Finding the best link to transmit 4K content

BY MICHAEL VAN DORPE

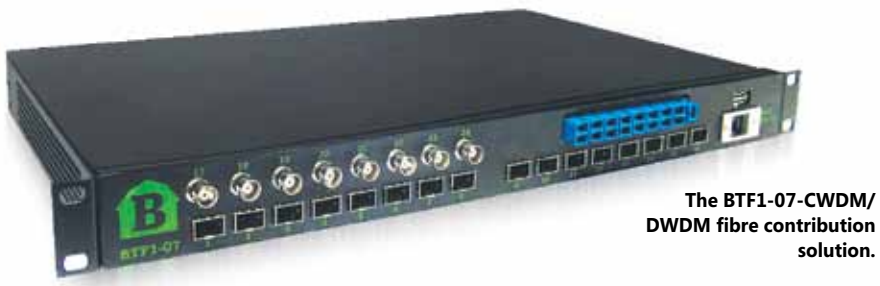
As a global distributor for several brands, Village Island has access to state-of-the-art technology from around the world, in the form of OEM components and modular equipment.

We are also now delivering advanced solutions such as 4K 60p 10-bit real-time decoding. However, there is always a gap between the cutting-edge technology that US, Japanese and European manufacturers are ready to offer, and what our customers need as a final application — right now.

An easy example of 4K is the upcoming football World Cup in Brazil, where 4K 60p 10-bit HEVC contribution links will be made over satellite. The full 4K 60p 10-bit baseband signal is 10Gbps, and there is little chance that hardware chip manufacturers will be ready in time, or even decoder/set-top box (STB) integrating such technology will be released in time.

Satellite operators naturally came to us for an alternative solution, and in a few months we achieved a real-time decoder solution based on DekTec hardware and our VillageFlow software.

Our VillageFlow software approach to most technical problems, allows us to create links between very specific Ins and Outs and connect logical blocks within our customers' workflows. This flexibility enabled us to react in time to the 4K 60p 10-bit demand with new products such as the VH-4000 and VillageStudio 4K. In the same way, we have recently released a HD HEVC decoder which is unique in the market.



The BTF1-07-CWDM/ DWDM fibre contribution solution.

The VH-4000 HEVC 4K 60p 10-bit decoder.

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The core of VillageFlow is available to customers as a ready-made application, or an SDK (software development kit), which they can build freely upon. The core processing of the stream is a basis, and we are able to attach new inputs and outputs to it on demand.

A new interface card will take us a few days to integrate and your system gets upgraded! For example, an original satellite receiver could output tomorrow in QAM, IP, DVB-T2, multi-PLP, HLS ... It is up to the user to decide. A full re-multiplexing enables a complete control of the output streams, including PCR re-stamping and bit-rate control.

Adding the proper hardware and processing to this existing platform was easy, and the 4K 60p 10-bit live decoder was born.

4K can represent more than 10Gbps of data, which is impossible to transmit in real time over most networks. So there are basically three ways to tackle this:

1 Broadcast compression: The first approach is to use highly efficient broadcast codecs such as the new H.265/HEVC to transport considerable quality for 4K 60p 10-bit over 15Mbps (as it will be transmitted for this year's football World Cup).

This represents an important gain compared to similar quality at 80Mbps for H.264. It is important to note that we are not talking about 4k 30p, but 4K 60p — therefore twice the bit-rate.

And when we address sports content, the frame rate difference is immediately noticeable (panning, fast-paced movement). Some customers in Japan claim that they want to reach even higher frame rates such as 120fps and 240fps, as it was nicely shown by the European Broadcasting Union (EBU) at IBC2013. Over 240fps, the human eye will not see a difference, but we have a long way to go from 25/30fps!

Michael Van Dorpe is the President of Village Island.

2 Cinema compression: The second approach to the transmission of 4K 60p quality is based on JPEG2000 technology as it is acknowledged by the cinema industry.

The mentality here is completely different, and video compression can be accepted as long as it does not affect the video quality. For short-event durations (a few hours to a few days), a higher bandwidth is not necessarily an issue, and reaching lossless encoding/decoding is a lot more appreciated.

Here we are talking about "visually lossless", which means that the video signal is compressed at a level imperceptible to a human viewer in normal conditions. We deliver such systems to cinemas and telecom operators for high-quality links, and universities for high-end videoconferencing.

3 No compression: Yes, it is possible to transmit a 10Gbps baseband 4K 60p 10-bit signal over several kilometres, using fibre-optics cables and the well-known CDWM/ DWDM techniques.

As recently demonstrated in the Village Island headquarters in Tokyo, Japan, the 4K signal can be transmitted as four separated 3G-SDI links without any de-synchronisation. This is thanks to the recent collaboration between Village Island and the Norway-based manufacturer Barnfind.

Barnfind frames can house BNC and SFP ports, multiplex and de-multiplex CWDM / DWDM wavelengths and connect inputs and outputs in a click through an intuitive matrix view.

No external synchronisation was required to achieve the transmission properly; however, multiple sync types are available on the chassis.

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