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TV without boundaries.
INTRODUCTION

The road to more personalized TV started with multichannel TV and has led us to PVR, VOD and most recently multiscreen TV, which inherently encourages solo viewing sessions. As consumers become accustomed to ‘doing their own thing’ on portable devices, often in the same room as other people, there is an opportunity to take TV personalization to another level.

Some service providers are now on a quest to give us recommendations, programme guides, channel lists and social integrations that reflect only our tastes and inputs rather than those of everyone in a household. Pressure is growing on Pay TV providers to make our personal recordings available on every screen.

The door is open to innovation, like choosing your preferred language for subtitles or a soundtrack. Audio personalization is an exciting new concept and includes separate commentaries for different teams in a sports event to user-generated commentary for friend groups. More targeted advertising becomes a natural complement to individual viewing to both enhance and fund the personalized TV experience.

John Moulding, Editor, Videonet

CONTENTS

- Content discovery and synchronization
With access to rich data about their subscribers and what they do, operators can improve recommendation, encourage social TV and exploit second screen synchronization.

- Recordings get more personal
One of the next big steps in multiscreen TV is giving people access to their personal recordings on every screen. This is the moment for nPVR to finally make its entrance.

- Evolving the User Experience
As service providers go beyond household level and address individuals, the role of log-ins or context will become important. There is a place for social TV and big data.

- The role of audio in personalization
Audio has a huge impact on how much we enjoy video services. Now it can help to personalize them. ‘Allegiance’ based audio choices are one possibility.

- Making advertising more targeted
Addressable advertising is in its infancy but has a bright future, helping to fund the growth of on-demand and multiscreen viewing.
**INTRODUCTION: Transforming the User Audio Experience**

By Rob France, Senior Product Marketing Manager for Broadcast Audio, DOLBY

As the next generation of consumer experience is being defined, it is important to ensure that these new experiences line up with consumers’ desires and preferences. Historically the broadcast experience is, by its very nature, a ‘one size fits all’ experience. For example, while a consumer may be a fan of a particular team, the commentators and team stats that are broadcast to them are based on the market they are in and are often biased against their team.

Consumers increasingly have come to expect experiences personalized to their desires and through increasing use of second screen applications on mobile devices and through social networks they can often satisfy their desire for personalized content from sources other than their local broadcaster.

This personalization has become even more individually targeted as consumers are more than ever before watching live sports and events while connected via social media. With social media, personalization can go right down to the level of a truly singular experience as social content is blended with content from the main event, where the experience one consumer may get will be truly unique as it will include the thoughts and opinions of their specific group of friends as a key part of their experience. Going forward, enabling consumers to connect with each other will be an important part of broadcast services in the future.

Personalization will require a deeper understanding of viewer preferences for how they experience content than has been required to date. Historically, if something was interesting to only 10% of the market it would not have been delivered. Now, through the use of second screens, in the form of mobile phones and tablets, this content is readily available and consumers are seeking it out. So now broadcasters have to think about how they can address the preferences of not just the general audience but also of these smaller groups with the goal of providing choices that enable as many of their viewers as possible to get the experience they desire.

Personalization offers new opportunities for content owners and creators. As the tools become available to deliver personalized experiences to consumers, content owners can better create experiences that leverage their content. For example, for sports with multiple points of action, like motor racing, multiple camera angles and audio feeds will allow fans to follow the action that is relevant to their favourite racing team. And for movies, access to additional elements such as director’s commentaries, which have been available on Blu-ray discs for some time, can be made available over broadcast networks.

The ability to personalize content can also increase how accessible a service is to persons with disabilities. For example, Dolby is working on technologies to give users control of the loudness of the dialogue and for those who have hearing loss such features can make all the difference in the experience that they have.

Increased personalization does not come without challenges. It means more decisions for consumers so broadcasters will have to ensure that the user experience is clear and simple to use so that consumers do not get lost in all these choices. For example, a consumer could be tagged as a fan of a particular team and their experience could automatically change to give them a commentator who supports their team, more stats and facts relevant to their team, and the sound of the fans singing their team songs.

At Dolby we have always believed in the power of audio to tell a great story and we have seen how different audio sources can be used to tell different versions of the same story. The roar of the crowd, the passionate cries of the fans, and running commentaries from the players can all easily be tailored to provide personalized audio experiences.

Personalization can really add value to content, and by delivering different audio choices the likelihood of repeat viewing can be increased. Ultimately a consumer who gets the experience they want is a happier consumer and one who will see more value in the service they are consuming.
Today’s TV experience is worlds apart from the one we were talking about even five years ago. We’ve witnessed exponential growth in services such as HD and have moved from a model in which one screen is watched by many, to many screens (and devices) being available to the individual viewer, what is today called TV Everywhere. Having multiscreen access to content is driving the demand for a more personalised experience, in which the viewer can expect to see what they want, where, and when. While video on-demand (VOD) has been a great method for delivering compelling content to viewers, it is not always a truly seamless TV-like experience, and traditionally has been limited to the living room.

The growing demand for the personalised experience is driving seismic change within the TV industry, and we’ve seen great strides made already, with time-shifted TV and nPVR as just two examples of how we in the industry can deliver content in the ways viewers want to watch. The next step is to move towards more advanced content discovery, effectively creating a personalised channel or playlist for the individual user.

In reality, this is an innovative step we’re already seeing from organisations like Netflix. The OTT service offers recommendations based on in-depth subscriber intelligence and viewing history, building suggestions to match what the viewer wants to see next, as well as remembering what the user was most recently watching. The challenge for traditional content providers is to do this themselves in order to stay financially viable.

Pay TV operators with premium content and information about their customers are in a unique position to combat these market disruptors. In the UK, BSkyB is one example of a broadcaster doing just that. Not only does it provide a traditional linear experience through its PVRs, it also provides OTT services via its apps and the NOW TV service. This gives users access to a wide range of programmes available on Sky’s platform, at a reduced price from a full Sky package. It is services such as these that are enabling the viewer to access the content they want in a way that suits their environment.

But personalisation isn’t just about delivering TV programming. Operators want to better monetize their services, and they need to think about ensuring the advertising that’s delivered is relevant to the viewer. In many cases, ad skipping is possible, so operators must be in a position to reassure advertisers that their content appears in the right place at the right time and in front of the right people. Ad insertion tools are vital to this process, as they enable the operator to stitch in the best advert for that ad space. By providing relevant advertising that’s more personalised and targeted to the individual consumer, operators are likely to see less ad skipping across their multiscreen ecosystems. This in turn is likely to provide a better return on investment for the advertisers, which can encourage them to invest further in the operator’s offering.

The drive for personalisation obviously creates a number of challenges in the delivery infrastructure, namely how to deliver content seamlessly across different platforms and screens simultaneously. To do so effectively requires a ‘software-centric’ approach, i.e. using converged software architecture to dynamically package and deliver content on demand to each platform. This approach simplifies the distribution process, making it much simpler to provide TV and advertising content at will across multiple internet-connected screens simultaneously.

The next step in personalisation is going to be incorporating new functionalities, such as enabling viewers to pause and rewind live streams on any screen, instantaneous video clip recording and sharing with friends, allowing users to create their own TV channels a la carte, or recording a show on one device and watching it on another. It’s an exciting time, and the team at Envivio are working on solutions to help make it all possible.
MAKING TV MORE PERSONAL

First came multichannel TV, then PVR and VOD, then multiscreen and catch-up TV. There are still several important steps ahead to true personalization of the TV experience, from recommendation and second screen synchronization to PVR everywhere, targeted ads and even tailored audio tracks.

By PHILIP HUNTER

INTRODUCTION

Many platform operators have deployed TV Everywhere and have reaped the benefits in terms of customer satisfaction and engagement, and the reduced threat of cord cutting. Operator multiscreen services provide the ‘everywhere’ in the well-known mantra about giving consumers what they want, when they want it, where they want it. Coming on top of PVR and VOD, and indeed the whole concept of multichannel television, TV Everywhere extends the concept of individual choice, as multiscreen viewing on computers, tablets and smartphones frees us from compromise decisions on what we should watch with someone else. Shared and family viewing is not disappearing but now we have the option to seek out our own content choices more readily.

Platform operators know they must not stop there. To remain competitive, especially when dealing with early-adopters, and to monetize their on-demand and multiscreen offers more effectively, they need to make television even more personal. TV personalization is not arriving as a ‘big bang’ but through a series of steps that encompass more personalized recommendation and viewing history, nPVR to provide access to on-demand content everywhere, targeted ad insertion, second screen synchronization and even personalization of the audio that accompanies programming.

From early deployments and trials, there is growing evidence of the benefits that more personalized TV provides for both consumers and operators. But for traditional Pay TV operators, personalization is a priority even in the absence of clear...
Good content should be matched by good content discovery, including recommendations. The current state-of-the-art is defined by Netflix.

**Content Discovery and Synchronization**

The popularity of multiscrreen devices is putting pressure on platform operators to make more of their content available throughout and outside of the home. Several operators have observed how tablets are being treated like second televisions by customers and the line between what is multiscreen TV and what is multiroom TV, though technically easy to determine, is beginning to blur in terms of consumer behaviour. The phrases whole-home TV and TV Anywhere encompass both.

As platform operators pursue the Holy Grail of delivering one unified TV service, but one that is made available across different screens, the requirement for a consistent user experience is matched by the need for consistency in content availability. Multiscreen viewing is no longer just about VOD and catch-up TV. More linear channels, including live TV, are being made available on game consoles, smartphones and tablets.

In all cases, good content should be matched by good content discovery, including recommendations. The current state-of-the-art is defined by Netflix, which personalizes titles by category and then issues recommendations to subscribers by combining this with their known viewing history and preferences. Pay TV operators have to match this capability, including for linear services.

ZON Optimus of Portugal, which is primarily a cable TV provider but also has DTH satellite customers, believes Pay TV operators can and must exploit data derived...
from their subscribers to improve the quality of their linear and on-demand programming. ZON has taken a stepwise approach to personalization within its multiscreen offering called IRIS, according to its Head of Product Development, Nuno Sanches.

“Our overall aim is to minimize the effort associated with content discovery,” he says. “Firstly we introduced a social ecosystem giving the ability to share, recommend and push content to friends. The second layer was a recommendation engine that recommends VOD but especially supports the discovery of content in Timewarp, our seven-day catch-up TV recording system.”

The third step in ZON’s progression towards more personalized TV is to incorporate real-time audience measurement into the recommendation process to create dedicated channel lists. “We can create favourite channel lists for each user, populated on real viewing habits,” Sanches explains. “We update these with daily data and create favourite lists for every user.”

These increasing levels of personalization have already achieved demonstrable benefits for ZON in terms of both ARPU and churn. Pay TV operators should not expect personalization and recommendation to translate into immediate, direct gains in revenues, however, Keith Nissen, Senior Analyst at SNL Kagan MRG, warns. “Most consumers are not aware of the extent that recommendations are driving the content being offered. If users are not aware of personalization, then they do not put a high value on it.”

He suggests that personalized recommendation data will be monetized by being sold to third-parties, rather than directly within the service. Such parties might include broadcasters interested in gaining more eyeballs for their channels or advertisers.

More TV personalization can also mean improving the linear TV experience by enabling additional features through synchronization between the living room TV and second screens. Civolution has been pioneering the technology needed to make this possible. Its SyncNow product is based on its Automated Content Recognition (ACR) technology and primarily uses audio watermarking to enable a second screen device such as a smart phone to identify what content is showing on the main screen. The key technical property of ACR is its ability to overcome varying delays over transmission to synchronize a companion screen app tightly with the linear content playing on the main screen.

According to Emmanuel Josserand, Civolution’s Director of Marketing: “Our ACR solution synchronizes companion apps on second screens with a programme aired on TV. The watermarking technology is then used to identify the content and provide a second-accurate time-code, which will be used in the case of time-shifted viewing to synchronize the app with the TV content.”

SyncNow was used in April 2013 by the UK commercial broadcaster Channel 4 for an app that...
enabled viewers to follow progress of their chosen horse during the Grand National steeplechase, as an example of how you can enhance a live transmission. The technology can also be used by content rights holders, like the Vienna State Opera, which has integrated the ACR technology to enable OTT viewing of its productions with personalization. Viewers can select the appropriate language for subtitles, enabling them to follow the score on their companion device. The same approach could, in principle, be used to display the subtitles on a Smart TV, which could effectively recognize the content being played on its screen via ACR. This technology could also be used to select from alternative audio tracks.

**RECORDINGS GET MORE PERSONAL**

An emerging requirement, when making TV services more personal, is to ensure recordings are available on every screen. This is set to become one of the next big things in multiscreen TV. There are two obvious delivery options, as with linear TV. You can feed multiscreen devices direct from the Internet or use a media gateway to convert a classic broadcast feed into IP, with or without in-home transcoding. This second option requires CA to DRM translations. Obviously the two approaches can co-exist.

If you are streaming PVR content from a media gateway then it is very clear that the PVR recordings were originally requested by you and they exist as discrete and individual recordings in the home. If you are streaming direct from the Internet, nPVR is technically similar to catch-up TV; if someone requests a recording, it is made available to them. The difference is really about content availability. nPVR requires that content becomes available very quickly after live broadcast and that the on-demand window stretches beyond the point at which catch-up availability currently ends. Consumers are also used to skipping ads on a PVR so business decisions need to be made (between content owners and platform operators) about whether this is going to be allowed.

Belgacom, the Belgian IPTV provider, is demonstrating the potential for network-based personal recordings and also the proximity of this to catch-up services and technology. The company provides an nPVR service for IPTV and users can schedule recordings from their TV Partout TV Everywhere app. The company has just deployed TV Replay on TV Partout as well, allowing access to most programmes up to 36 hours after scheduled broadcast.

“You need nPVR [as a technology platform] to be able to run that service, so it is an underlying technology,” explains Stéphanie Rockmann, VP for Content and Acquisition at Belgacom. She notes that PVR is still popular with users who like to record and collect their own content. TV Partout is available for users at home and on the move via a WiFi Fon Spot or the Proximus 3G/4G network and includes multichannel linear TV, including some in HD quality.

The era of network or cloud DVR has finally arrived, thanks partly to improvements in network capacity. Cloud-centric vendors are confident that it is the future of personal recordings. ActiveVideo, which provides cloud UI technology that among other things is helping operators to introduce sophisticated VOD catalogues on thin client or legacy devices, including in the absence of set-top boxes, is one of them. Sachim Sathaye, VP for Strategy and Product Development at ActiveVideo expects a migration from single to whole-home DVR and then to cloud DVR. He thinks some operators will end up with a hybrid solution, where maybe 80% of content is stored in the cloud but the most popular 20% is stored in the home.

CDN providers have a role to play in enabling network-centric PVR functionality, like live pause and rewind. Broadpeak’s nanoCDN technology is designed for linear
streaming to multiscreen devices in a home and uses a very lightweight client in the home router/gateway that intercepts the unicast stream requests made by a tablet or smartphone to an origin server, and looks for a multicast stream of the linear content instead. The nanoCDN client receives this multicast stream, then converts it to unicast ABR inside the home so it can be watched on the multiscreen devices without any changes to their apps.

This technology also uses local caching, where it harnesses some local memory, whether in a broadband router or the hard drive on a DVR, to store up to 15 minutes of the linear stream once it has already played out on the display device. This means that a pause or short rewind can be served from the cache, avoiding the need to exit the multicast and revert to a unicast request, with the bandwidth savings this delivers. Nivedita Nouvel, VP Marketing at Broadpeak, says a 15 minute buffer enables a platform operator to handle 80% of time-shift requirements without the need for unicasting.

The original motive for deploying nPVR was to save on storage and maintenance costs for operators by avoiding the need for costly and fragile disk drives in homes, but the advantages are greatly diminished if rights holders insist that operators store separate copies for each viewer in the network. Although some operators have negotiated the use of single copies of content shared across populations, the ‘one copy per user’ model is an important part of the market today. That has intensified demands for efficient storage designs that enable operators deploying nPVR to store all these multiple copies as efficiently as possible with the least hardware cost.

These storage constraints have spawned specialist vendors in the field of efficient storage software that enables operators to make use of large numbers of relatively inexpensive commodity storage servers. One such vendor is Scality, whose software enables the use of large numbers of low cost storage units, rather than dedicated disk arrays under single storage controllers often arranged in Storage Area Networks (SANs). Such array-based systems deliver high performance but at a cost that can quickly escalate out of control when deploying nPVR for large numbers of users. Traditional
SANs may scale in performance but certainly not in price.

The alternative approach of connecting many small systems is known as scale out, and here the challenge is to maintain performance as the number of users and amount of content stored increases. Scality’s software was developed to achieve this by dividing video content into smaller chunks that are then ‘virtualized’ and distributed across multiple servers. The relatively small size of the chunks, and the fact that a given file is distributed across many servers, avoids bottlenecks occurring at the interfaces to individual servers as well as guarantees higher levels of data availability, data protection and rapid recovery from disk or server failure.

“The benefit is that in the past operators were relying on specialized high end hardware - very expensive, dedicated and high-end devices,” declares Arnaud Perrier, VP for Solutions Marketing at Envivio. “That is OK when you use it for things like Pay Per View or playout or maybe VOD, but when we talk about millions of copies and petabytes of data, this is too expensive and does not scale, so you are better off leveraging the power of inexpensive commodity servers. But then you need to optimize storage performance, which is where Scality comes in.”

Perrier says scale-out storage is equally applicable to single copy storage, because even then vast amounts of data would be generated when nPVR is rolled out across large user bases. In any case, the growth in catch-up and on-demand services generally requires that operators store ever more content overall.

Envivio also provides transcoding solutions optimized for the increasingly demanding requirements of on-demand content. The company’s Envivio Muse On-Demand transcoder and Envivio Halo network media processor reduce operational costs for nPVR, partly thanks to the use of dynamic (just-in-time) packaging capabilities for ABR delivery. This technology combination requires 3-4 times less storage than scenarios where operators produce and store multiple final output formats.

The Envivio Halo Experience Server, launched at NAB 2013, is a multiscreen application server designed to support more personalization and therefore better monetization based on individual viewer requests. It enables Pay TV subscribers to pause and rewind live streams, record programmes and watch them on any other device, make instant video clip recordings and share them with friends, and even allow users to create their own TV channels à la carte. It also supports personalized ads.

Halo Experience Server is compatible with both on-net and off-net services and does not require any significant changes to the existing multiscreen infrastructure. No multi-platform or specific client development is required, and no changes in the CDN are required, for example.

Some people think all content will eventually be available on-demand, removing the need for consumers to remember to record anything, however it is stored and accessed. This is the natural extension to nPVR, according to Jason Blackwell, Director for Service Provider Strategies at the technology research firm Strategy Analytics.

“Catch-up TV and nDVR deals are becoming more commonplace so I would expect to see nDVR continue to expand and then eventually we could reach a place where everything is available on-demand, whether you remembered to record it or not.”

Consumer behaviour will determine how far this trend goes. Some operators like ZON find that many of their customers like to record their favourite content and keep it, rather than access it on-demand. “It is an easier way to navigate to content they have made an explicit decision to watch,” explains Sanches. “They then do not have to go through the EPG or VOD system.”

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“EVENTUALLY WE COULD REACH A PLACE WHERE EVERYTHING IS AVAILABLE ON-DEMAND, WHETHER YOU REMEMBERED TO RECORD IT OR NOT”
MAKING TV MORE PERSONAL

BELGACOM OFFERS LOG-IN PERSONALIZATION AS AN OPTION FOR USERS, PRESENTING IT AS AN ADDED VALUE FEATURE THAT RESULTS IN BETTER RECOMMENDATIONS

While multiscreen TV serves individual devices, with greater scope for identifying the user, it also encourages divergence in consumption patterns that makes personalization even more important if you want effective targeting of services or advertising. While a household may have some common interests, there is a limit to the effectiveness of targeting if it is based on an average profile of a family. So a major challenge for many operators now is to break through the household barrier and target the constituent individuals directly for both recommendations and advertisements.

There is disagreement within the industry over whether you need to identify the precise user or whether effective targeting can be achieved by analyzing contextual information, such as recent consumption patterns. The only sure way of identifying individual users is by authenticating a device, as mobile operators can do via the handset’s SIM card, or by inviting the user to log-in. The latter imposes an extra task on the user and so operators are reluctant to enforce it. A few though, such as Belgacom, are offering log-in personalization as an option for users, presenting it as an added value feature that results in recommendations that are better tailored to their preferences.

“We offer it as an opt-in service,” emphasizes Belgacom’s Rockmann. “Our experience is that you have to give people the choice and you cannot force them to do this.”

The advantage of this approach is that subscribers that do
opt-in tend to be very happy with the service, but the downside is that relatively few people choose to do so. “The digitally savvy early adopters are a very important group, but are also a minority,” Rockmann admits.

Nivedita Nouvel at Broadpeak says many operators are taking the contextual approach. “Log-in procedures are often rejected by customers who do not want to spend time typing passwords to watch their videos,” she notes. Operators instead depend on analytics to provide the user intelligence needed to serve recommendations and ads, with relevant data about consumption patterns residing in the network. The device provides QoS metrics but not user identity.

Tvinci, which provides a multiscreen TV platform used by Pay TV operators, thinks ‘Multiscreen 2.0’ requires recommendations based on what you watched personally rather than what everyone else in the house has been watching, and lining up the next episode of the show you have been watching based on where you are in the series – not where somebody else has reached. The company allows for ‘multi-tenancy’ within the home and you can even have individual VOD budgets for each person.

Once a service is truly personalized, you can then start to really harness social media, according to Ido Wiesenberg, VP Business Development & Co-Founder at Tvinci. Users can discover content based on friend activities, which could mean a social EPG with social buzz to indicate what programmes are hot right now among your friend group. Each user could receive a news feed that lists friend activity on the service.

Canal Plus’ Yomvi TV online service in Spain has certainly recognized the power of ‘social’. It has been gaining subscribers and also interest from content producers by combining TV with social networking to generate buzz around content that is available first over the Internet. “We are creating a network of online connections around newspapers, bloggers, studios, operators and channels,” explains Pablo Romero, Yomvi’s Head of Content. “Then it is a question of synchronizing all these players.”

The strategy is to break down the traditional barriers of Pay TV and extend it across the web, for example through TV series that are accessed as ‘webisodes’, shown first online and supported by personalized content discovery through the Jinni recommendations engine. “Right now we are preparing many launches of different series,” Romero reveals.

“Yomvi is already reaping the benefits of its personalization strategy around online, according to Romero, in terms of increased subscriptions and also traction from content owners. “More and more producers are coming to us and saying we want to do more things with you,” he explains. In terms of subs, Yomvi now has 550,000 compared with 200,000 a year ago. “In terms of consumption, in February 2014 we had 4.5 million views compared with 1.5 million in February 2013.”

As with ZON, advanced TV services that put more personalization at their heart are seeing rewards in terms of uptake. Orange is another platform operator that is pleased with the results of personalization efforts. Olivier Dhotel, Director New TV Video Services at Orange France, says: “Personalization can generate extra ARPU by proposing relevant premium content and services to our customers, such as premium live packs, VOD, EST [Electronic Sell Through] and SVOD (Subscription VOD).”

There is a lot of contextual data that operators can exploit to improve the level of targeting, put you have to find ways to deal with it effectively. “Indeed we do have all this...”

Jason Blackwell, Strategy Analytics

Yomvi is already reaping the benefits of its personalization strategy around online, with increased subscriptions and content owner traction.
data, especially when correlating information between Orange services consumption on the TV set and second screen apps,” says Dhotel. “We do not yet make use of a lot of this information. We are currently building big data logistics that will enable us to target our customers more accurately and in a live fashion. It is mainly a question of linking different back-office and business intelligence solutions that do exist, and setting business rules that will enable us to better serve our customers.”

**THE ROLE OF AUDIO IN PERSONALIZATION**

Audio is a subject that sometimes gets overlooked when discussing video services yet it is well understood that the quality of audio can have a dramatic effect on viewer enjoyment. It is one of the areas the industry must focus on if we are to deliver the same quality of experience for streaming video as for traditional television. This is a message that Dolby Laboratories has been delivering to content owners and platform operators for several years, highlighting the need for Surround Sound in the streaming environment.

Dolby has been using trade shows to demonstrate how its Dolby Digital Plus (DD+) enhanced audio compression solution works with adaptive bit rate video. DD+ is considered one of the most efficient and reliable ways to handle advanced audio and brings cinematic surround sound to online services across multiscreen devices, as well as unlocking the full audio potential of HD services.

The company has demonstrated how an ABR video stream retains the full capabilities of 5.1 audio (five speakers, one sub-woofer) even as network conditions degrade from 5Mbps to 64 Kbps. Only at 96 Kbps does DD+ shift from 5.1 surround to 2.0 and that transition is seamless. This advanced audio codec can

THERE IS GROWING INTEREST IN PROVIDING A CHOICE OF AUDIO TRACKS, PARTICULARLY AROUND SPORTING EVENTS WHERE YOU COULD DELIVER MULTIPLE COMMENTARIES

The L’Oreal interactive channel brand campaign, which uses ActiveVideo cloud technology ▲
deliver immersive surround sound via both broadcast channels or IP content, and is part of the HbbTV standard for hybrid broadcast broadband services, working with a variety of DRMs and delivery formats.

Audio also has a big role in making Ultra HD the premium, immersive viewing experience the industry hopes it can be. Among other things, Dolby has been working to improve the precision of timing across the audio channels so that, for example, sound can be issued from all speakers at slightly staggered times to approximate more closely the effects of a real concert or performance.

What many people may not appreciate yet is the role that audio can play in personalizing the TV experience. Relatively little attention has been paid by operators to the potential for satisfying user preferences for different audio tracks. For a lot of content, such as movies, the audio is integral to the product, with the only scope for variation being the ability to dub different language tracks on top. Now there is growing interest in providing a choice of audio tracks, particularly around sporting events where you could deliver multiple commentaries oriented towards different teams, individuals, or parts of the action.

This prompted Dolby, given its pedigree in sound, to develop technology that allows broadcasters to incorporate and distribute personalized audio selected on the basis of individual user preferences. “It is about allowing broadcasters to tell multiple stories around the same piece of video content,” declares Rob France, Senior Product Marketing Manager for Broadcast Audio at Dolby. “To use a European example, for every goal in a soccer match there are two stories. There is the story of the team that scored, which is one of jubilation and excitement, and the story of commiseration for the other team.”

For some sports, such as motor racing, there are multiple teams and drivers, creating the potential for different audio tracks associated with the same video footage. “You might be really interested in what is happening between the fifth and sixth car while the camera has to focus on the first and second,” says France.

Ideally there would be multiple camera views to choose from and that raises another application for personalized audio. “Sometimes you get poor audio quality associated with alternative camera angles. So in some cases the personalization will be achieved just with audio and in other cases by complementing alternative video,” France reveals. The idea here is that the audio for alternative camera angles might be created separately to ensure that it was of comparable quality to the primary track.

Dolby has been developing its personalization technology for some
Making TV more personal

Time, working with both broadcasters and technology partners. It has been conducting tests and demonstrations to ensure that it will fulfill immediate requirements whilst being sufficiently flexible to cater for unanticipated applications that will only emerge in the field after initial deployment.

One technology partner is Envivio, which already incorporates Dolby sound technology into its encoding and video processing products. Envivio is excited about the potential of personalized audio and plans to incorporate it as soon as possible, according to Arnaud Perrier. “The focus will be on personalizing the dialogue or audio track on the basis of known user preferences,” he says.

Dolby’s audio personalization technology is still at beta stage and has not been discussed openly until now, but it is being demonstrated for the first time at NAB Show 2014 in Las Vegas. Though strongly promoted for sports, it has potential applications in TV entertainment programmes, such as American Idol or X Factor, where there is scope for associating audio with particular aspects of the show. In some cases alternative voiceovers could be presented to suit varying tastes.

Audio is cheaper and easier to deploy at multiple locations than video, requiring just a microphone rather than a camera, while also consuming less storage capacity and bandwidth. In some cases, as France points out, the audio may exist already. “It may be just a case of taking a feed that is there and giving consumers the choice to access it.”

Dolby has identified three broad categories of audio with respect to personalization, which may be mixed within single tracks. Firstly, there is audio that everyone will want to hear, such as the noise of a crowd or the sound of a motorbike at a race, which creates ambience.

The second category comes under the banner of ‘allegiance’ and includes a separate commentary for each team or individual player, but it could include audio inserts into the main commentary generated by specific microphones around an arena. “You may want to hear audio just from mics worn by players of your particular team,” notes France. “We are increasingly seeing players at ice hockey games, for example, wearing mics. You might not even be aware, as a viewer, that you are being fed audio just from mics that are being selected on the basis of known preferences or allegiances.”

This second category also embraces multilingual tracks, which France views as a major opportunity for the technology. In most cases this should be relatively easy to implement.

The third category would be the most personal, including...
MAKING TV MORE PERSONAL

user-generated audio inserted into the stream. “At the very personal end you may be watching a game at the same time as your friend and say, ‘Let’s take the commentator out of this and get together on Skype,’” France explains. “So you are getting elements that are truly personal to you. No one else apart from your friend will hear you talking on Skype but because of the way we have implemented the system, an operator can blend that beautifully with the content that is coming from the broadcast.”

Dolby has already conducted consumer research to identify popular applications, of which alternative sports commentaries are one. The predominant finding was that there is a wide range of requirements for audio personalization. “The biggest thing that comes out of the consumer research is that different people want different things,” France points out. That is precisely what personalized audio was designed to cater for.

ADDRESSABLE TV ADVERTISING IS IN ITS INFANCY BUT “IT IS RAPIDLY GAINING STEAM AS OPERATORS BECOME CONVINCED OF ITS REVENUE POTENTIAL”

The research found that there is enthusiasm for the idea of personalized audio in general. “There is a lot of pent up desire for this,” says France. But consumers will have to wait a little longer to enjoy this, as Dolby has indicated that after the technology is unveiled at NAB there will be a lengthy period of trials before deployments.

Making Advertising More Targeted

Targeting advertising on the basis of viewer interests makes advertising more palatable or even welcome for consumers, which is important in an era when ad skipping is possible. This is another aspect of TV personalization. Replacing standard ads with more targeted ones could be a way to monetize on-demand, multiscreen and even classic linear services more effectively. Even replacing old advertisements with fresh messages during a catch-up window, without any specific targeting, can encourage content owners to make their programmes available on-demand, which strengthens a TV service.

Addressable TV advertising is in its infancy but Chris Hock, Senior VP for Product Management and Marketing at BlackArrow, which provides advanced advertising systems for multiplatform TV, says it is

Enabling TV Providers to Deliver Addressable TV

Above, a view of how TV advertising is evolving and next page, the TV roadmap, courtesy of BlackArrow
rapidly gaining steam as operators became convinced of its revenue potential. “It is good for advertisers. It helps make TV advertising more efficient by eliminating waste. It is better for viewers because they get to see more relevant ads,” he argues.

He believes it will take the industry time to work out just how deep targeting can go, especially around linear content. “Highly personalized one-to-one advertising, using techniques such as behavioural targeting or re-targeting, is great for the web, where direct response and action-based ads rule,” he says. “But TV – aside from some of the late night and fringe channel direct response commercials – has traditionally been more about brand advertising. We believe that most brand advertisers will be able to leverage some form of addressability to make their TV campaigns more efficient.

“We are already seeing a lot of interest from advertisers and agencies in advertising that is targeted to a household based on some attributes of the household, like renters vs. homeowners, children present in household, household income and so on.”

The U.S. cable operator Comcast can deliver ads targeted at the household level around its VOD content. “With their Xfinity On-Demand service, Comcast has built up a very large library of VOD content. We worked with them to launch dynamic ad insertion capabilities into that content across their entire footprint,” Hock explains.

One reason targeted advertising arrived earlier in the U.S. than in Europe is that there is a clear and well understood demarcation there between Pay TV operators and the networks providing most of the content. That makes it easier to establish mutually advantageous revenue sharing agreements.

In the U.S., the advertising inventory on traditional TV is often split between the programming network and the distributor and that has encouraged the cooperation needed to make dynamic ad insertion happen. Merrick Kingston, Principal Analyst at the IHS Technology Group, points out that in Europe the operator/broadcaster relationships have tended to inhibit targeted advertising until now.

“To do it fully requires the broadcaster to call the operator a technology partner when it comes to ad insertions and that requires ceding some control,” he explains. He cites the case of BSkyB, whose AdSmart platform tailors ads by household profile and location, having been taken up by some major brands like Tesco and American Airlines. “There is a reason why they are only inserting ads around Sky’s own channels,” he comments.

Discussing targeted advertising in Europe generally, Arnaud Perrier at Envivio says the business models have yet to catch up with the technology. “The way sales teams sell those ads is still lagging behind the

AD INSERTIONS REQUIRE THE BROADCASTER TO CALL THE OPERATOR A TECHNOLOGY PARTNER AND THAT REQUIRES CEDING SOME CONTROL

TV Service of the Future

Multiscreen

Addressable / Personal

On Demand

Data Driven

Measurable

Discoverable
technology, but with the arrival of IP unicast there is a new wave of interest among broadcasters and operators to actually deploy targeted ad insertion,” he suggests. His company’s Halo Experience Server offers audience measurement capabilities to better track connected user viewing patterns and also makes it possible for viewers to receive personalized ads based on their profile.

Belgacom is certainly interested in targeted advertising. “It is something we are looking into,” reveals Stéphanie Rockmann. “We are running a platform with consumer data. If you make it anonymous you can use it in many ways. It is definitely the way to create some value in the ad space.”

Olivier Dhotel at Orange does not believe it is worth deploying targeted advertising until it is proven that it will increase the advertising rates that can be charged, however. “It is not part of our core strategy. The only service where customers are exposed to advertising is Catch Up, which is financed by advertising. Before considering targeted advertising, we first need to prove that we can raise the value of advertising materials thanks to personalization. That is not the case yet.”

Perrier is confident that targeting will deliver those improved ad rates, referring to an online service with a one-to-one relationship, like when viewing on a tablet. He awaits evidence of increased CPM (cost per mille) rates but believes they could quadruple. And he can provide evidence that ad targeting generates additional revenues irrespective of CPM rates, by reaching multiscreen devices.

He points to two Envivio customers, the two largest U.S. cable operators, Comcast and Time Warner Cable. “They already had live ad insertion in legacy cable networks and they are now leveraging that to get additional revenue streams from the new devices,” he explains.

Envivio makes this possible thanks to its Muse encoder software and Halo packaging software, which signals and confirms the ad slot. This part of the system talks to ad decisioning systems from companies like BlackArrow. “The idea is that you signal ad slots to a device, regardless of the streaming format. Because we process that signaling and confirm it in the network on our Halo software, it becomes independent of the client and of the streaming format, so it is all centralized, Perrier explains.

The system will therefore work with Apple HLS, Microsoft Smooth Streaming, Adobe HDS and the industry standard MPEG-DASH. Then when ad slots have been confirmed, the insertion is performed by the decision system based on whatever metrics are available about the user.

According to Jeff Whatcott, Chief Marketing Officer at Brightcove, which now owns the Once ad platform, Civolution makes it possible to personalise opera subtitles.

“COMCAST AND TWC ALREADY HAD LIVE AD INSERTION IN CABLE AND ARE NOW LEVERAGING THAT TO GET ADDITIONAL REVENUE STREAMS FROM NEW DEVICES”
insertion solution that it acquired via Unicorn, there are two primary ways to approach multiscreen ad insertion when it comes to multiscreen viewing. The first is manifest manipulation, which works with ABR streaming. This is where a client device makes a request for content and that is manipulated so that it fetches ad streams and content streams separately but then displays them in the right order to give viewers what appears to be a continuous stream. This requires a ‘player’ on the receive device that is integrated with the different ad servers and ad networks that make ad targeting and insertion possible.

Another approach, which is characterized as server-side ad insertion, stitches advertising into the original content stream in the network and then delivers a complete video stream, with correct advertising, to a client device. Brightcove Once uses this approach. This method needs a light-weight client but not a ‘player’ on the receive device. Whatcott believes the complete answer for multiscreen ad insertion is a hybrid model that combines server-side ad stitching, which provides good device reach, with a lighter-weight player where the vast majority of the advertising logic moves to the cloud but the player caters for interactivity, like clickable overlays, and fast-forward disable.

At International CES this year, ActiveVideo unveiled a cloud-centric approach to delivering interactive advertisements, a sub-set of advertising that is traditionally fraught with complexity.
complexity due to the need to develop ads that work across different platforms and devices. CloudTV AdCast uses the same technology and device client software as ActiveVideo’s CloudTV user interface solution. You author the application in HTML5 (whether the application is an EPG or an interactive advertisement), then in response to customer commands from a remote control, the pages and graphics needed on a television screen are rendered in the cloud and stitched together into MPEG video streams that are simply decoded in the receive devices.

The benefit of this approach is that you author the application once in HTML5 and it can then be used on any receive device that can host a lightweight software client and video decode capabilities. At International CES the solution was pitched for television screens, whether reached via a traditional STB or a connected streaming device like a Roku box.

The CloudTV AdCast platform has been used for two interactive advertising campaigns by American Express and L’Oreal, delivered via Roku TV channels. “L’Oreal call it the brand experience, allowing users to click on different products and categories or make purchases,” Sachim Sathaye explains.

Personalization will come in the next phase of this project, with back end integration to link with other web based services. “For advertisements, personalization will come from understanding the consumer behaviour as well as integrating that capability in the back end with their Internet activity,” he comments.

**CONCLUSION**

The term Multiscreen 2.0 appeared at various trade shows last year with sometimes vague and occasionally specific references to what it means. The concept encompasses truly personal recommendations and bookmarks, personal social integrations and addressable advertising, among other things. Making personal recordings available everywhere and personalizing audio are other important innovations for advanced TV services. Most of these concepts are as valuable on a widescreen living room TV as on a tablet and they all reflect a growing focus on how we can make TV a more personal affair.
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