Entertainment Challenges in Today's Digital Society



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2. How will 4K be adopted by consumers?

Before answering this question, it's worth looking back into the evolution of display technologies.

Higher resolution displays have been typically linked to larger screen sizes. For instance, throughout most of the 90's the sweet spot for standard definition (SD) broadcast was around 30" (30 inches/76cm diagonal). Then the sweet spot for high definition (HD) grew to around 50". For 4K Ultra HD (UHD), displays appear to be establishing their sweet spot at around 80". So as monitors get larger, we need more pixels to fill in the additional screen space that consumers have purchased. At the same time, our eyes are expecting higher resolutions and higher quality as technology improves.

But this doesn't necessarily imply that our viewing distance is changing. If ten feet (around three meters) was the typical sitting distance from televisions throughout most of SD's existence, this vantage point hasn't changed for 50" and 80" TVs. Living room sizes certainly haven't grown at the same proportion to screen sizes. What is changing is an increased pixel count enjoyed by the viewer. With larger televisions, our viewing angles are rivaling that of cinema, even if our living rooms are significantly smaller. Although the ideal viewing angle varies per consumer, the sweet spot for an immersive experience converges on a viewing angle of approximately 40° (measured from one's eyes to either edge of the screen)¹.

Consumers enjoying a cinematic experience in their own homes may partially explain the gradual decline in cinema goers over the past decade. Larger displays coupled with high-quality surround sound in the living room now mimic the same immersive experience as a movie theater.

Meanwhile, on the second screen, consumers are acclimating to higher resolution displays. Apple

by Gabriel Dusil

popularized the notion of the retina display which can now be found on many smartphones, tablets, monitors, and laptops. The market is following suit, as shown by recent announcements at CES '14 in Las Vegas, with 4K displays reaching and exceeding 100" (2.5 meters in diagonal).

Possibly by the time 8K UHD monitors arrive to market, we will have 120" displays hanging on our walls as light as picture frames. Or better yet, the wall itself will be an 8K monitor, and we will mount them like wallpaper.

Regarding how 4K will be initially introduced to consumers, early adopters have already shown interest, with OTT providers such as Netflix announcing their plans for introducing 4K content in 2014. Even their hit show, *House of Cards*², was filmed, edited, and mastered in 4K. In the meantime, subscribers can test 4K content on their portal with sample footage from Netflix.

One lingering question that is consistently raised by the media is the lack of 4K content. In fact, there is plenty of 4K content; it's just not accessible to the general public. Thousands of movies have already been filmed using camera resolutions between 4K and 6K thanks to pioneers like RED digital cameras which announced their Red One camera in 2006. Furthermore, many movies shot on film have been digitally scanned in 4K. So there is definitely no shortage of 4K content. As 4K becomes mainstream then, these libraries will be progressively released to market, similar to (or maybe even faster than) the speed of Blu-Ray releases over the past seven years.

OTT providers are positioning themselves as early adopters of 4K through Video on Demand (VoD services). OTT providers are the obvious candidates for adopting 4K because they can utilize steady improvements in Internet speeds to transmit such demanding bandwidth. Initial deployments of 4K OTT may require a hefty buffer to play the video in Entertainment Challenges in Today's Digital Society



a *download-then-play* approach (if the OTT provider allows for it). True live and uninterrupted playback will take a bit longer since 4K currently needs around 24-40 mbps of bandwidth when using the existing H.264 codec. With less than 24 mbps, it will be difficult for many subscribers to showcase the benefits of streamed 4K. This is expected to improve once H.265 is deployed, which anticipates around half the bandwidth, as providers are looking to implement 4K between 12 and 20 mbps.

Computing power will need to be higher for decoding 4K content. There are no consumer electronic (CE) appliances at the moment that can decode H.265 4K, although high-end desktop computers and existing GPUs (graphics processors) have the power to do the job. It's just a matter of time before high-powered, low-cost processors will be available for mass-market distribution in CE appliances.

Finally, 4K OTT will initially need adaptive bitrate capabilities (ABR) to minimize subscriber frustrations that lack the appropriate bandwidth. Early deployments of the service may be a little bumpy for 4K OTT and may result in a lot of customer complaints. So service providers will need to be hyper-sensitive to maximizing quality of service (QoS) during the initial stages of a 4K service launch. Eventually, the entire supply chain will align to remove any bottlenecks - from the cloud down to the consumer. This includes bandwidth speeds, processor capacity, and optimized H.265 encoding.

In summary, 4K will be adopted by video enthusiasts that want an immersive theater experience in their living room. 4K content will reach the home as content owners release their libraries, and OTT providers will likely be the first to deliver the service to their subscribers. This content can be encoded using the latest video encoding standard, H.265, and sent through high-bandwidth Internet connections reaching and exceeding 20 mbps.

• Synopsis

Understanding the entertainment market from ten thousand meters helps industry executives make strategic decisions. This leads to tactical initiatives that drive innovation, new services, and revenue growth. This Q&A series takes a top-level view of today's digital landscape and helps decision makers navigate through the latest technologies and trends in digital video. Gabriel Dusil, Chief Marketing and Corporate Strategy Officer from Visual Unity discusses the ongoing developments in Over the Top (OTT) services, how these platforms are helping to shape today's digital society, and addresses the evolving changes in consumer behavior. Topics include 2nd Screen, 4K Ultra High-Definition video, H.265 HEVC, global challenges surrounding content distribution, and the future of OTT.

About Gabriel Dusil



Gabriel Dusil is the Chief Marketing and Corporate Strategy Officer at Visual Unity, with a mandate to advance the company's portfolio into next

generation solutions and expand the company's global presence. Before joining Visual Unity, Gabriel was the VP of Sales & Marketing at Cognitive Security, and Director of Alliances at SecureWorks, responsible for partners in Europe, the Middle East, and Africa (EMEA). Previously, Gabriel worked at VeriSign and Motorola in a combination of senior marketing and sales roles. Gabriel obtained a degree in Engineering Physics from McMaster University in Canada and has advanced knowledge in Online Video Solutions, Cloud Computing,

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Security as a Service (SaaS), Identity and Access Management (IAM), and Managed Security Services (MSS).

- gabriel@dusil.com
- http://dusil.com
- http://www.linkedin.com/in/gabrieldusil

• Tags

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- ¹ Optimum HDTV viewing distance, Wikipedia, http://en.wikipedia.org/wiki/Optimum_HDTV_vi ewing_distance
- ² House of Cards, Wikipedia, http://en.wikipedia.org/wiki/House_of_Cards_(U .S._TV_series)