

Arista case study: TVM Ireland outside broadcast truck

Highlights

Challenge

For its new OB10 truck, TVM wanted to move from SDI to an IP-based backbone to stay at the forefront of broadcasting technology and increase efficiency. TVM made the move to a fully IP-based mobile facility, seeking guidance from Arista's broadcast technology experts to ensure reliability and scalability to handle 4K video and beyond.

Solution

- Arista 7500R & 7020R family switches for high performance, low latency, and scalability
- Arista EOS® for reliability and simplified network operation

Results

- TVM is the first OB facility to adopt SMPTE ST 2110 standards-compliant IP technology in Ireland, ensuring they stay at the forefront of developing technology
- A futureproof facility that can flexibly adapt and provide a huge 4000 squared HD matrix
- The Arista switches occupy a very small form factor, enabling higher system density than legacy SDI

When a television broadcaster covers a live event, it typically must install everything that is needed on site, not just cameras and a studio but, crucially, a complete mobile production facility that controls the production, mixes video and sound, and transmits the finished product to broadcast.

Supporting this production requirement are outside broadcast (OB) specialists like TVM. Based in County Cork, Ireland, TVM is a one-stop broadcast facilities company whose OB trucks support the diverse broadcast needs of its clients across Ireland and the UK.

TVM builds all its OB trucks in-house. When they decided to add another unit to their fleet, 'OB10', they opted for an IP-based solution centered around Arista Networks' switches and IP encoders, positioning the company at the forefront of future broadcast television production.





Company Background

As one of the leading OB service providers in Ireland, TVM provides mobile TV production facilities for more than 500 events per year, including prestigious tournaments like the European Rugby Championship Cup for TNT Sports and the GAA Gaelic Games Championships for RTÉ Sport.

While TVM's OB solutions historically relied on serial digital interface (SDI) technology, they recognised the industry's transition towards IP. Consequently, TVM decided to build their latest vehicle, OB10, equipped with an IP backbone adhering to the SMPTE ST 2110 standard, embracing the evolution of broadcast technology.

Unlike the cabling complexity of an SDI-based truck, an IP-based ST 2110 truck operates with enhanced simplicity and efficiency. Using coax cables and serial digital signals, an SDI-based truck would be configured with cables running directly from device to device, using matrix routers, patch bays and daisy-chained connections where needed.

However, an IP-based ST 2110 truck is simpler and more efficient. All devices are cabled directly to a network router, and a broadcast controller determines the signal routing between sources and endpoints.

This streamlined approach provides greater flexibility in the configuration of OB trucks, enabling engineers to easily add and remove devices, and reconfigure the vehicle without the need to rewire it. It also achieves substantial weight savings by transitioning from single duplex coax – with one media flow comprising video, audio, and metadata – to full duplex fibre capable of carrying multiple essence flows.

Challenge

In planning for its new OB10 truck, TVM made two primary decisions early on: to implement Ultra-HD rather than standard HD and to fit an IP-based backbone rather than SDI. In addition, the truck had to be capable of handling up to 24 camera inputs plus a further 30 remote video sources, with high output capacity.

While the company had used IP in its SDI trucks for control networks and other functions, this was its first foray into a pure IP-based mobile facility, according to Engineering Manager Eoin Coakley. He knew it would be a learning curve, but the company has always been committed to building in-house knowledge and capabilities and keeping pace with the latest trends in broadcast technology.

Coakley reveals that, based on industry recommendations, one of their first conversations was with Arista. "The advice was, 'speak to Arista', and once we had those initial conversations, we knew we didn't need to talk to anyone else about the IP part of the project".

With the goal of building the best possible outside broadcast solution, TVM worked closely with Arista's Media & Entertainment specialists who were keen to share their experience and best practice learnings from working on other OB projects.

The ongoing conversations served as a valuable resource for TVM, helping to accelerate their learning and providing a sounding board for their technical questions early on. This included specification for the network infrastructure and 100Gbps network switches that would provide them with the flexibility and headroom to easily handle 4K video and beyond.

Solution

The solution benefits from both the 7500R and 7020TR Arista switch families. The 7500R series of modular, high performance network switches combine high scale L2 and L3 forwarding and traffic management with advanced real-time streaming telemetry to deliver the deterministic network performance required for high value SMPTE ST2110 Live production.

The 7500R delivers the core media matrix providing non-blocking connectivity for the media processing including: 21 EVS Neuron Gateways, the Grass Valley K-Frame X video switcher and the EVS multiviewers. Redundant supervisors in the 7500R provide enhanced resiliency, allowing the 'show to go on'.

The 7020TR series enables highly accurate, secure, scalable and robust SMPTE ST2059-2 compliant PTPv2 (Precision Timing Protocol) to be delivered through a combined PTP, Audio and Control & Monitoring network - lowering costs, and increasing system visibility.

The Arista switches ensure the network architecture is as reliable and simple as possible. Coakley highlighted the benefits of the 7500R, including its energy efficiency, simplified configuration, smaller size – which saves a considerable amount of space in the confines of an OB truck – and flexible expansion capabilities.

The 7500R and 7020TR switches run Arista EOS®, the world's most advanced network operating system. EOS is highly modular in design, based on a unique multi-process state sharing architecture that completely separates network state from dataplane processing. It enables fault recovery and incremental software updates on a fine-grain basis without affecting the state of the system, and so delivers the high resilience and reliability required for the most demanding media and entertainment workloads.

"This truck now has a router that is approximately 4000 x 4000 HD, Coakley adds, "so we can hire big boxes and connect them into our network reasonably easily, whereas in a baseband truck we would struggle if somebody said they needed another 100 inputs or outputs."

Should future scale requirements grow even further, the 7500R chassis is currently fitted with three line cards providing a total of 3x36x100G connectivity, but there remains an option to fit an additional line card, bringing the total throughput to over 28Tbps.



Conclusion

With the addition of OB10, TVM not only has a 4k capable, SMPTE ST 2110 standards-compliant IP-based mobile facility, but also the in-house knowledge to respond positively to the demands of the evolving IP production ecosystem. The experience gained from this project will make new builds and upgrades in the future easier and more cost-effective. “Working with Arista has helped us expand our skill set in IP networking and get us into the IP world, which is really important,” Coakley confirmed.

The IP-based truck has the flexibility to plug into studios and even other OB trucks where needed, and as new equipment and higher bandwidth requirements enter the market, incorporating them into the truck will be a simple matter of installing a new line card to increase capacity.

Eoin Coakley concluded: “In Ireland, we’ve been the first to adopt technology in the OB sector. We were first into HD, first into 3D, first into 4K UHD and now – with the help of Arista – first into IP. When customers call us asking for IP, we won’t be excluded from opportunities. At the end of the day, we’re a technology company, we’re forward thinking, and that’s why we continue to be a market leader.”



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