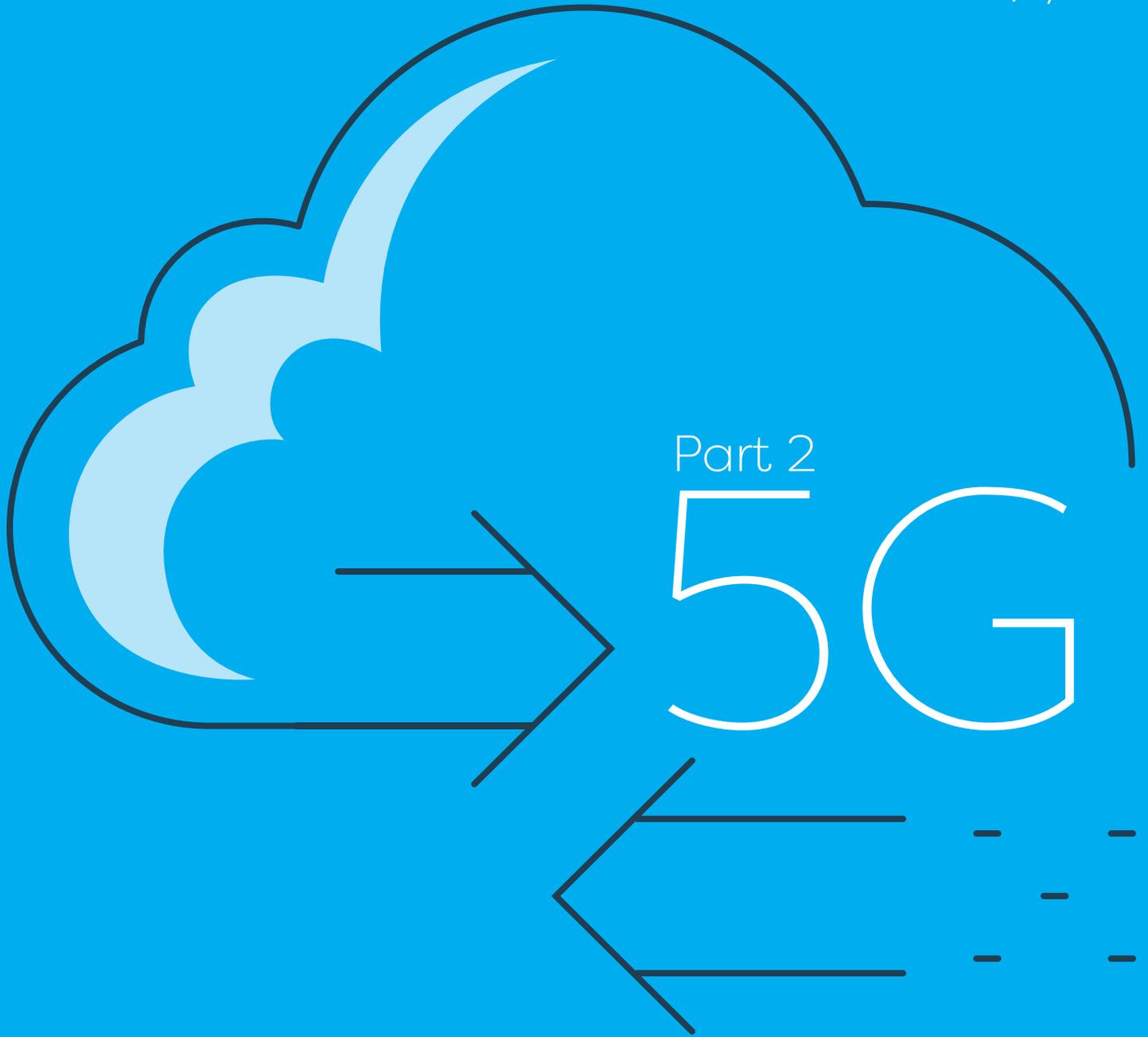
However, Mulligan points out one reason for caution that is often overlooked: "There is no more untapped attention. Newly launching media services now need to compete directly against incumbents and the ones who succeed will be those that offer a substitute for traditional TV, with live sports and live news being the big gaps in the current DTC landscape."

For now, we live in a time of near-endless opportunities for operators, but those which decide to move into the space must ensure they have a compelling package to attract advertisers and enough content to engage with viewers. ●

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July 2019



Part 2

5G

Multiscreen & OTT Series 2019

5G set for slow-burn uptake

Operators are approaching early 5G rollouts to deliver efficiency savings and enhanced broadband with the more exotic consumer apps lined up for phase two. Adrian Pennington reports.



There is no immediate 'killer application' for 5G. Its early consumer commercialisation should be seen as a way of evolving and expanding the established business of service providers. The prosaic objectives, at 5G's birth at least, are a successful coexistence with existing network infrastructure and applying the lessons hard learnt over the previous decade.

"The early days are primarily to support some areas where there's always been a limit to what 4G can do, in stadiums and train stations, for example," says Matt Stagg, director of mobile strategy, BT Sport. BT-owned EE has launched 5G in six UK cities with ten to follow by end of the year. "5G will enable a much better experience in those high footfall areas."

Orange teamed up with France Télévisions to demonstrate 5G video at the French Open.

First-off-the-block launches by the likes of EE in the UK and Vodafone in the UK and Spain are using a 'non-standalone' deployment focused on using the combined power of 4G and 5G to boost mobile broadband (enhanced MBB)

Stagg adds: “We’re addressing urban centres where there’s a high population concentration. You have to be aware that [EE] is still heavily investing in 4G networks, so it’s about being able to provide the best experience for our customers.”

Many of Vodafone’s rivals, such as Movistar, Orange and MásMóvil in Spain, will not launch commercial 5G services until at least 2021. Telefónica is also taking a pragmatic approach.

“They are keen to wait until the technology progresses and to learn from launches in other markets before jumping straight in,” says Kester Mann, director, consumer and connectivity, CCS Insight. “There is consumer benefit in faster, more reliable broadband but 5G will be around for many years and the marketing kudos from launching early is only worth so much. Most operators see far larger revenue opportunities for 5G in the enterprise. The consumer use case is more opaque.”

Orange, for example, has run trials in several countries but is waiting for devices to be ready and available in more brands before commercialisation in 2020. “In some markets we’re waiting for regulators to release spectrum,” says Jean-Pierre Casara, 5G innovation expert at the company. “We expect the smartphone experience will be better but not a huge jump. 4G is good for many, many use cases. What is interesting is to go beyond that with partners and unlock innovation yet to be imagined.”

Operators are also wary of repeating the mistakes that blighted previous generational uplifts. Vodafone CEO Nick Read admitted that MNOs had only themselves to blame.

“As an industry we don’t collaborate well enough and in terms of customer need we are not fast enough,” he told MWC in February. “We were protectionist around text messaging revenues and let OTT players move take over the rich messaging space.”

Beware the dumb pipe

In 2008, 3G smartphones were hitting their stride and revenue for operators in Western Europe was at its peak. At the same time, mobile broadband was developing, and a significant amount of service revenue was lost.

“Over that period, cell operators in Western Europe collectively lost over a quarter of

their service revenues while traffic over the networks grew 50-80% a year,” says Stephen Carson, director of business strategies at Ericsson. “The massive increase in traffic was not matched by revenue growth. The only way to keep pace with demand and not go backwards financially is to serve that traffic more and more efficiently. 5G is a big step in that direction.”

5G eMBB will deliver a significant reduction in cost per bit compared with 4G MBB, and this will continue to reduce (thanks to increased spectral efficiency, higher network utilisation, greater user numbers and higher average speeds). Access to new and wider spectrum also delivers efficiencies.

“The challenge for operators, particularly in Europe, is to have some sort of value proposition and some service that they are in control of rather have it taken OTT,” says Carson.

“The telco reality is that they have to provide ever increasing bandwidth capacity while not ending up a dumb pipe,” agrees Kaltura’s SVP Product Marketing, Gideon Gilboa. “This is a difficult balance to manage. They are looking for ways to ensure the total cost of ownership makes sense by making reasonable commercial propositions balanced with big investments in the network.”

picture is that video will rise in volume and in quality and open up immersive experiences – but we’re at a very early stage yet.”

Raising ARPU

“Not matter how much bandwidth there is or how much the cost per bit comes down, spectrum is still finite,” Stagg says. “If you have payment models where a consumer pays for all their data then streaming 4K quickly becomes expensive. Where the operator such as EE offers all-you-can-eat video passes where a lot of content is zero rated, then the operator pays for bandwidth.”

Early reports suggesting that 5G services would be priced significantly higher than 4G appear to have been overplayed. According to Futuresource Consulting, many operators offering 5G for either the same price or only a small increase over 4G.

“Given the limited coverage of 5G, handsets are likely to be on the existing 4G network for the majority of the time currently, so [exhausting data caps] may not be a major concern in early adopters,” says analyst Simon Forrest.

“Primarily, the question is whether operators could raise ARPU by delivering

“The potential is huge. The ability to enhance sport by, for example, overlaying stats of players taking a penalty – live, is phenomenal.”

Matt Stagg, EE



video is the king of content demand and it will be long into the future. NSR predicts that by 2022, 82% of all IP traffic will be video.

Video is also a prime mover for 5G with upwardly revised predictions by Ericsson that 5G coverage will reach 45% of the world’s population by end of 2024. This could surge to 65%, as spectrum sharing technology enables 5G deployments on LTE frequency bands. Where 60% of data traffic is video today, it believes that close to three quarters will be video in six years’ time.

“In some territories operators are trying to get around unlimited tariff structures,” notes Carson. “You can have all-you-can-eat data plans so long as the video is 480p. The bigger

video over 5G. But since video is regarded as part of the mobile data service, consumers are initially unlikely to consider delivery over 5G as a major differentiator. This would challenge operators wishing to improve the monetisation of such services. However, there are advantages to being able to receive uninterrupted live broadcast streams, especially sports and live events, which present revenue-generating opportunities if packaged appropriately.”

Partly to keep costs down, BT Sport argues against 4K over mobile since no-one can see the extra pixels, even on a UHD smartphone.

“We believe the optimum format for the small screen is HD HFR [high frame-rate]

5G video: the journey begins



5G rollouts are underway, but it is still not clear which applications will drive consumer take-up. Video is likely to play a major part, but operators need space to experiment, as Thierry Fautier, VP of video strategy at Harmonic, explains.

5G is coming. Operators are now launching services in key cities and plans are afoot to expand coverage dramatically over the next few years. But questions over how much demand there is for the great leap forward 5G will bring in terms of bandwidth, and how much consumers will be willing to pay for the ultra-fast connectivity that the technology promises, remain unanswered.

Step forward video. Streaming video is one application that seems, on the face of it, to be made for 5G – costs notwithstanding – thanks to the technology’s ability to deliver a massive increase in bandwidth and extreme low-latency.

The leap forward in bandwidth that 5G will bring holds great promise for video. Currently, with 4G networks, many consumers have become accustomed to service providers’ practice of zero-rating, which enables them to watch unlimited amounts of video content from their provider without eating into their data allowance. However, high levels of demand for live video sessions means that the quality is often compromised, with streams defaulting to a very low-resolution to avoid buffering and freezing.

“The problem is that when you look at video on a phone that is capable of supporting 4K, the quality can be limited, especially for something like live soccer, where you often can’t even see the ball,” says Thierry Fautier, VP of video strategy at Harmonic. “This is where we think 5G can play a role.”

According to Fautier, 5G can provide sufficient bandwidth to support 4K HD quality video, “but we believe as most of the phones are 1080p capable, we will start with HD first. HD 1080p, even zero rated, is already a big leap versus what we experience today on 4G.”

Delivering 100Mbps simultaneously to millions of subscribers, combined with the low latency possible with 5G, could have a transformative impact on video distribution – especially for live streaming. Sports in 4K is today encoded with HEVC at about 25Mbps for reference.

One application that has been widely discussed is live-streaming of sports content from inside a stadium, enabling spectators to see more of the action than is possible from a corner seat behind a pillar, and instant replays of goals and other key moments for everyone else at the ground.

Delivering video to thousands of spectators gathered in a single space has proved challenging until now. Fautier says that eMBMS, or Evolved Multimedia Broadcast Multicast Services, which was part of the 4G standard, proved disappointing, in part because it required

an expensive base station upgrade as well as specific mobile device functionality.

However, in the case of 5G, the 3GPP release 14 eMBMS will be supported by the network and devices from the start, and the network will be able to deliver the bandwidth to support the service.

The challenge of delivering content to a large number of people gathered in a small area such as a stadium remains considerable. Various solutions are under consideration. One is to restrict replay to the stadium from a local MEC (Mobile Edge Computing) server, which could be more achievable than uploading content to the cloud and making it available from there.

“You can capture a live event and transmit it via eMBMS to people in a stadium. Then you can capture a file for time-shift viewing and let people replay a clip of a few seconds, which can be streamed out of a

local MEC server in the stadium in unicast over 5G,” says Fautier. MEC is another innovation that 5G brings.

Harmonic recently tested in-stadium delivery of sports content with France Télévisions.

The trial, which was centred on the

delivery of 8K coverage of the French tennis open using a 5G network at 250Mbps, employed unicast delivery only. While France Télévisions and Harmonic used reception via a PC as decoder for the purposes of the trial, the intention was to demonstrate the potential for the delivery of 8K unicast streams to two Sharp 8K smart TVs. IP streams were uplinked to base stations serving showrooms belonging to France Télévisions and network partner Orange respectively. Harmonic also tested the playback of file-based assets to phones over 5G in the Orange showroom.

Multicast distribution could have a much wider application than in-stadium delivery of content in the future of course. Much attention has focused on mobile delivery and in-stadium applications, but eMBMS, as defined in Release 14 of the 3GPP standard, could theoretically hold the potential to ultimately serve as a complement technology for digital-terrestrial broadcast.

While broadcasters have been highly protective of their terrestrial distribution networks, they know that in the long terms more people will want to view content on mobile devices – something that could also generate pressure over the future use of spectrum for broadcasting. This is an approach developed by the EBU in Europe, while in the US, some broadcasters plan to use ATSC 3.0 to transmit to mobile devices.

“In principle, a multicast stream can be transported direct to the mobile device, replacing terrestrial distribution. The technology would be built into your phone and you wouldn’t need a SIM card,” says Fautier.

“People want to have a more immersive experience with sports and an interactive and immersive personalised video would be a good way to promote 5G to consumers on their mobile devices.”

“Broadcasters want to be able to offer their content to everyone.”

With a 5G phone, consumers should be able just to download an app and start watching their favourite free TV channel in high quality up to UHD, without any scalability issues. Fautier says that there is a strong level of interest in the technology in countries including Germany. “There will be trials, this year and next – there is a strong level of interest, including from the EBU,” he says.

Other applications that could drive interest in 5G video in the nearer term include virtual reality and what Fautier describes as immersive personalised 8K streaming services.

First 8K is the only technology that can capture the entire field (whether in tennis, soccer or baseball). “We think there could be interest in this because it is already being done in the broadcast production domain. For sports content, you capture 8K content and via a tiling mechanism, you consume content on your legacy device on a moving window that follows the action and only transmit to the resolution of the device what you watch,” says Fautier.

Harmonic and partner Tiledmedia worked on trialling this during the French Open tennis tournament. 8K coverage was encoded into an HEVC mezzanine file by Harmonic and sent to the cloud where Tiledmedia’s ClearVR streaming technology created a ‘tiled representation’ of the clips that was accessed via a Samsung mobile phone. The technology enabled users to choose between a ‘zoomed out’ view of the action or zoom into get a closer view without any visible loss of detail. Harmonic and Tiledmedia also recently showcased this ‘personal 8K streaming’ application with Hong Kong telco PCCW at the HKT 5G Tech Carnival.

“People want to have a more immersive experience with sports and an interactive and immersive personalised video would be a good way to promote 5G to consumers on their mobile devices,” says Fautier.

Cloud technology

Despite the successful conclusion of trials, Fautier is keen to emphasise that work on 5G video is still at a relatively early stage. The positive impact of the technology will take some time to be felt as operators

build out their networks and experiment with applications that consumers are likely to be attracted to.

For the general public, for example, live mobile broadcast TV, which is attendant on seamless 5G coverage, may have less appeal in the near term compared with easily accessible file-based video-on-demand. Virtual reality is one potential application that could take advantage of 5G, but up until now the appeal of VR has remained limited, except for gaming. Quality of Experience at scale for zero rated services, in-stadium delivery combining live streams with file-based replay clips and personalised streaming 8K video are all potential applications that could capture the public’s imagination and give them a real sense that 5G is delivering something new, but no-one really knows for sure what will be the killer video app of 5G in the video space. Nevertheless, it is clear that mobile operators need to come up with compelling applications to sell 5G to the public.

“All this has to be tested. We have to be careful not to recommend one size that fits all. You have to try things before you know what works, and that is why operators are in test mode,” says Fautier.

For Fautier, it therefore makes sense for broadcasters and service providers to experiment, and they can do this at relatively little risk by tapping the potential of cloud technology.

“You can do all the processing and origination in the cloud and you can use a CDN or a mobile edge network – MEC node – to distribute the content,” he says. “Harmonic can provide an end-to-end solution, with partners, with most of the heavy lifting done in the cloud. What people are asking for is a solution that will enable them to test things on a small scale and a solution that will enable them to deploy on a large scale.”

Ultimately, he says, superior bandwidth, married to the ability to deliver more sessions at scale, means that moving from 4G to 5G will be a bigger step change in the mobile experience than the switch from 3G to 4G. In the meantime, service providers need an opportunity to try different things out and see what works.

5G rollouts are in clear sight, but the applications that will drive take up are only just beginning to come into view.



Harmonic recently tested in-stadium delivery of sports content with France Télévisions at the French Open tennis tournament.

and HDR,” says Stagg. “We don’t advocate 4K other than for casting to larger screens in the house over WiFi. This is the strategy for BT Sport and it should be for every operator.”

5G also opens an opportunity to drive fixed line subscriptions to the home by connecting a 5G router to the set-top box or smart TV in the living room and delivering enhanced TV over the last mile.

“We ran some field trials in Romania last year for last mile delivery of high-speed broadband in the mmWave spectrum which worked very well,” says Casara. “It’s probably more a use case in eastern Europe where cable and FTTH are still limited outside of the main cities.”

Cable providers too can put 5G cells into street cabinets and cover the last 500 yards where replacing coax with fibre or enhancing it with DOCSIS 3 is a less viable option.

Stagg urges the industry to be agnostic to the underlying technology and provide “the optimum experience at commercially viable cost. If it’s going to cost a million pounds to dig up a road and we can use a wireless tech that delivers better capacity to the home then this is a good use case. We’ve done a lot of testing on wireless routers. We need to decouple the underlying tech and use whatever makes most economic sense and provides the best experience.”

Tipping point

Arguably it will be the introduction of the full next generation 5G core network, enhanced device chipset capabilities, and increased availability of 5G-ready spectrum which will kick-start more exotic consumer applications.

EE has scheduled this phase 2 rollout from 2022 and promises “truly immersive mobile augmented reality, real-time health monitoring, and mobile cloud gaming.” It is also a vital step to the convergence of fixed, mobile and WiFi “into one seamless customer experience.”

A report by Ovum, commissioned by Intel, suggests 2025 will be the ‘tipping point’ for 5G in entertainment and media. By then, 57% of wireless revenue globally will be driven by the capabilities of 5G networks and devices, rising to 80% by 2028 by which time M&E experiences enabled by 5G will generate up to US\$1.3 trillion or almost half of the projected US\$3 trillion in wireless revenues overall.

Augmented reality is top of the list. BT Sport has AR sports related experiences for both at home and in stadia in the works.

“The potential is huge,” Stagg confirms. “The ability to enhance sport is phenomenal by, for example, overlaying stats of players taking a penalty – live.”

Early AR experiences are imagined via smartphone but BT Sport is casting future interaction toward some form of lightweight glasses.

Telcos are also trialling virtual reality harnessed with 8K capture live streamed over the network. Orange’s partnership with France Télévisions took this to the next stage at Roland-Garros with a demo mostly to devices spread over the stadium.

“We wanted to push the envelope on bandwidth and see how live 8K encoding would cope,” says Casara. “We concluded that 8K is a good format to start with for VR using tiling technology to encode and send just the

parts of the image the viewer is looking at.”

Audible AR could evolve in tandem with 5G ‘hearable’ devices that overlay spoken information from an AI-enabled voice assistant to augment the real-world environment in real-time.

“With 5G connectivity and location-based awareness via an on-board GPS, spoken direction will become an essential skill for hearable products, capable of directing users through spoken step-by-step instructions,” says Forrest. “Advertisers will be quick to harness the opportunity to speak to wearers, conveying precisely timed and relevant information based upon geolocation.”

Given that 5G requires densification of the network infrastructure, it becomes possible to more accurately identify the locations of consumers via cell tower connection.

“This may lead to advanced advertising and improved targeting, perhaps delivering information and advertising based upon

5G as a DTT replacement? Not yet

5G will play a role in eventually replacing digital-terrestrial broadcasting although this is expected to be neither short term, a top priority or universal.

“The requirement is free-to-view, not free-to-air,” says Matt Stagg, director of mobile strategy, BT Sport, who notes the resilient popularity of the linear broadcast schedule. “But as viewing shifts OTT and broadcasters looks to move more things to IP we’re going to reach a point where, with fewer viewers on terrestrial, DTT becomes cost prohibitive. If your percentage of viewers goes down yet your costs of maintaining the broadcast network remain, at the same time as CDN costs rise, then inevitably things will change.”

Operators and broadcasters are collaborating on projects to investigate the overall benefits and efficiencies of 5G broadcast or Enhanced TV (enTV). Examples are 5G-Xcast (a Horizon 2020 and 5G-PPP project); Finland’s 5GTN+ programme; and 5G Today, ongoing in Bavaria, operating trial broadcasts over 5G using the 700MHz spectrum. “One of the objectives is to identify the best solutions to exploit the enhanced capabilities of 5G, notably using the new radio interface [5G-NR] for broadcast TV and digital radio services,” explains analyst Simon Forrest

of Futuresource Consulting. “Television over 5G is especially interesting for Europe, as there is an immediate deployment potential using the 700MHz spectrum band previously occupied by terrestrial services.”

The 3GPP Release 14 specs already meet all EU digital TV broadcast requirements; technical studies conclude this is approximately twice as efficient as DVB-T which would open up spare capacity in the spectrum for alternative use cases. “In this instance, the remaining DTT frequencies (470MHz to 694MHz) could be reallocated to 5G, with TV broadcasts migrating from DVB to 5G broadcast technology,” says the analyst. “This consumes less bandwidth, leaving the remaining spectrum free for mobile use.”

Gideon Gilboa, SVP, product marketing, Kaltura notes moves among DTH providers to switch services from satellite to IP. Among them, Sky’s launch of Sky Q over IP in Austria and Italy and a DirecTV DTV package with an IP only connection. “5G is an enabler for more video to IP and in that sense, we see the trend to IP continuing and maybe even accelerating the transition,” he says.

Even in the case of 5G and its capacity, unicasting to the entire nation is still too costly for live events especially at high bitrate 4K/8K.



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ZTE and China Telecom demonstrate a 5G 8K and VR ultra-wide bandwidth experience

over mmWave frequencies that won't easily penetrate walls, so indoor coverage will be close to non-existent."

The 5G network will be meshed with the Internet of Things, allowing operators to rollout new consumer services hooked into smart cities. Apps for parking, waste disposal, real-time traffic management and the leisure/tourism industry can all be introduced as part of a wider city-wide data grids.

For EE, this falls into Phase 3 of its 5G rollout, from 2023, when "ultra-reliable" low latency communications, network slicing and multi-gigabit-per-second speeds are introduced. This phase will enable the "tactile internet" it predicts, where a sense of touch can be added to remote real-time interactions.

"Everybody is talking about new immersive AR/VR forms all the way out to volumetric 3D holograms but in order to have such experiences you need six degrees of freedom to look all around you and see superimposed data on reality," says Carson. "You need extreme low latency and a shift of heavy compute processing to the edge to feed all the calculations for rendering. You might also need new forms of compression."

5G may not even be good enough in the next decade to cope with the plans telcos have scoped out for it.

"The increasing number of new applications such as VR/AR, autonomous driving, IoT, and wireless backhaul as well as newer applications that have not been conceived yet, will need even greater data rates and less latency than what 5G networks will offer," states NYU Professor Ted Rappaport, in a paper published by the IEEE.

US government agency the FCC recently voted to grant licences for research into submillimetre wavelengths in the terahertz frequency range to unearth 6G bandwidth capacities.

If the risks of working in potentially radioactive frequencies are overcome, then 6G – and ultimately 7G and beyond – promises such high capacity and instant data transmission that – it has been speculated – it could deliver artificial intelligence to wireless devices operating at the speed of the human brain. ●

time of day and location to generate uplift in engagement," says Forrest.

In parallel, this should open up more flexible pricing models to target the generation of consumers who don't want lengthy fixed-term contracts.

"This generation is used to bite-sized video and Netflix-style subscriptions and want the same from their connectivity provider," says Adam Davies, product manager, Synamedia. "We've been talking about being able to build those flexible consumer models for years and with 5G, service providers have the network to make localised, personalised and flexible video packages happen."

Next-gen entertainment

Intel predicts that AR and VR will deliver cumulative revenues of US\$140 billion between 2021 and 2028.

Immersive and new media applications which don't even exist today are estimated to generate US\$67 billion a year by 2028 – equivalent to the value of the entire global media market in 2017, including games, music and films.

Perhaps the most significant new consumer application twinned with 5G is cloud gaming. Some see it as more of a game-changer than video since real-time multiplayer gaming isn't possible, certainly over mobile, without it. One of the first games to tap into this is *Harry Potter: Wizards Unite* from Niantic which claims to render AR in tens of milliseconds.

Synched with this is the need for edge computing in which logic is moved out of the device into the cloud. If you can process more encodes and transcodes there you can create thinner client apps, effectively streaming from the edge with less rendering on the device.

However, Forrest suggests that the industry is confused over what could be done with a 10Gbps low-latency WiFi network versus what should be done with a 10Gbps low-latency 5G mobile network.

"The parallel development of WiFi 6 – 802.11ax – promises to closely match the performance of 5G for local/indoor communications," he says. "This provides an alternative choice for networking of VR, AR and other applications, especially given that high-bandwidth 5G services are carried

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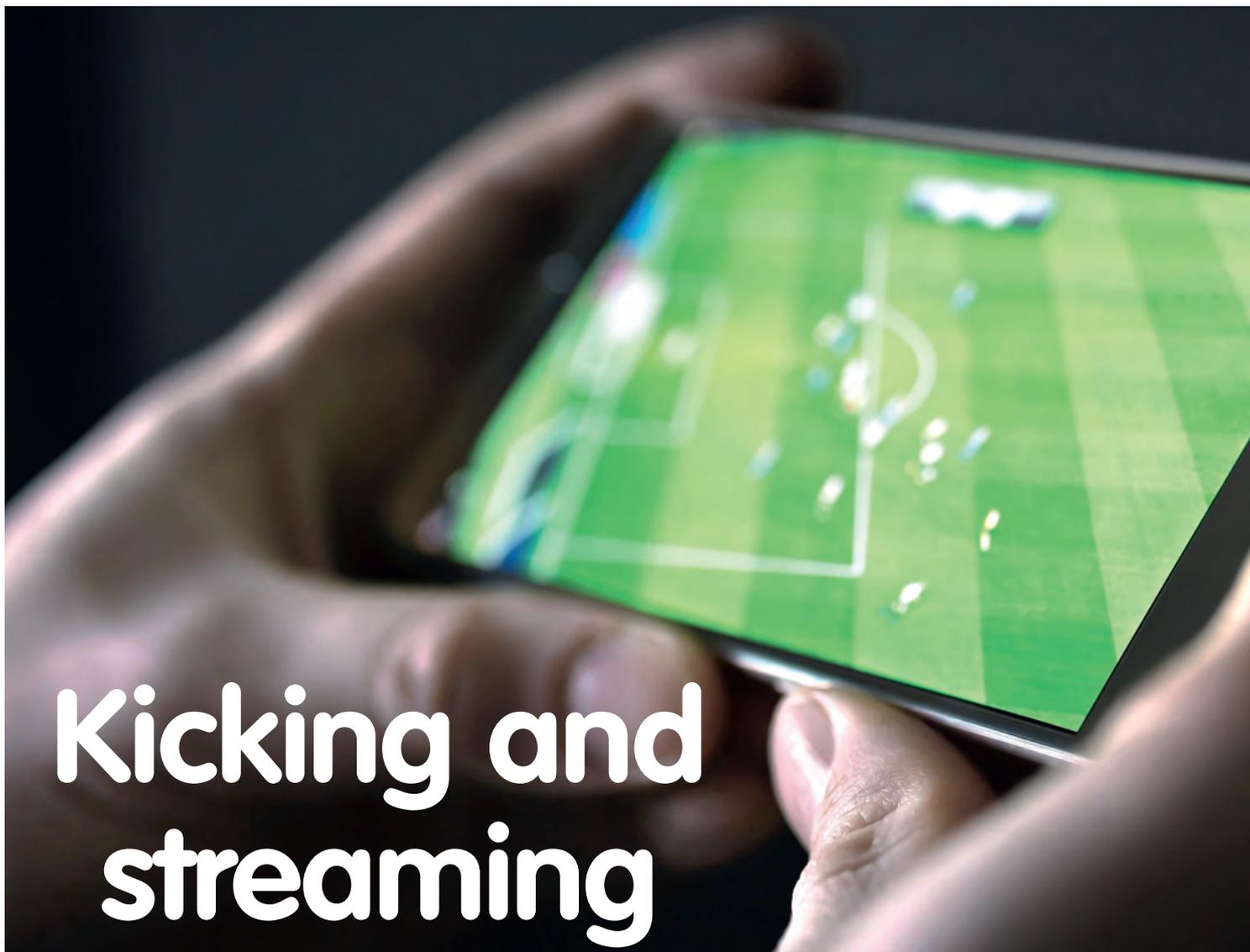
July 2019



Part 3

OTT live-streaming

Multiscreen & OTT Series 2019



Kicking and streaming

Live streaming, including of major sports events, is becoming increasingly popular, but the technical challenges of delivering a high-quality service at scale remain considerable. Anna Tobin reports.

OTT providers have been streaming live content for years now, but more often than not, the experience has been – frankly – bad.

With audiences increasingly expecting live streaming quality to match the highest live broadcast quality, there is growing pressure on OTT providers to deliver. Live OTT content is known for buffering, latency and system crashes. Will it ever literally get up to speed?

From a picture quality perspective, it is highly likely that the quality of OTT video is already as good as, if not better than, broadcast

quality, claims Steve Miller-Jones, VP product strategy at Limelight Networks. “Certainly, with VOD content and most modern large and small form-factor screens, OTT video quality can be indistinguishable from broadcast picture quality, and where linear channels have not invested in or completed digital transformation projects yet, will be exceeding it already,” he says.

It’s when OTT goes live, however, that Miller-Jones admits that its quality can take a hit. “Live events pose different challenges to the OTT delivery workflows than VOD

content libraries, and while picture quality can still be high, the overall quality of experience of the event, not just the video, is where the focus is today.

“Reducing and removing rebuffering issues while watching the streams, while maintaining high bitrates throughout the event, regardless of where the user is and what device they are watching on, are critical issues to solve in order to maintain user satisfaction with OTT services.”

These glitches need to be ironed out, because OTT is increasingly finding its place



on the main living room TV, not just second screens. Nivedita Nouvel, VP of marketing at Broadpeak highlights the challenge: “If the industry wants to mutualise investments and have one solution that fits all screens, the first step is defining ‘broadcast quality,’” she says. “Broadcast quality encompasses providing a fixed video quality, i.e. a single bitrate for all, with a quality that depends on the channels, from SD to 4K with UHD and HDR; continuity of service, with no rebuffering; and low latency, below 5s.”

Nouvel continues: “For live OTT services, the adaptive bitrate and hence the video quality depends on the state of the networks, i.e. backbone and local. An OTT service can be considered as equivalent to broadcast if the higher profiles are available and can be reached thanks to an optimised network.”

Working for Discovery, Europe’s second largest broadcaster, across all platforms and overseeing Eurosport Player, the only Europe-wide sport streaming service, Gordon Castle, senior VP, technology and operations at Eurosport, is uniquely placed to understand all the challenges faced by both broadcasters and OTT operators. He says that multi-platform production and distribution brings additional layers of complexity, given the significant variations between linear broadcast and OTT.

“From the consumer viewpoint, some audiences are transitioning to streaming with similar viewer expectations, but more widely streaming audiences expect a different experience. This means simply sending out the same content on both types of service is not appropriate,” he says. “At Eurosport, we meet this challenge by having one unified team managing the content and delivery requirements for both linear and digital. We are able to plan and tailor the experiences we offer by audience and the screen they’re choosing to watch.”

Moving into OTT

Traditional broadcasters are keen to get a foothold in the OTT market so that they can offer the best of both worlds. However, doing so requires substantial investment.

It’s all about scale, says Thierry Fautier, VP of video strategy at Harmonic. “First, broadcasters need to deploy technology that allows them to stream live content at scale,” he explains. “Next, they need to deploy their app across multiple devices, including phones – HLS and Android – tablets, web browsers – Edge, Chrome, Safari, Firefox – connected TVs and game consoles. This is a lot of work, and they also need to keep it profitable.”

With traditional DTH subscribers now increasingly moving over to OTT, satellite operators are particularly keen to infiltrate the space, says Antonio Corrado, CEO of streaming technology specialist MainStreaming.

“The demand to move content from satellite to online is increasing rapidly as the cost drops and quality rises. This is what we’ve been helping Sky with in Italy, as they push to stream video with the best quality of experience to their subscribers with their existing offering, as well as with new services,” he says.

The biggest challenge for broadcasters is extending the capability to provide content in an IP environment, alongside having to create a means of offering the streaming service to consumers, says Tim Pearson, senior director, product marketing at Nagra. “For example, they may need to create an app through which to present the content, which may have to be replicated onto many device types,” he says. “Equally, piracy forms a key concern for streaming broadcasting alongside requirements for device authentication and secure session management, to ensure that only those paying a subscription have access to the service.”

Broadcasters have several options if they want to address multiscreen, adds Nouvel. “One approach is to set up a pure OTT service relying on a CDN service provider, dedicated to multiscreen. The drawbacks are that broadcasters have no control over the quality of experience, incur expensive CDN costs, with high volumes related to the usage of unicast even for live channels, and there are two different setups for main screen and mobile screen delivery,” she says. “Another method that broadcasters can take is to rely on the partnerships with network operators, and possibly implement multicast ABR for live, with a local cache in the network. The benefits are improved QoE, along with controlled costs thanks to multicast ABR and local caching. Ideally, broadcasters should try to mix local caches with a CDNaas in order to maximise availability. Finally, satellite operators can directly implement multicast ABR down to home STBs and have a single solution to address all screens. VOD use cases can be handled by pushing some content in the local STB.”

The technical obstacles are not the only problems that broadcasters need to overcome when creating an OTT channel, says Ian Munford, director of product marketing and enablement, media, EMEA at Akamai. “As each country is uniquely different in terms of its internet infrastructure and regulatory environment, these challenges can vary greatly from country to country,” he explains. “Moreover, broadcasters in Europe operate across a variety of different rights holdings and business models be that ad funded, licence funded or pay TV, which also introduce challenges for their streaming services and, in many cases, it is these commercial challenges which present the biggest hurdles.”

Eurosport player covers over 70 countries and is accessible via apps and the web

Added to all of these obstacles standing in the way of perfect live OTT delivery, there are also problems that the OTT provider cannot control: the size of the pipe transporting the content to the consumer and whether the device is optimised to receive high quality content.

Surges in demand

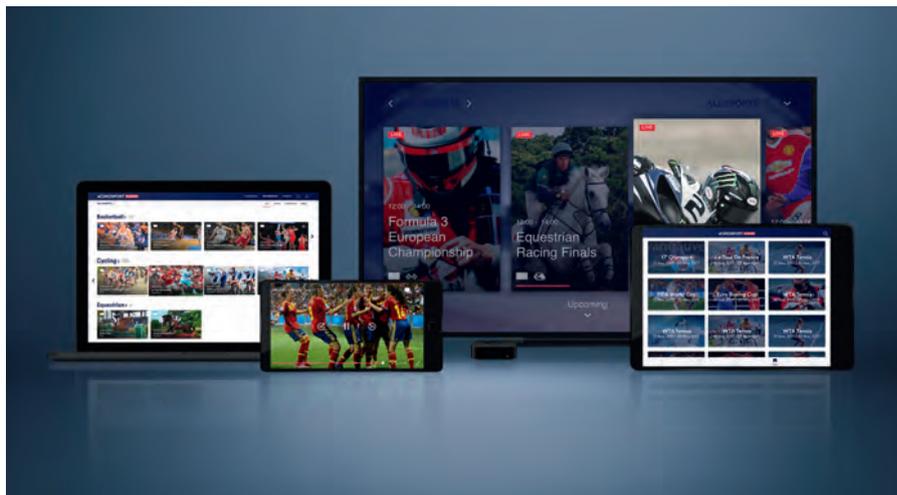
It is sudden unexpected surges in demand for live content, such as the recent surprise success of the Women's Football World Cup, that puts undue strain on OTT services, and means that operators have to scale up bandwidth rapidly.

Internet bandwidth capacity, the penetration rates of global high-speed mobile devices and delivery optimisation, all come into play when having to scale up at speed, but these challenges are all being tackled by technology, says Castle. "While these are challenges the industry has to overcome today, the growth of internet connectivity and the evolution of associated technology is continuing to enable the expansion of delivery via OTT services. The roll out of 5G and future advancements to come should only help overcome such obstacles in the future," he says.

Planning is key to dealing with any unexpected demand loads, says Munford. "Our experience in delivering large sporting events shows that careful scenario planning and robust testing can ensure any event can be delivered," he says. "At this year's IPL cricket final, we delivered more than 18 million concurrent streams to a highly demanding audience and this was only achieved through close collaboration and planning.

"We always encourage our customers to thoroughly test the entire technical workflow with a service that will emulate exact audience peaks, the audience or fan location and with the ability to dynamically control testing parameters. This will help identify any issues across the technical workflow, including delivery."

Typically, in a major sports event there are a number of key points during the match where demand surges. Being aware of this is vital for planning, points out Pearson. "Five minutes before the start, if there is a goal or incident,



half time breaks and the final five minutes.

"These peaks in demand require an operator's platform to have the necessary network and peak-load capacity in key areas, such as authentication, authorisation, licence delivery and CDN payout."

Managed networks are the answer to scaling live OTT, reiterates Fautier. "Today, the scaling is done either by increasing the CDN capacity, therefore the cost, or putting edge caches in the ISP network, to reduce cost and increase QoE," he says. "One other way to scale live OTT is to carry the traffic across multicast lanes used today in IPTV. Think, for example, about the BBC renting a fast lane to BT and delivering its iPlayer to the home through a gateway managed by BT, which will convert it locally to unicast. This might have seemed like a science-fiction model a few years back, but it's getting more and more attention. To be successful, this will require a business relationship between OTT providers and ISPs. It might take time to establish, but it could be a simple and cost-effective way to scale live OTT."

Playing to multiple formats

To further complicate things, to achieve maximum success, OTT content needs to be playable in multiple formats. To accommodate this, OTT providers have had to become adept at managing transitions between multiple bitrates and multiple formats.

"Multi-rate is a well-mastered technology, both on the server and client side. What is still a work in progress is the client behaviour when the bitrate gets scarce," says

Fautier. "Multi-format is mostly a content preparation and a player issue. To optimise the delivery cost, you need to encode into a multi-bitrate TS format, which is fed to an origin server that will make the live content available in multiple delivery formats (i.e., HLS and DASH). But you also need to protect the content using a DRM technology, which starts to complicate matters, as each format can have a different DRM. Today there are three major DRM technologies: Apple FairPlay, Google Widevine and Microsoft PlayReady, which can be used with each delivery format. With CMAF (Common Media Application Format), we now have a single file format that can be encrypted with the Common Encryption (CENC) and two encryption schemes CBC (for HLS) and CTR (for DASH). However, as some players can only decrypt one encryption scheme, you still have to store two copies in the CDN when content is encrypted. We think over time there will be convergence, on new players, to one single encryption format (CBCS), as the three DRM families have announced CBCS support for their new release."

Keeping watch

Being proactive and monitoring the OTT user experience is crucial to being able to spot and if possible fix problems before the user becomes aware of them.

"Critical metrics include video re-buffer rate, rate of error and bitrate sustained during playback," says Miller-Jones. "In addition to this, metrics from the player are able to help broadcasters understand how successful their



Q&A: Mikael Dahlgren, Agama Technologies

Mikael Dahlgren, CEO of Agama Technologies, talks about recent key developments in streaming, the importance of targeted advertising and what service providers need to put in place to ensure optimal service quality.

What are the key developments that you see taking place in the OTT streaming arena?

OTT services are growing and, in many cases, now complementing existing pay TV services. As the number of subscribers to these OTT platforms grows, customer expectations for service quality and user experience rise too.

The OTT business is quickly evolving to take advantage of the new possibilities that the technology enables. Sports content on OTT platforms, for example, is driving consumption of premium content on the big screen. Technologies such as adaptive bitrate streaming are being used in all forms of video delivery to enable service flexibility and coverage. TV Everywhere extensions and virtual cable rollouts are two examples of this.

In this fast-moving environment, we believe agility will be a key differentiator. To evolve and enhance the customer experience, while remaining cost-effective, solutions must provide transparency and the right insights to support the service provider in both day-to-day and strategic decision making.

In the OTT world, the customer experience is getting more unique – each unicast session is sent from the network edge and consumed on any of a multitude of different apps and devices. This makes it critical to use every single subscriber interaction to understand how the service is used and how it performs.

This, of course, will generate huge volumes of raw data – on the scale of petabytes. To create relevant and actionable insights, the right metrics and the right analytics must be used for each use case. Managing video latency, targeted advertising and optimising encoding, for instance, all need different analytics approaches.

Targeted advertising is becoming more and more important. What can Agama do to assure that the ad insertion works correctly?

Agama has been active in the ad insertion domain for years. We see that targeted advertising is increasingly seen as an important additional revenue stream, not only for broadcasters, but also for telcos and cable

operators in cooperation with content owners.

For ads to be correctly played to subscribers, ad insertion requires time critical signaling. Errors on the frame level can cause both visual artefacts and lost ad impressions, causing loss of revenue and leading to poor customer experience. The Agama ad insertion assurance offering has the monitoring, validation and visibility needed to assure ad insert services for both multicast and OTT, and to ensure an excellent customer experience.

What do service providers need to put in place in order to assure optimal service quality and meet or exceed customer expectations?

Customer centricity has been a hot topic for years, and for good reason: understanding customer experience and customer behaviour forms the basis for building and evolving offerings that excel and exceed customer expectations.

Creating successful video services requires compelling content, an optimised user experience, efficient customer service and, of course, a competitive price. To succeed in all of these dimensions, solutions and processes need to work across silos and teams.

With the solutions and processes in place to provide real-time insights across the complete service-delivery chain, from head-end to subscriber, service providers have the foundations to provide excellent services in a cost-effective way.

At Agama, we believe that to assure service quality and to really understand how the customer is experiencing and using the service, the best approach is a unified end-to-end assurance solution that covers the entire service delivery in real-time with in-depth KPIs and metrics, from encoding and packaging, through CDNs and the ISP, to STBs, apps and devices. This provides superior results compared to fragmented and siloed analytics systems based on limited metrics.

Agama will be presenting its unified solution for monitoring, analytics and visualisation at IBC2019, stand 5.B72. Visit the Agama team to see a demo and to discuss joint projects. For more information, visit www.agama.tv

content is, with metrics like viewing time, drop-off rate and drop-off time being critical to understanding ROI on content and rights investments.”

Authenticating sign in

For live OTT providers keeping track of who is using their services is vital to maximising advertising and subscription revenues and stopping piracy.

“Increasingly the role of single-sign-on is addressing service authentication challenges,” explains Pearson. “Other such challenges exist with late registration for PPV content, an example being where a live PPV sports event is due to start shortly and new subscribers register to watch within the final few minutes before the game. Business rules have to be set to ensure the need to validate and collect payment is matched with the viewer’s immediate requirement to watch the content.”

To effectively authenticate viewers in a sport environment, you must be able to manage concurrency peaks during the live event, says Liz Goulding, VP of product at Eurosport Digital.

“Building scale is essential, she says. “The ability to scale during these time periods is

“If the industry wants to mutualise investments and have one solution that fits all screens, the first step is defining ‘broadcast quality.’”

Nivedita Nouvel, Broadpeak



key to ensuring a smooth customer journey and experience,” she says. “In Europe, additional considerations have been added by EU-portability and GDPR rules, but bring significant advantages with additional viewing opportunities and protections for users.”

Slipping in the ads

OTT is particularly well suited to personalised ads and so this is one area that most OTT providers are intent on tapping, particularly where they are offering content for free.

“Our starting point is always the consumer,” says Goulding. “Advertising has to be personally relevant and meaningful, delivered at the right time and supportive to the customer experience. We are seeing the technology around dynamic ad insertion

mature rapidly, which is something we’re monitoring closely.”

Adapted bitrate technologies are great tools for simplifying personalised ad insertion for OTT, adds Nouvel. “There’s no longer a need to perform complex splicing at the video level; content insertion and replacement can be handled through manifest manipulation. The benefit of a server-side solution over a player-side system is that the ad insertion is seamless,” she says.

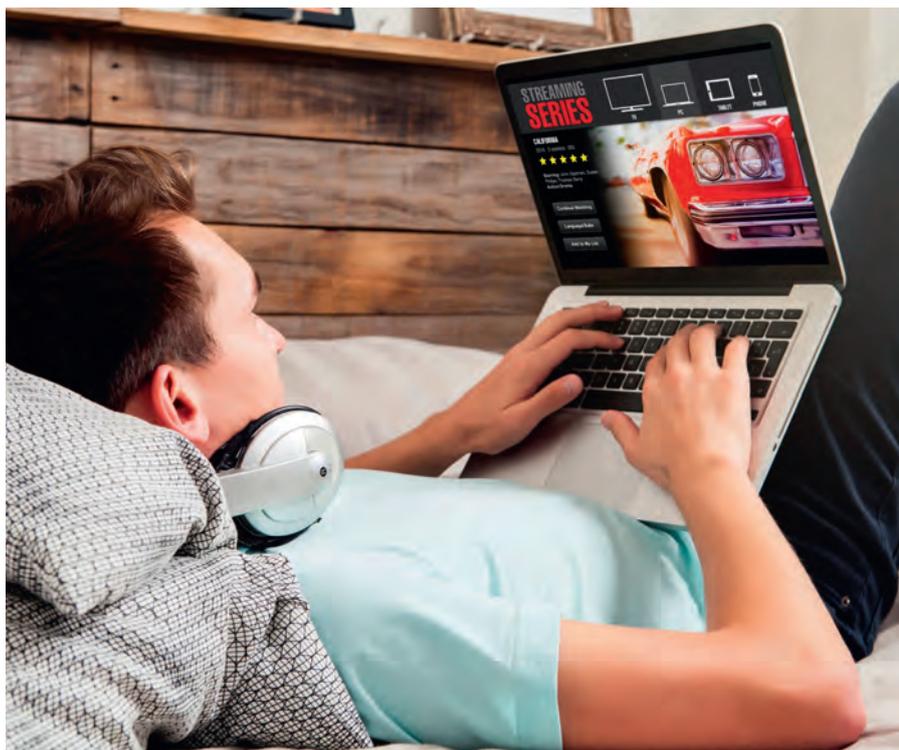
“Ad blockers cannot identify the specificity of the ad and hence cannot block it, since it is served in the same session as the original content. For live channels, the usage of SCTE-35 and VAST technologies enable triggers to be added in the stream and used in a timely manner.”

Server-side ad insertion (SSAI) is the winning architecture for serving ads to OTT content, agrees Fautier.

“With SSAI solutions, all ads are ingested and transcoded to typically match the bitrates and resolutions of the content. Content and ads are stitched together, in a frame-accurate way that guarantees the best QoE for end users,” he says. “No rebuffering, black screens waiting for the ad response, or player swaps during ad breaks to support exotic ad video codecs exist. These are all problems that can still be seen today with legacy methods of inserting ads at the client. Scalability can still be an issue, especially for popular live events. ADS can be overflowed by ad requests, which could cause the ADS to respond too late. Of course, prefetching ads is an option, but over time, we expect native cloud technologies to help ADS scale at will.”

With revenue streams into OTT increasing and the technology behind it and receiving it improving rapidly, the future of live OTT streaming is looking bright.

If the conditions are ideal, in some instances, live OTT content will surpass broadcast quality. Getting those conditions right, however, is not easy and often out of the OTT operator’s control. ●



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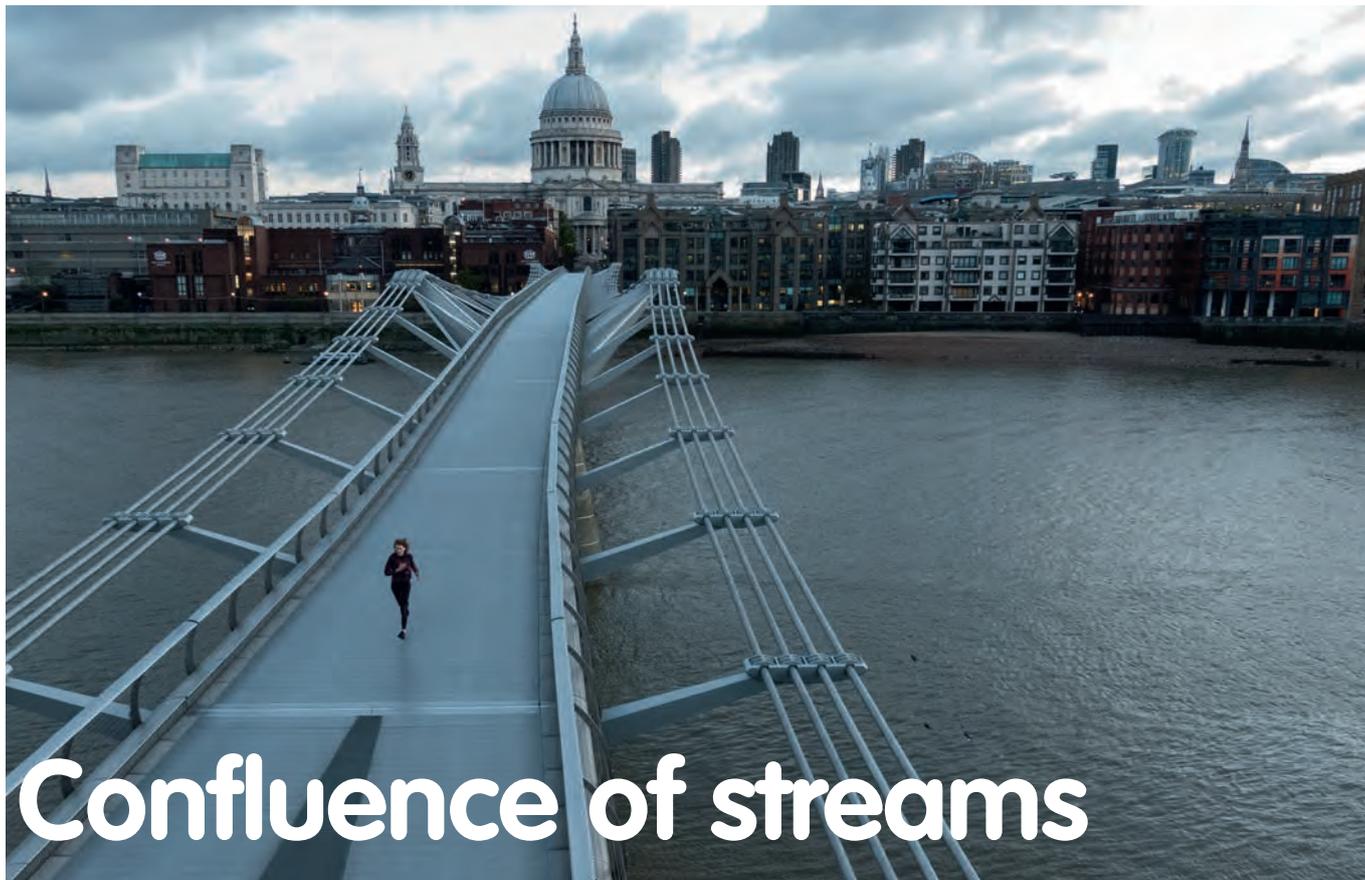
July 2019

Part 4

Subscription services



Multiscreen & OTT Series 2019



Confluence of streams

Subscription video-on-demand services are proliferating, but questions are arising about the affordability and convenience of stacking multiple offerings. Stuart Thomson reports.

Subscription video-on-demand has transformed the video distribution landscape, with global players such as Netflix and Amazon effectively disrupting traditional pay TV with a low-cost subscription model.

Disney+, Apple TV+ and WarnerMedia's HBO Max will soon join an already crowded market, while other content companies such as Viacom and NBCUniversal adopt advertising or hybrid strategies, supplemented by SVOD services targeted at specific niche audiences.

The SVOD field of play is also occupied by slightly less high-profile services such as Lionsgate-owned Starzplay – now building a strong international base – or MGM's Epix. At the same time, local broadcasters such as the BBC and ITV with Britbox, ProSiebenSat.1 (and Discovery)

with Joyn, and France Televisions, TF1 and M6 with Salto are making late moves to find a place.

In such an increasingly crowded landscape, questions have been raised about how much growth remains possible in SVOD. Netflix's latest quarterly figures alarmed market-watchers, as the clear leader in the field signed up half as many new subscribers as expected, leading to a sharp drop in its share price.

If Netflix is stumbling, what hope is there for smaller premium streaming outfits? That depends on where you look. While French pay TV operator Canal+ saw subscriptions to its Canalplay SVOD offering collapse thanks to competition from Netflix and restrictive local windowing rules, there are plenty of examples of other streaming offerings – whether regional, international or highly niche.

The regional player

The fortunes of local players have varied hugely between markets. While Canal+'s Canalplay service in France clearly lost its battle with Netflix – something that the service's owner blamed on local regulatory shackles – Nordic Entertainment's Viaplay in the Nordic market appears to have gone from strength to strength, adding 65,000 customers in the normally quiet second quarter of this year.

"Viaplay is doing very well and we are signing up new subscribers all the time," says Alexander Bastin, SVP and head of Viaplay and Viafree at Nordic Entertainment.

Bastin says that he believes there is

Above: Starzplay's *The Rook*: the streamer has received support from owner Lionsgate.

still room for growth, even in the highly penetrated Nordic market, where streaming services are taken by around half of the region's 12 million or so households. The market itself is particularly conducive to take-up of streaming services because of the high-level of broadband penetration and the high quality of connectivity. The market is traditionally home to a large proportion of early adopters of new technology and adoption of streaming offerings is helped by widespread proficiency in English among the general population.

"Streaming is not a niche service. It is becoming mainstream," says Bastin, adding that he expects a significant proportion of the remaining 50% of non-streaming homes to sign up for a service. He also expects further growth through service stacking. Currently streaming households take an average of around 1.4 services per household in this market.

"We don't see this as a winner-takes-all market. Rights tend to be exclusive to platforms and there are reasons for people to sign up to multiple services, unlike with music," says Bastin. "At some point streaming will be the norm and vast majority of people will be taking something. There are not many households that would not venture into streaming at all. It is then up to us to maintain our edge through differentiation to capitalise on that growth. We are quite well positioned. Viaplay costs about €10 or €11 on average which is tremendous value."

Bastin says that increasing competition is a sign that "streaming is a very attractive market". New entrants mean more competition for subscribers but also more competition for rights, and more of a premium placed on exclusive content as a differentiator.

Unlike some global rivals that have set up shop in the Nordic market, Viaplay provides live sports as part of its offering alongside movies, series and kids programming. Bastin says that Viaplay is not a niche service, but it is complementary to other offerings in the market rather than a direct substitute.

He says that two things in particular make Viaplay stand out. One is that it combines films and series with live sports, unlike rivals. "We have the best sports portfolio in the market and that is a clear differentiator," he says.

The second is that Viaplay is a local

player. "Maintaining a position in local content is our second differentiator. Nordic Entertainment has been active in producing and delivering local content since 1987, with 20 original productions per year. We also benefit from local content coming from the local free TV ecosystem," he says.



"Rights tend to be exclusive to platforms and there are reasons for people to sign up to multiple services, unlike with music."

Alexander Bastin, Viaplay

With regards to sports, Bastin says that the more sophisticated user experience of the streaming service gives it an edge over broadcast TV, the traditional home of mass-market live television. "Using the Olympics as an example, we were able to stream far more events than on pay TV. We have technology features that enable people to choose camera angles and so on," he says.

Nordic Entertainment is also active in pay TV, and subscribers have access to the streaming offering, but Bastin says that the company is actively "pushing streaming on its own as a market strategy" with Viaplay as a standalone service.

The strategy includes developing distribution partnerships so that the streaming offering is available via Nordic broadband service providers. For Bastin, service providers can play a role in making access to multiple services easy for consumers and he expects the importance of the aggregator of multiple services to grow as the market becomes more fragmented.

"There will be consolidation. Some players will not find a space and may merge, and there will also be new types of service that aim to aggregate different offerings," he says.

Pay and free-to-air broadcast players rooted in specific regional or national markets are increasingly following Nordic Entertainment's example. French national broadcasters France Télévisions, TFi and M6 have teamed up to create Salto, plans for which are now being examined by the country's regulator, while in the UK, the BBC and ITV have joined forces to launch a version of their existing US joint venture BritBox for the domestic market.

In Germany, commercial broadcaster ProSiebenSat.1 has taken a slightly different tack, teaming up with Discovery to launch a joint service, Joyn, that will initially focus on advertising-supported VOD with plans to build a subscription play as the service evolves.

Talking with *Digital TV Europe* at the recent Variety TV Summit Europe in London, Nicolas Eglau, ProSiebenSat.1's executive vice-president, international, said that "there is a space in the market" for "a local champion". However, he cautioned that "the consumer doesn't want three different outlets" to sign up to. For this reason, he says, an open approach that welcomes other broadcasters on board makes sense.

"This is a one-stop shop. If you want to watch something in German you know where to go. There is no other destination that can deliver all these channels ad-free, and we want to make it very easy for people with one price point," he said.

Service stacking

While local players have their unique strengths, Netflix and Amazon have made the running in popularising SVOD in most international markets. Despite the challenges facing Netflix, evidence of which was provided by highly disappointing quarterly subscriber growth in the second quarter, the streaming outfit remains by far the market leader globally. However other US-based streaming offerings are available and are trying to develop their presence in international markets. One of these is Lionsgate-owned Starzplay, a streaming offshoot of the US premium television network Starz.

Superna Kalle, executive vice-president of international digital networks for Starz, believes that the overall market still has plenty of room for growth internationally,

given that penetration outside the US overall is only about 5%.

“There is a lot of opportunity for more service to come into play,” she says.

Like Bastin, she views her service as a complement to Netflix rather than a substitute for it. “We are not competing with Netflix. We are a companion to them and to pay TV. We are a fabulous add-on.”

Kalle believes that many subscribers will typically be able to stack between four to six services before affordability becomes an issue, particularly where distribution deals are done with partners that can bundle several services together. In Spain, Starzplay is bundled with Movistar’s offering, with a discount for subscribers that take both services, for example.

Kalle says that launching on third-party platforms makes sense for SVOD players to gain an entry into new markets and achieve scale. She says that Amazon has proved to be a “fantastic” partner for Starzplay. Nevertheless, she adds, “there is room for direct-to-consumer too”. Launching with a D2C offerings enables a provider such as Starzplay to decide how much to spend on subscriber acquisition and to gain control of consumer data in a way that may not always be possible with third-party partnerships.

Establishing a brand presence in a market is challenging for new players, but Kalle says that Starzplay’s main focus is to ensure the service maintains a high profile for its titles on platforms such as Amazon or Apple TV, with whom it has a revenue-share agreement. She says that a franchise such as *The Hunger Games* has more resonance with subscribers than Starzplay as a brand in its own right, and

this is where marketing dollars are allocated.

In this context, Kalle acknowledges that a strong supply of original content is key to selling SVOD as a proposition. The pipeline of content from the US domestic Starz pay TV network to the streaming service is seen as crucial to the US offering, and Kalle says this will be extended to the European services. She says that Lionsgate too has been “incredibly supportive of the international rollout of Starzplay, citing the example of paranormal thriller *The Rook*.”

“In the US everything that is on Starz comes to Starzplay exclusively. When it comes to Lionsgate we have our first pick of what we want, and there are a few shows that we are taking internationally that are on other platforms in the US;” she says.

Allied to securing a steady pipeline of original content for the service is the use of data to optimise the use of that content. “One of the benefits of being part of Starz is that they have a well-oiled machine to put together app and consumer data with social monitoring tools and that helps drive content acquisition and subscriber retention,” says Kalle. In addition to data gathered via Starzplay’s own apps, she says that Amazon and Apple are also more inclined to share data with content partners than many people suspect.

Niche service

While direct-to-consumer has advantages, SVOD providers increasingly are focused on striking partnerships with pay TV service providers – or more accurately with multi-play service providers and emerging online

aggregators such as Amazon or Roku, both of which have developed ‘channels’ platforms specifically as a vehicle for third-party partner services.

BFI Player, the digital service from the UK’s British Film Institute, recently launched on Roku Channels in the US with an SVOD proposition focused on classic British movies – a shift from its UK proposition that includes a free archive offering, transactional and rental VOD, an SVOD service and a focus on world cinema as well as British movies. In the UK, the domestic version of the BFI service is available on Amazon Channels.

Edward Humphrey, director of digital at the BFI, says that Roku, which launched its own channels proposition relatively recently, had a “shared set of priorities” that made it a suitable partner for the US launch. “The opportunity to create and launch channels at relatively low cost with the potential to plug into a large known subscriber base, with harmonisation around billing and subscriber management, can’t be overestimated.”

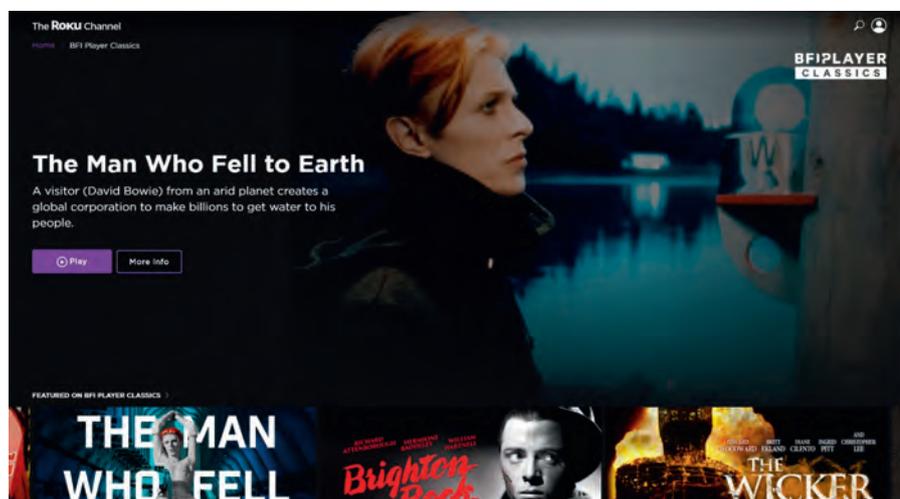
Humphrey says that the BFI chose the SVOD model because it “wanted to focus on where we would have the most commercial potential”. Given the scale of Roku – and of Amazon in the UK – the conversion rate required to make what he describes as “a proudly niche service” a commercial success is “relatively modest”, he says.

Marketing and raising awareness of the service leaned on Roku’s in-house marketing of the channels proposition combined with the BFI’s existing reach in the US through its website and social media. Humphrey says that about a quarter of the BFI’s total website traffic comes from the US, giving the brand significant reach.

“We have an active, passionate fanbase, especially in the East and West Coast markets. We have a strong sense of the scale of the connected audience over there,” he says.

The level of data feedback obtained by partnering with a third-party is “obviously different than the data you get on your own platform”, Humphrey says. However, from the BFI’s perspective, data is less significant as a tool than curatorial expertise. “What is unique about our brand is that it stands for curation. People come to us to see something they wouldn’t necessarily search for,” he says.

The BFI Player is a niche offering that serves a tightly curated array of content.





Q&A: Simon Trudelle, NAGRA

Simon Trudelle, senior director, product marketing, NAGRA, talks about super-aggregation, sports OTT services, advances in content protection and the importance of leveraging data.

What are the key ingredients in today's converged pay-TV and OTT era for pay-TV operators to deliver compelling consumer propositions?

Providers intent on creating a compelling consumer proposition must focus on one key ingredient – super-aggregation.

As super-aggregators, they must become the central gateway to all the content consumers love on any screen – not just OTT but linear broadcast and live sports, too. They will need to also consider their audience acquisition approach which in turn drives the platforms they will support.

In delivering this extended audience reach, it's important to also consider a common UX across all platforms. So when consumers change platforms, the environment is instantly recognizable, with their personalised content displayed identically on each platform once signed in.

We're entering the era of active content monetisation. Providers will have to rely on a smart combination of data analytics and curation to not just constantly monitor and tune the catalogue, but also to actively track and promote content.

You recently released a report on the state of the sports OTT market as part of the 2019 Pay-TV Innovation Forum programme. What is the impact on the growth of sports OTT services on the pay-TV industry?

More than a third of the top 25 football clubs now offer premium direct-to-consumer OTT services.

And while sports have historically been a key driver of growth in pay-TV, the advent of these OTT sports services means we could potentially see reduced demand for pay-TV as a result.

It's critical for pay-TV companies to retain tier-one sports rights and augment the multiscreen experience they deliver. And pay-TV companies are potentially well-placed to retain these rights – especially if you consider multi-play operators' ability to cross-subsidise sports from high-margin broadband businesses and their existing billing relationships.

How important is digital business transformation for pay-TV providers and what are the biggest organisational or operational challenges facing pay-TV businesses as they seek to transform?

Pay-TV service providers find themselves at a pivotal time where the lines between pay-TV and OTT are increasingly blurred. And more than ever, they face the challenge of proactively embracing "true digital transformation" in order to anticipate the rapidly changing market conditions.

But in terms of specific challenges, providers have to embrace client horizontalisation, service virtualisation and a data-driven methodology to define and evolve their consumer propositions – all while claiming their super-aggregator role and ensuring continuous solution renewal.

That's a tall order, but it's vital. Operators have to make multi-platform acquisition frictionless and adopt an increasing number of cloud-based technologies to reduce overall cost and time to market.

NAGRA has been a market leader in content protection for the last 25 years. What do you see as the "next big thing" in content protection?

The next big thing is simply thinking beyond just content protection, to scalable service protection. This means taking a holistic approach to service protection – one that scales on the backend across multiple networks, devices and applications.

The other aspect of scalability is to naturally span all device ecosystems with an adaptive security approach. That way, we can leverage the security infrastructure of any client device, from smartphones to set-top boxes to Smart TVs.

Thinking further ahead, scalable service protection will also allow us to naturally extend content protection to extra business propositions, like Smart Home devices and network security.

What are the most effective anti-piracy strategies and approaches?

We've anticipated the shift to online piracy, developing a comprehensive line-up of technologies and service. What makes them effective is their ability to stop commercial piracy by marking content at the source, providing real-time delisting, taking down pirate cloud infrastructure and blocking pirate traffic at the residential ISP level where possible.

And at infrastructure level, we provide scalable monitoring and take-down services that, combined with our intelligence on pirate services, allow us to disrupt illicit streaming services and measure the impact.

Of course, no single method will magically take down piracy – the most effective strategy is to utilise all of these technologies and best practices, alongside cross-industry and legislative collaboration to tackle piracy at its source and protect content end-to-end.

How can incumbent pay-TV operators leverage data to compete with emerging platforms?

Pay-TV operators have long been sitting on a wealth of under-utilised consumer and behavioural data. Thankfully, most of them are all set to catch up now.

With actionable business intelligence designed by pay-TV experts for pay-TV experts, providers can keep and grow their customer base, all while continuously optimising their content catalogue and marketing campaigns to increase revenues and margins.

We're entering the era of super-aggregation and active content monetisation. Incumbent pay-TV operators must harness a smart combination of data analytics and curation. With this, they can then monitor, update and promote content in line with what consumers want.

Nordic Entertainment's Viaplay added 65,000 customers in Q2 2019.

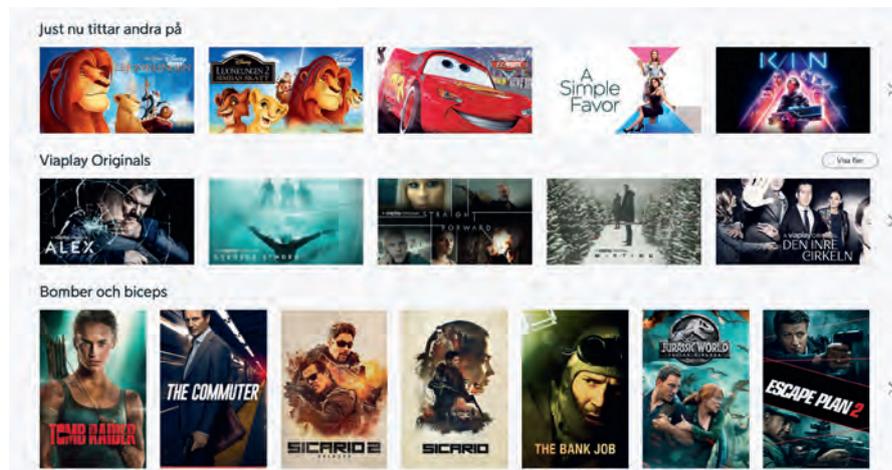
For a niche service such as BFI Player, teaming up with Roku Channels means that it necessarily surrenders control of the user experience. However Humphrey says that “harmony with the platform” is more useful than “trying to be distinct” in this context. He adds that harmonised search across the proposition is useful in bringing people to content on BFI Player. “It allows people to find your content. The benefit of being within the platform ecosystem almost always plump the value of having your own platform, especially in the US where we don't have a direct-to-consumer proposition,” he says.

BFI Player's sense of its own unique appeal is shared by another UK export to the US – the US version of BritBox, which brings British content to an American audience.

“When *Downton Abbey* happened it became apparent that there was an appetite to treat British television as something unique and different,” said Soumya Sriraman, president of BritBox, speaking with *Digital TV Europe* at the Variety TV Europe Summit. “And it behoved those of us in the content business to ask how we can create something that this audiences will respond to. We know that to be successful in SVOD there are three things that you need: access, discovery and community. The big guys can offer the first one readily. Look at any remote control or any television and you can see what apps are there. When you are the Google of media you know what discovery can be prompted, but I don't think anyone can offer community the way we can. We know there is content but getting it to the right audience is what makes us unique.”

Re-aggregation

While technology platforms such as Roku can help niche players find their audience, for mainstream pay TV operators, the focus has been more on integrating the most popular mass-market services such as Netflix. TV technology specialist Nagra's has conducted research under the auspices of the Pay TV Innovation Forum that shows that pay TV operators, though cautious, now “see [SVOD partnerships] as a new source of content that deserve to be integrated”, according to Simon



Trudelle, senior director of product marketing at Nagra. The direction of travel, he says, is towards more of an integrated, genuinely aggregated service offering.

“Partnerships with one or several SVOD services will create a small portfolio of sources that can be smartly integrated into the pay TV experience, but the challenge is to find the right model for pay TV and prove that this adds value for the service provider and consumer,” says Trudelle, who believes that the current phase of fragmentation and proliferation of diverse streaming options will be superseded by more moves to pull different offerings together.

“In the short term, there will be a phase of increased fragmentation but at some point switching from one app to another will get too complicated. The pendulum will shift back to convenient smart aggregation,” he says.

Challenges in the way of this reaggregation include figuring out who has access to data under what terms and how to integrate billing of multiple services.

“Netflix – and to some extent Amazon – understands that incumbent operators have reach and being part of their packages has value. To achieve the same reach on their own requires massive investment,” says Trudelle. “Our analysis is that pay TV operators have, to date, managed to retain their position in front of consumers and in terms of their content partners. They face a transformation risk, but the best way for service providers to manage that risk is to keep innovating, to have no limitation on the technology side, and to be flexible enough with their overall multiscreen play.”

Trudelle points out that many multi-play operators have moved from being pay TV players to focusing more and more on broadband, where is a possibility to increase margins. In this context, partnerships with content providers makes more and more sense. Operators can also potentially build a business trading data rather than focusing on acquiring their own content rights.

In this context, TV could simply evolve into one product within overlapping bundled offerings. While service providers increasingly are focused on broadband and using content partnerships to add value, an SVOD provider such as Amazon is primarily focused on bundling content with a wider retail proposition. The same could theoretically be true of a Disney that could bundle entertainment park access with streaming in some way.

The precise model chosen for bundling an SVOD service will depend on the nature, scope and scale of the company behind that service. Established operators may bundle their SVOD offerings with traditional pay TV for a discount while also providing it as a standalone option. National free-to-air broadcasters will seek to forge partnerships with their peers to create joint venture open platforms.

Standalone SVOD services will likely shift towards a place akin to that of linear pay TV networks and forge distribution partnerships with multi-play service providers – or, in some cases, with new aggregators such as Roku, Amazon or Apple. As SVOD options proliferate, the case for some form of reaggregation is becoming ever-more compelling. ●

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