

# ETCA 2016

## New Name Heralds Increased Scope for Conference on Entertainment Technology

*Industry veterans gather for the fourth annual conference, bringing together Hollywood and Silicon Valley to discuss future directions in entertainment technology*

By David Cardinal

**I**n keeping with the increased importance of connectivity of all kinds—between entertainment producers and consumers and between consumers via social media—SMPTE’s conference in Silicon Valley was renamed Entertainment Technology in the Connected Age (ETCA) this year. The agenda was expanded to include virtual reality (VR) and the connected car. Over time, the conference program has moved from a heavy emphasis on the internet as an adjunct to traditional programming (e.g., second screen) to focusing on its growing role as the primary driver of content consumption—particularly on mobile devices. ETCA 2016 kicked off with SMPTE’s own Bob Seidel’s opening remarks, putting the organization’s century of entertainment technology progress into context, with the challenges and opportunities facing the industry going forward. One that he highlighted was the shrinking content release windows, which are helping ensure the growing success of alternative delivery systems, such as those using the internet or other digital and streaming systems.

### Alive and Online: The “New Linear” Television

Colin Dixon of Nscreen Media kicked off the main program with a panel covering the online delivery of traditional television (TV) content. CBS’s Jon Mantell explained how the network

has made much of its content available live and online in 720p high definition (HD). Of note, he stressed that live events generated much longer viewing sessions than more traditional video on demand. Challenges include dealing with many different content source formats and then distributing them across a wide variety of devices and platforms. Part of the process includes embedding ad blocks via metadata, which can be replaced with the appropriate ads when the content is delivered. Server-side ads were highlighted as delivering better



“Alive and Online” panel. (L-R) Moderator, Colin Dixon, Nscreen Media; Matt Smith, Anvato; Jon Mantell, CBS Entertainment Digital; Thomas Box, Verizon Digital Media Services; and Stuart Russell, You.i.

performance than client-side ads, which often generated “spinning wheels” and cost viewers.

Stuart Russell’s You.i tackles a different part of the problem—creating a cross-platform development environment for those building video apps, such as Crackle, which emulates a traditional TV channel by starting to play in the middle of a show and then following up with a curated list of shows that further mimic an over-the-air (OTA) TV channel—although with the advantage that you can rewind and restart shows or jump to other shows. Dixon challenged the panel to explain their response to ad blockers. Server-side ads were again touted as a solution, and CBS has been looking at ideas for premium subscriptions that might allow consumers to opt out of ads.

### Live Through the Internet: Here Today, Better Tomorrow

Eric Grab of Disruption Wave moderated a panel focused on the unique challenge of streaming live events, including participants from YouTube, Twitch.tv, Akamai, and Media Melon. The rapid growth of live streaming and live streaming services is driving a large increase in internet traffic. Akamai is now providing 33 Tbits/sec of content and extrapolates the current growth rate to 8.5 Pbits/sec in 10 years. The Common Media Application Format was promoted as a better, and more standardized, format for delivering content—as HTTP Live Streaming (HLS) and Dynamic Adaptive Streaming over HTTP (DASH) can share the same source files. Similarly, Google’s QUIC provides a faster way to serve data over the User Datagram Protocol. The Web Application Video Ecosystem is an attempt to provide a unified, HTML5-based, player platform across all devices.

YouTube has made its live streaming platform available to everyone since 2014. It supports up to 1440p, although YouTube always transcodes all content into multiple resolutions so that it works well on all devices. Users can actually send two copies of the source stream for redundancy, and each will be processed in a different data center. One nice feature of streaming on YouTube is that, at the end of an event, the stream is immediately



(L-R) Jim Burger, Eric Ramberg, and Milo Medin.

available as a YouTube video. Going forward, YouTube is continuing to address challenges of playback quality, latency, and staying ahead of growing demand.

Media Melon aims to solve live streaming delivery problems independent of the choice of encoders. The company has an adaptive bit rate solution—called QBR—that analyzes content in realtime to change the bit rate, based on the complexity of the scene during both encoding and streaming. Panelists said that one issue for live streaming today is the challenge in reducing latency compared to broadcast. Currently, they are working to keep the delay at 8 sec or less, but they are hoping to drive it down to 2 sec as the new technologies roll out, and network bandwidth and quality continue to increase.

### The Rise of Multichannel Networks and Personalization

Jim Burger, a familiar figure to those who have attended past SMPTE events, hosted a panel on how internet technology can be used to make the electronic entertainment experience increasingly personalized, particularly through the use of multichannel networks (MCNs). Burger set the stage with charts showing that traditional TV viewing is decreasing for every age group, except for those more than 65 years of age. At the same time, primetime internet viewing is increasing. This represents a unique challenge for content providers. MCNs are one answer.



Moderator Eric Grab, Disruption Wave.



Moderator Jim Burger, Thompson Coburn, LLC.

An MCN is essentially a bundler of related channels (in many cases, simply individual YouTube channels) that are then marketed to advertisers and sponsors. The consumer gets a curated collection of related channels, making finding and watching content of interest much more personal. To put this in perspective, 8 out of the 10 most popular celebrities for teenagers are YouTube stars. Those stars are often recruited by more traditional media companies and go onto additional exposure through TV and movies. This can also work the other way. The Food Network, which might get about a million viewers for a primetime show, had more than 180 million views on YouTube in March.

Max Hirshik from Paladin views the change from traditional TV to online video as a revolution that is dramatically changing the entertainment economy. Hirshik said that, today, there are a few dozen major MCNs, such as Maker Studios (now part of Disney) and Fullscreen, that build much of their own technology. Part of the reason for this is that YouTube provides only the tools needed to be an MCN to large players. MCNs got started taking a few percent of the advertising revenue that would otherwise have gone to the content creators of their channels, but now are adding revenue streams from sponsored content and other more direct marketing campaigns, including merchandise. There is also a proliferation of hosting options for MCNs, as other services like Amazon Video (and soon Facebook) that have added the needed infrastructure, which means that most MCNs are likely to become multiplatform.

### AMD Keynote: VR and the Race to Real

VR is not new to ETCA. Last year featured a “Holodeck” and an evening chat on the topic. This year, AMD’s Roy Taylor gave a keynote on the promise and challenges of making VR a successful mainstream technology. He positioned 1895 to 2016 as the “Age of the Rectangle,” during which our model of moving images in film and video has

been confined to a rectangular window into the world—a window that VR is poised to shatter. Taylor made the case for VR succeeding, starting with the hundreds of start-ups, billions of dollars being invested, and the rapid ramp of enabling technology. Taylor sees 4K headsets, such as those currently available for high-end applications, becoming mainstream over the next couple of years, and that low-cost manufacturing in China will reduce the prices of current-technology headsets. The eventual goal in Taylor’s mind is 144 frames/sec at 15K resolution per eye, with nearly zero latency. Clearly, however, we are many years away from that. He invited conference participant companies to consider joining the VR Council—part of The Immersive Technology Alliance—that AMD has helped establish. AMD is also working with film schools to help them teach the new techniques needed to create compelling VR content.

Unique to AMD’s VR push is that it has open sourced much of its related software technology under the name LiquidVR. By doing this, it hopes to accelerate the performance gains needed to reduce latency—and therefore reduce motion sickness and increase responsiveness. In addition to the importance of both 360-degree video capture and game engine content, Taylor stressed the importance of immersive audio to complete the experience.

### VR Storytelling in a Connected World

In addition to the technical challenges in delivering VR, there are substantial challenges involved in rethinking storytelling to work with the unique features and constraints of VR delivery. Moderator Ajit Ninan conducted a poll of audience members. He started by asking the audience members when do they think VR would beat conventional 2D entertainment, with most of the audience estimating never, whereas the rest were split between 2020 and 2025. On the brighter side for VR advocates, 80% of the audience said they would be willing to wear a VR headset to watch a VR story. Most attendees also said they would not be willing to give up some resolution and field of view in exchange for having an untethered solution.

Almost all the attendees said they have watched VR content on a headset, whereas only about 10% said they had created VR content themselves. Of note during the panel, Facebook’s David Pio has helped develop a technology that allows the company to only stream a portion of a VR video that is being viewed. It does this by prerendering many views and having the client software request the one it thinks it will need. Coupled with a new projection format that allocates more bandwidth to the center of your view, the combination of technologies is greatly reducing the bandwidth required to display usable VR content.



“Media on My Terms” panelists. (L-R) Moderator Tom Coughlin, Coughlin Associates; Jim Burger, Thompson Coburn, LLC; Eric Ramberg, Ericsson; Milo Medin, Google; Mike Dolan, Media Industry Technology consultant; and Tim Bajarin, Creative Strategies, Inc.

## Media on My Terms

Tom Coughlin kicked off Day 2 of ETCA 2016 with an all-star panel focused on how media experiences can be truly personalized. Burger started by educating attendees on the legal issues involved, particularly the impact of the Federal Communications Commission's (FCC's) decisions. Burger presented the FCC's rulemaking as an attempt to apply facility-centric rules typically used to regulate cable providers to the new, non-facility-based, over-the-top (OTT) providers. This would give OTT providers broader access to content, including over-the-air (OTA) broadcasts. However, Burger explained that key OTT players, such as Netflix and those represented by the Consumer Technology Association, believe that the obligations of that regulatory scheme would outweigh any possible benefits.

Separately, the FCC has proposed rules that would open up the set-top box (STB) market to provide more competition and more choice for consumers. This has been a long time coming, starting with 1994 legislation that called for consumer options. Burger lauded the goals of the effort, but he relayed industry skepticism that the actual rules would achieve the desired result without excessive or inappropriate government regulations. Erik Ramberg of Ericsson stated that, outside the U.S., open standards were very common for STBs, and he speculated that the STB rental model common in the U.S. was partially responsible. Mike Dolan, consultant to the entertainment industry, spoke about how future versions of the Advanced Television Systems Committee will be able to incorporate various content streams, including all of OTT, OTA, STB-based, and, potentially, even wireless delivery integrated into one consumer device for the home.

Milo Medin from Google stressed the importance of open standards and said he was pleased to see at least some movement on this topic from the cable industry—and felt that opening up the STBs would be good over the long term for the cable industry. He also echoed what was heard throughout the conference—that the wide availability of consumer-friendly content creation tools and user-contributed content platforms, such as YouTube and Facebook, has democratized entertainment content



Moderator Alan McLennan, the PADEM Group.



"Entertainment on the Road" panelists. (L-R) Alan Messer, General Motors; Michelle Avary, Aeris; and Marc Manus, Manus Entertainment.

(although, ironically, those platforms themselves become well-compensated gatekeepers, as we have seen recently with concerns over Facebook's possibly playing favorites). Tim Bajarin brought a tech industry perspective to the discussion, stressing the potential for both 360-degree video and VR to upend the entire personal entertainment experience. He also pointed out that, from his research with Millennials, many of them are using a streaming box plus a simple OTA antenna to replace more traditional, as well as more expensive, cable plans.

## Entertainment on the Road: The Connected Car

Along with mobile devices, the car has been a growth market for entertainment—although one that has its own unique technical and safety issues. Allan McLennan of The PADEM Group moderated a panel, including General Motors' Allan Messer, Michelle Avary from Aeris, and Marc Manus, a consultant to the entertainment industry. Messer kicked off the session by stressing the upcoming explosive changes in the automotive industry, comparing the changes expected over the next five years to the changes from the past 50. He positioned connectivity as one of the four major themes driving changes to autos—electric propulsion, sharing, and autonomous operation being the other three.

Avary said that about half the cars being built in the U.S. this year will have an embedded phone of their own (distinct from the capability of being used with a tethered smartphone). How many of those customers will actually subscribe to the optional services available for the car's embedded phone after a trial period was a subject for speculation—with none of the panelists hazarding a specific estimate or giving any subscription figures. Manus said that, so far, he had seen the most interest from Hollywood in using the connected experience to help market and generate brand awareness—through long-form commercials that merge a scripted narrative with a product. The panel tried to hash out how large the market needed to be before content is created specifically for



Moderator Sunil Bharitkar, Hewlett Packard.



Ron Sanders, CEO, Warner Home Entertainment.

consumption in the car. Currently, driver content is limited to audio; thus, radio and related models are leading the way. Most video in the car is simply the same content that might be consumed elsewhere, but either downloaded or streamed into the vehicle. McLennan said that some of the MCNs in the U.K. are specifically targeting kids and the car's "back seat" for their programming. Panelists conjectured that, when content is created for viewing in cars—particularly shared cars—it would need to be authored and produced differently from versions made for consumption in the home. As an example, Avary asked what might be possible if content creators could have access to the car's sensors and incorporate their input into the experience (anything from location-based informational content to driving-related experiences, based on vehicle speed and dynamics).

### Evolution of Audio: Connected from Cinema to Couch to Car

Switching from video to audio, Sunil Bharitkar from Hewlett Packard led a panel on the challenges and future direction of audio as part of entertainment. Underlying the changes is a massive upgrade in the delivery technologies for audio, from Video Home System (VHS) to digital video disc (DVD) and, now, potentially very high bandwidth internet connections. The devices that used to play the content have also improved in general, from mono to stereo, to multichannel. Mobile devices were a step backward in many cases, but even those now have access to fairly high quality audio reproduction. VR represents the next frontier, as spatial audio is a key component of realistic immersive experiences.

Robert Fisher of Warner Bros. (WB) touted binaural remixes, specifically designed for headphones, as a breakthrough in quality sound reproduction. WB has been working with Dolby and others on this endeavor and reported that the early results of the new binaural remixing technology have been very impressive. Tim Carroll of Dolby Laboratories said that there has been great progress

in codec quality over the past year, but end-to-end system reproduction remains a problem, as distribution pipelines and players have such a wide range. Just because something sounds good in multichannel theater audio does not automatically mean that it is the right mix for a pair of mobile headphones. This tied in well with Fisher's call for doing binaural-specific remixes of content.

Deep Sen, from Qualcomm, took the audience through how scene-based audio works and why it is particularly important for VR.

VR requires both a true 3D sound field and the ability to rotate that sound field in realtime in response to head movements. This necessitates the use of scene-based audio—similar to light field capture for video. It includes sound pressure measurements based on space and time using a specialized array of microphones. The result is then mixed with any desired object-based audio sources. Qualcomm helps support the production of scene-based audio by providing plugins for ProTools. The output is rotated as needed and rendered through a standard or a personalized head response transfer function.

### The Future of Home Entertainment in a Connected World: A WB Perspective

Ron Sanders, chief executive officer of Warner Home Entertainment, provided the second day's keynote, in the form of an interview conducted by EnGadget's Roberto Baldwin. Sanders stressed that as fast as technology improves, customer expectations are increasing just as rapidly. The proliferation of devices has made the job of meeting those expectations much more difficult, but worth it as the overall demand for content continues to increase. Sanders said that one problem with the rapid pace of technical innovation and emerging standards is deciding which of those formats are even worth promoting, but the combined impact is, without a doubt, an improved viewing experience.

A key challenge outlined by Sanders is consistent messaging of the benefits of the new technologies, as well as refitting the retail purchase experience to showcase the new features. Warner is promoting versions of its movies—about 100 this year—that include several of the new video capabilities, along with immersive audio, as "4K UltraHD." To make it practical to produce these improved versions, the new technologies need to be considered early in the production process. Sanders compared the difference between 1080p TV and 4K UltraHD being as large as the upgrade from VHS to DVD. In the short term, Sanders sees the new versions as a complement to the existing HD and standard-definition versions, but over

time, more of the market will move to the higher quality versions. The Digital Equipment Group, chaired by Sanders, is trying to coordinate consistent messaging around the rollout of the new technologies.

## HDR, the Silver Bullet for Connected Content?

Annie Chang of Walt Disney moderated a broad panel on this hot button topic. For many attendees, HDR and wide color gamut (WCG) are more important than 4K resolution to image quality, but they have received much less attention in the media and from consumers. One problem is that the term HDR is used inconsistently, sometimes to mean high dynamic range, and sometimes to mean HDR plus WCG, and 10-bit sampling. Whichever of these definitions is used, it does not require 4K resolution, but has been hopelessly intertwined with 4K in the consumer TV marketplace. However, mobile small screens, with lower resolution or lower resolution content streams, can still take advantage of HDR. While it might go without saying, Matthew Goldman of Ericsson also reiterated that HDR does not mean a brighter display—it means more contrast.

Michael Zink, from WB, provided an analysis of the movie *Lego* in HDR and showed that high light levels were only used in a small number of frames, and only for certain highlights. Thus, overall, the HDR version of the movie was not significantly brighter than the standard dynamic range version.

Steven Robertson, who works on YouTube at Google, made the point that content streamed to computers and devices have some major advantages in adapting to new technologies. As devices are shipped with higher resolution or wider gamut displays, content can be automatically optimized for the new features as it is delivered. Robin Atkins, from Dolby Laboratories, agreed with Robertson and said that they have found that Vudu and other OTT



SMPTE Education Vice President Patrick Griffis.

services were able to incorporate new technologies very rapidly since they had end-to-end control over their content delivery.

Panelists agreed that another challenge was viewing conditions, both optimizing them and using metadata to adapt the content stream to where it is possible to determine what they are. Atkins also described how dynamic (content-dependent) metadata can be used to assist in mapping the color volume (gamut and tone) of the input scene to particular displays. For example, some scenes might be designed to be dark (perhaps a nighttime scene) and should not be mapped into a more typical rendering, whereas others (perhaps a discussion between characters in which facial expressions are important) might be designed to always be easily viewable and should be remapped. There are already more than 50 titles available for streaming that use Dolby Vision's "Smart Content" dynamic metadata.

## ETCA 2016 Takeaways

Content consumption on nontraditional devices, as well as using nontraditional delivery systems, is growing at a faster rate than almost anyone predicted—driven by demographics, user preferences, and rapid technical advances. However, these new forms of content delivery have exposed a lack of discovery, navigation, and personalization tools to make them truly mainstream and meet customer needs. In addition to continuing the rapid progress in delivery technology to meet the growing demand for internet-based entertainment content, the industry is just beginning to build the new ecosystem needed on top of it. Eventually, VR will also become an important part of the mix, but it is likely to be a gradual process.

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Panelists. (L-R) Moderator Annie Chang, Walt Disney; Matthew Goldman, Ericsson; Steven Robertson, YouTube; Michael Zink, WB; and Robin Atkins, Brightside Technologies.