UHD: What's in it for telcos?

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4K UHD's 3064 x 2,160 pixels are an increasingly mainstream TV experience as content offerings increase from few and far between to a fairly decent showing today. After a slowish start, content streamers like Netflix and Amazon and operators such as British Telecom are realizing the potential of pixel-rich content. Thierry Fautier, President and Chair of the Ultra HD Forum, gave us his thoughts on the challenges facing the UHD domain, especially for operators hoping to compete with OTT players.

By Gary Maidment

Three main challenges

Research by the Ultra HD Forum shows that the most pressing issue for most operators is the availability of UHD content. According to Fautier, "This means high-quality content they can put on a channel to provide a commercial service, not a spike of two hours every week like you often find in Europe." An unbroken stream of content like British Telecom's 4K offering, BT Sport Ultra HD, the UK's first 4K channel, is obviously more attractive to service providers and subscribers than a series of one-off movies.

And that's also the catch-22: For UHD content to be broadcast and consumed, a service channel must be in place and enough subscribers must have UHD devices to watch it on. But, service providers are unwilling to build a UHD service channel and invest in the tech to do so if there isn't enough content. The same is true at the user side, says Fautier, "A family won't spend upwards of €1,000 to buy a 4K UHD TV, unless they have a good reason. They need enough content."

Challenge number two, says Fautier, is the "capability of devices – from production to delivery to playback and display – to offer a true UHD experience, including HDR, your high framework rate, and your white-color gamut." He also refers to device interoperability, which is necessary to ensure that the standards defined by Ultra HD Forum actually work in real life. A case in point is High Dynamic Range (HDR) technology, one of the latest acronyms in the image realism armory. Offering a range of color, contrast, and brightness that achieves an eye-popping level of realism, a special HDR camera is needed to shoot HDR content. That said, true HDR-capable TVs can upscale content to near HDR levels of millions of colors, but native HDR content is better.

The third stumbling block for operators thinking of deploying UHD services is an excess of standards. HDR, for example, doesn't have a single standard and is therefore impossible to regulate in the context of "HDR-compatible" claims when it comes to TVs.

Four standards

There are four main HDR standards: HDR10, Dolby Vision, HLG, and Advanced HDR. Of these, HDR10 is the most commonly adopted, with big name TV manufacturers like Sony, Samsung,

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LG, Vizio, and Hisense all supporting HDR10, as well as Sony's PS4 Pro and Microsoft's Xbox One S. Samsung has gone one step further and released its own standard, HDR10+, while LG and Vizio have produced models that support Dolby Vision, a step up from HDR10 to the tune of millions of colors.

Developed by the BBC and NHK, HLG is designed more for live broadcasts, while Advanced HDR, the newest high-def kid on the block, targets broadcast media and the upscaling of SDR to HDR. Although these standards are compatible with HDR10, "Many more are coming," says Fautier. "So operators are a bit scared of which standard to pick and in what timeframe."

Show me the money

For operators and broadcasters, 4K UHD must make sense from a financial point of view. And they're understandably cautious. To get the ball rolling, Ultra HD Forum developed a range of standards that Fautier describes as "well-defined but not ambitious." Or that's what the forum thought at the time, having launched Phase A in 2016 based on simple, easy-to-deploy technologies. Operators didn't respond as anticipated. "After 12 months since we first published our technical specifications, we're still not seeing operators deploying services, which means we were maybe a little too ambitious," says Fautier.

The reason? "If a trial isn't successful, operators are postponing the decision [to offer UHD channels] because they want to scale," he explains. "If you have 1 or 5 or 10 million subscribers, you cannot afford a glitch." Users want and expect a UHD service to be smooth and simple straight out of the box. As Fautier points out, there's no 1-800 number for users to call if it isn't.

So, here's where the industry is currently at: "Operators are testing, they're trialing, and they're also working closely with STB manufacturers and TV manufacturers. They want to have everything working," he says. "I think everybody's now starting to understand that once operators see trials working, they'll be much more confident."

Ultra HD Forum acts as a partner and guide on the UHD journey, with its mission centered on "bringing together market leaders from every part of the industry;

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broadcasters, service providers, consumer electronics, and technology vendors to collaborate on solving real-world hurdles, and accelerating Ultra HD deployment."

As part of this, the forum works with operators to ensure they can capitalize on their inherent advantages, such as robust infrastructure for content delivery and huge numbers of subscribers, in readiness for UHD industry maturity.

Key technologies

Despite the reticence of operators, Fautier states that the basic tech building blocks for UHD are in place. In terms of delivery, we need bitrate speeds of 20 to 25 megabits to stream live events like sporting events. "Only fibers of very advanced vector technology like G.Fast can support those bitrates. Don't forget that if I'm saying 25 megabits for my video service, I probably need 10 or 20 for my data services, which means the lines need to be at least 30, 40, or 50 megabits to sustain this. And this is quite high."

G.Fast technology comes into its own in the last mile of transmission, potentially achieving gigabit speeds over short distances by extending frequency spectrum. However, higher frequencies also mean higher costs and greater power consumption. So, in practice the frequency band that's ultimately used is a compromise between performance, cost, and implementation. For operators, G.Fast requires a well-thought-out solution.

G.Fast in action

Last year Openreach, British Telecom's fixed-line and infrastructure arm, selected Huawei to help deliver the first phase of G.Fast deployment in the UK. The agreement is part of a project that will bring ultrafast broadband speeds to 10 million UK premises by the end of 2020, the culmination of a £6 billion investment by the British incumbent that will no doubt expedite the reach and take up of UHD services.

Announced in July 2017, Huawei is partnering with Omantel to deploy the first E2E G.Fast solution in the Middle East, minimizing investment by reusing copper

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lines to deliver ultrafast broadband. Omantel is planning to deploy a high-performance G.fast home gateway, which will provide subscribers with dual-band gigabit Wi-Fi and improved voice, data, and video services, including the potential for 4K UHD services.

Now until 2020

Fautier states that consumers can look forward to a much more immersive experience in the future, when UHD, HDR, and other technologies like High Frame Rate (HFR) intersect with VR. HFR is a proven means of dialing up realism by eliminating the strobing and blurring that can affect moving images, something we're perhaps not yet completely ready for. Peter Jackson's controversial decision to use 48 frames-per-second (FPS) instead of the usual 24 FPS for his Hobbit movies received criticism for being so realistic that it was distracting. However, in a VR context, it's exactly what's needed.

"Then we have Next Generation Audio," says Fautier, touching on another ingredient for true VR immersion. "It can be channel-based, object-based, and interactive." Channel-based audio is the traditional method of capturing sound with the user device in mind. Object-based audio (OBA) is a newer surround sound technology that overlays up to 128 audio tracks onto a 3D rectangular coordinate with defined audio channel locations. For example, a gunshot in the distance will sound like it's coming from the distance, forming part of a rich, highly layered sound experience, as if you're in the scene. "When all the features of UHD technology are stable, you'll be able to transplant those technologies into a VR environment. And this is something we believe should happen around 2020," predicts Fautier.

The logical progression of mature immersion technology is "six degrees of freedom," says Fautier, which will produce a hugely data-intensive, full-image capture scenario that will allow the user to move inside a scene, "All these applications when they come together will give an outstanding experience." He believes that Huawei is well-positioned to play a part in this immersive future, "Huawei understands the internal workflow from creation to delivery to the end, so it's uniquely positioned to catch the VR wave."

Equally, the opportunities for operators are definitely there, assuming the right partnerships and strategies. A key growth point for them over the next few years is the convergence of fixed and wireless services with bundled communications, broadband, and TV services – with UHD as a key offering. There's always risk, but as Fautier puts it, "It's like digging for oil – if you don't try you'll never find anything."