

Ultra HD 4K: Investing in the Future of Video

By Jesse Cryderman

Who remembers VHS? The uber-popular consumer video format ushered in home theater experiences, kicked off home-recording, and disrupted appointment-based viewing. And yet, the video resolution (240x480) was truly abysmal in a best-case scenario. Factor in tape volatility and magnetic maleficence, and most often we watched videos that looked like garbled transmissions beamed to Earth from a Soviet orbiter.

Today, better-than-DVD video resolution is the norm. Televisions and monitors sporting 1080p resolution (18 times better than VHS) are ubiquitous and incredibly [cheap](#). This format has become the norm in television, gaming, video on-demand, over-the-top (OTT) video, and mobile. Even our phones and tablets shoot and display 1080p video. Service providers and content delivery networks have made significant investments in their encoding and transcoding software and network infrastructure to accommodate this shift to high-definition (HD) video.

Like Pixy Stix and potato chips, a little is not enough—once folks experience high definition, they want more. The answer is Ultra HD 4K video, and it's bound to pose some headaches for service and content providers.

While not quite as dramatic as the leap from VHS to 1080p, the difference between Ultra HD 4K and 1080p is awe-inspiring. After reviewing several displays, I found myself saying, "I want that!" Ultra HD serves up 8.3 million pixels, making it essentially four times clearer than 1080p HD video. The pixels are so small that I found it impossible to see them. Instead, you're presented with an animated work of art, a moving painting. Whether or not the experience is enough for the bulk of consumers to shell out \$1,000 for a new screen in 2015 remains to be seen; but one thing is certain: sooner than later 4K is coming to your network.



Tuning in to Ultra HD

With four times as many pixels to tickle the eyes, file sizes swell accordingly. A typical two-hour Ultra HD movie stream clocks in at around 40 GB. From a customer perspective, this doesn't play well with the [data caps](#) and throttling practices employed by many Internet service providers.

Comcast, for example, is currently trialing [data usage plans](#) in several cities. These plans include 300GB of bandwidth each month, and charge \$10 for 50GB extra, beyond the data cap. In this scenario, Ultra HD gets expensive quickly. A family of four could easily tap out the bandwidth bucket in a day by streaming movies on Saturday. Each

additional movie would cost nearly \$10 in bandwidth under such a billing scheme. There is currently active debate in the U.S. to address some of these issues with Net Neutrality provisions, but the outcome is far from decided.

Consumers don't just watch video in Ultra HD, however. Gaming, which is more popular than any other form of media, connects thousands of players simultaneously with 4K experiences, and these typically are marathon sessions. (If you know any gamers who play for less than two hours per session, please contact me at jesse@pipelinepub.com.) What's more, the next wave of mobile devices showcased at Mobile World Congress 2015 [sport 4K video and photo](#). This means those fun little family videos from Bobby's soccer game are now bill wreckers. In fact, just one 4K video sent over cellular could eat up an entire month's



Not for distribution or reproduction.

worth of mobile data under most plans on the market today!

These impending bill-shock dystopias are a reflection of the challenges service providers face. Simply put, the costs will be passed on to the consumer until network infrastructure, compression technologies, and capacity management are improved to accommodate such massive file sizes. There is a silver lining, however: service providers who innovate quickly will be able to deliver Ultra HD 4K at a much lower price point than those who don't.

Service provider use cases

There are numerous offerings from the vendor community on the market today that can ease the transition to Ultra HD 4K video. The proof is in the pudding, so the saying goes, and here are some real-world examples of service providers on the front edge of high def video.

Videocon d2h, a fast-growing direct-to-home video provider in India, recently selected Cisco's AnyRes Live UHD Encoders to launch its 4K-enabled Ultra High Definition viewing experience. This encoder solution from Cisco is capable of SD, HD, Full HD or Multi format ABR encoding using H.264 as well as H.265.

"Videocon d2h is bringing path breaking technology into the Indian homes through this wholesome experience of 4K Ultra HD using its [4K Ultra HD set top box](#) and 4K Ultra HD Multi Genre Channel," said Mr. Saurabh Dhoot, Director, Videocon Group. "We are the first in the country to provide this experience. The futuristic user experience will be eons ahead compared to anywhere else in the world. Keeping pace with the global market trends, we will continue to redefine the television viewing experience of our customers in India."

Videocon was first to the plate in India, but not alone. Tata Sky has also launched 4K video service in India, with [help from Ericsson](#). The compression technology integrated by Ericsson's solution enables Tata Sky to achieve cost-effective and crucial bandwidth efficiencies while deploying new video services to meet ever increasing network and consumer demands.

In China, [Huawei](#) has teamed up with China Telecom Sichuan to debut the first Ultra HD 4K video service in the country. The service combines fiber broadband, a 4K ultra-HD intelligent smart set top box, 4K ultra-HD video capabilities, and a 4K ultra-HD network construction, and represents three years of collaborative development.

Ultra HD can also be streamed from the sky. Two service providers, [Astra](#) and [DirecTV](#) are already in the game. DirecTV has achieved notably innovation because it

A family of four could easily tap out the bandwidth bucket in a day by streaming 4K movies on Saturday.

also offers 4K video-on-demand (VOD) from satellite transmission. DirecTV is the first multi-channel video provider to offer [4K VOD](#) to its customer base.

Netflix, always at the forefront of video delivery, has been [streaming Ultra HD 4K](#) since February, 2014. To stream content at this resolution, customers need to have some fat, reliable pipes. Here is what Netflix recommends:

"To get the highest quality Netflix experience in Ultra HD 4K, we recommend available bandwidth of at least 20Mbps. This provides enough throughput for the stream, which is about 16Mbps, plus headroom for service variability."

According to the most recent "[Measuring Broadband America](#)" report from the FCC, the average subscribed speed for broadband customers in the U.S. is 21.2Mbps. In other words, most customers in the U.S. have barely the bandwidth to support Ultra HD.

I can see clearly now

Romulo Pontual, Executive Vice President and CTO, DirecTV, believes that the 4K experience is compelling. "The picture quality and depth of detail that 4K provides is nothing short of remarkable," says Pontual.

Some video providers and OTT players are already offering 4K, but adoption has been slow and will most likely continue at this pace in the near future.

"It will still be a few years before Ultra HD 4K TV is mainstream," [wrote Stephane Bourque](#), President and CEO, Incognito Software. "Although Amazon, Netflix, and YouTube have announced plans to stream Ultra HD 4K content, so far, 4K TV is off to a slow start."

To deliver Ultra HD requires a combination of efficient encoding, compatible devices, and fat network pipes. The bulk of deployed technology in Ultra HD is in device, compression, and encoding. Encoding solutions help service providers achieve cost-effective and crucial bandwidth efficiencies while deploying Ultra HD 4K, and

devices must support the format. Ultra HD devices are readily available. The reality is that bandwidth is the [main limiting factor](#) in 4K.

What does this mean for service providers? Investments in network infrastructure and capacity management now will likely pay huge dividends in the future, as delivering a superior Quality of Experience at a lower price will create true differentiation in the video market.