

Ask the expert - Mauricio Alvarez Mesa

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Leading expert Mauricio Alvarez Mesa discusses the changing landscape of video codecs and answers questions on readiness of compression technology for 8K.

Q1 Compression technology continues to be a key enabler in the broadcast domain, but the landscape seems quite complicated. Could you say a few words about where the industry has got to in codecs for HD and UHD content distribution?

A1 The industry transition to HD was easier as H.264 (AVC) was the single codec for HDTV, Blu-ray disc and internet streaming. H.264 was a very good codec and IP licensing was clear, so the industry transition to HD was based on a single codec used in all applications, and it is still probably the most widely used codec today.

However, for the transition to UHD in both 4K and 8K, it is a little more complicated. H.265 (HEVC) was supposed to replace H.264 but there have been licensing issues and there are multiple patent pools. So although the technology was very good, there were IP licensing problems.

In response to the licensing issues, other codecs have emerged such as AV-1, and now we see the next generation codecs such as VVC H.266, although this will take a few years to be adopted in the industry. So we have multiple codecs now and they will not disappear, therefore the transition to 4K and 8K will happen in a multi-codec world.

Q2 One of the challenges of 8K service introduction is delivery of the content to the end user. Are there solutions available now for 8K content distribution?

A2 Up to a few years ago, only NHK was working on 8K, they have been doing so since 2008 when they did the first live transmissions in 8K. Recently more companies are involved in 8K trials and there are more companies creating technology. There are now different codec solutions, most of which are based on HEVC, which is the state of the art, especially for 8K live.

There are software CPU-based solutions, and hardware codecs based on GPUs and ASICs from different providers. The 8K codec ecosystem is becoming more diverse. There are different solutions addressing different requirements.

Q3 Would the solutions for offline encoding of 8K material be applicable to 8K live content?

A3 These are different applications. 8K offline is not so different from 4K or HD offline encoding. You need more time to encode because the files are bigger - you will have to pay more for the encoding process e.g. to a cloud provider. You don't need to do anything new for 8K offline encoding for VOD workflows.

One problem with 8K is the higher resolution, HDR, 10 bit 422 etc so the files are bigger and distributing them over the internet is an issue. People are working on implementations

to reduce the bit rate as much as possible. So common to offline and live is compression efficiency - reducing the bit rate but maintaining the high quality expected of an 8K service.

However in a live 8K scenario, the processing has to happen in real time. There is still the compression efficiency requirement but we cannot offer 8K live in very low quality, and there are low latency constraints. Some applications only allow a few seconds of end-to-end latency. Therefore live codec design is very different from the offline case.

Now there are available the second generation of 8K live codecs, most of them based on HEVC. They achieve high quality, with a relatively low bit rate around 50Mb/s, which may be high for some networks, but we can manage this today over the internet.

Q4 What's your prediction for when 8K codecs will be mainstream?

A4 8K live will happen in 2021. It should have been last year with the Olympics in Tokyo. This year we're seeing more projects ready to be deployed and trialed on larger scale pilots and live events. From this year we'll see more 8K live events happening and we'll see the real benefits of the technology.

There will be next generation video codecs in a few years from now, so we will be able to lower the bit rate even more. Then 8K will be even easier to receive at home and other bitrate constrained environments.

More and more events being done in 8K live from this year on.

Q5 If our listeners want to find out more, where should they look?

A5 A technical blog is available on the Spin Digital web site with several documents. A White Paper on what's needed to make 8K live possible is available here

<https://spin-digital.com/tech-blog/whitepaper-spin-enc-live/>

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