UHD AND HDR:

NOT JUST MORE PIXELS, BUT BETTER PIXELS TOO!

Jon Hatto, dock10's Senior Technologist, explores what he thinks will really drive the next big leap in television quality

UHD has been lauded as the next big thing in television. The 'U' stands for ultra, offering a resolution four-times that of HD and promising a sharper and more detailed picture. Now, it's important not to confuse UHD with 4K. The difference? 4K is predominantly for the film industry and uses 4,096 horizontal pixels, whereas in television, UHD is more common and has 3,840 horizontal pixels. Either way, you'd think that UHD would make a noticeable difference to TV viewing, after all, what's the point if it doesn't?

Whilst TV manufacturers have been quick to adopt UHD displays, the available content has been limited to providers such as Amazon and Netflix. In 2015, I purchased a 50-inch UHD TV (non-HDR) and sat down to watch House of Cards on the Netflix UHD package. Viewing distance in our rather average lounge is approximately ten feet. Despite the best efforts of my brain to appreciate the increase in pixels, there was a slow realisation, until finally my wife proclaimed, "*I can't see any difference!*" I had to admit, neither could I.

To appreciate the benefits of UHD, I needed to be sitting at most just six feet away from the TV. This simply doesn't work for our lounge setup. We could increase the size of the TV, but in our lounge, we'd need an 80-inch TV and a bigger wall. True, the average screen size is increasing in the UK, and has grown from 21 inches in 2000 to 40 inches in 2016. At that rate, we're likely to see the average lounge sporting a 70-inch screen by 2030. But that's a long way off and still not quite big enough for pixels alone to make a noticeable difference.

Step forward High Dynamic Range (HDR). The premise of HDR is that it makes our TV viewing experience truer to life by better mimicking the range of brightness that the human eye can see. Think about walking from a dark room into brilliant sunshine, and all the squinting we do before our eyes adjust to the brightness. That same experience could be replicated on your TV screen, requiring your eyes to adjust before viewing becomes comfortable again. This could be an intentional part of the story (a prisoner glimpsing sunlight for the first time in years) or unintentional (a dark scene followed by a garish advert for orange juice).

What's important for HDR isn't the number of pixels, it's the nit. This is a unit of brightness (nit comes from the Latin word nitēre meaning "to shine"), the higher the number of nits the brighter the image. For example, this picture shows the nit values of a sunny day.

Non-HDR content is created to display a peak of 100 nits, whereas HDR TVs display 540+ nits, with 1,000 nits being the current benchmark. But HDR isn't just about brighter pictures, the real value comes from the increased range of brightness it offers, as this translates into greater realism.

So where does this leave us? Interestingly, the BBC is putting more emphasis on HDR than UHD because they believe HDR is set to show greater public value – there is more benefit in having a more realistic-looking image than a slightly sharper picture. This has recently been reinforced by Sony's decision to release a 40-inch HD TV that has an HDR option but no UHD in sight! However, in the author's opinion, it's going to take some exceptionally creative marketing to get the viewing public to understand HDR and want to invest in it. The probability is that by combining the extra pixels of UHD with the enhanced brightness provided by HDR (and throwing in an enhanced colour range with Wide Colour Gamut), we will have something that could pass the average lounge-test from any distance.

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