tpc switzerland AG and Swiss Radio & Television selects Arista for one of Europe's largest SMPTE ST 2110 broadcast facility

Highlights

Challenge

To build a high bandwidth with low latency IP network infrastructure suitable for SMPTE 2110 compliant broadcast operations, along with seamless SDN integration capable of supporting up to 30,000 simultaneous content streams.

Solutions

- Arista 7508R Series spine switches

- Arista 7000 Series leaf switches across the facility

- Arista EOS® integrated with Nevion VideoIPath for seamless SDN functionality

- Arista CloudVision for network-wide visibility and analytics.

Results

- Scalable bandwidth able to support up to 30,000 content streams

- Offering a maximum latency of 3.5usec and efficient 25W per 100GbE port

- Arista professional services team engagement to streamline deployment

- Fast and responsive technical support with a credible long-term product roadmap

- Flexible architecture to support end to end UHD and future signal formats

With a need for high performance and low latency IP connectivity, tpc and SRF turned to Arista for the critical network technology underpinning a ground-breaking project to create one of Europe's newest IP broadcast facilities, adhering to the SMPTE ST 2110 IP media network architecture.

Project Background

Technology and Production Center Switzerland AG is responsible for production and technical operations of television, radio and multimedia programmes at SRF (Swiss Radio and Television). The subsidiary company of SRG SSR is the leading Swiss broadcast service provider, with extensive expertise in planning, manufacturing and managing audiovisual projects. The almost 1,000 highly professional employees have their own, well-equipped studios, galleries, data centres and mobile resources plus access to external partners to complement the range of services.

In 2017, tpc and SRF announced plans to build a new News, Sports and Technology Center in Zurich as part of a strategy for SRF to fundamentally renew its technical infrastructure for broadcast live production, master control rooms, postproduction and diverse other production systems. The move would replace legacy Serial Digital Interface (SDI) based technologies with the new SMPTE ST 2110 IP media network, offering a more flexible and scalable end-to-end IP infrastructure to optimise its workflows from ingest to playout.

Challenge

The multi-year Metechno project would create one of the largest SMPTE ST 2110 production facilities in Europe and includes technology from a wide range of vendors including Imagine Communications, Rohde & Schwarz, Tektronix, Stage Tec, Riedel Communications, Pebble Beach Systems, Vizrt and Embrionix amongst others.

One of the most critical elements of the project was the underlying multicast-capable network that was specified to accommodate up to 30,000 simultaneous multimedia streams. As part of the tendering process, tpc approached 9 networking and orchestration vendors with a detailed 120 page technical requirement.

The tender, which took place over three phases across a year, eventually whittled down the participants. "It became clear that only two vendors had the 100G density and performance that we required for a project of this scale," explains Sandro Furter, Project Manager at tpc. "However, the key advantages that prompted us to select Arista were its superior performance, deep integration with our chosen Nevion SDN architecture and the Arista professional services team that provided expertise across the scope of the project."

Solution

Arista has built close integration between Nevion's VideoIPath orchestration and SDN controller and Arista's Extensible Operating System (EOS) including support for Arista's EOS OpenConfig API. This allows VideoIPath to create deterministic connections across IP local and wide area networks, including the redundant paths, as well as to manage bandwidth – ensuring the performance required for live video broadcasting.

The Arista 7500 Series switch selected for the project is a store-and-forward switch that utilises a virtual output queue architecture, which provides deterministic low latency with no head of line blocking. Latency is predictable as packet sizes increase from a low of 3.5usec (port to port) for 64 bytes to under 9usec for jumbo frames.

This lossless and deterministic capability is vital for video and reduces the serialisation delay between forwarding engines and fabrics by utilising a cell-based switch fabric where packets/frames are sliced into cells and are transmitted in parallel across multiple fabric modules simultaneously.

At the spine of the IP switching infrastructure are multiple Arista 7508R switches. Housed within a compact 11RU chassis, each switch has up to 288 x 100G interfaces that fully configured, delivers up to 36Tbps switching capacity with a flexible arrangement of 10/40/100GbE interfaces. Offering an efficient 25W per 100GbE port, the Arista switches provide support for up to 30,000 simultaneous streams. For the leaf switches, tpc used a mix of Arista 7050X3 and 7020R switches.

The Arista CloudVision software delivers a fully automated environment and real time telemetry for all aspects of the network, including the storage of such telemetry data to allow analysing events that have occurred in the past. The Arista CloudVision software provides abstraction of the physical network to this broader, network-wide perspective that allows tpc to gain a more efficient view of operational and network telemetry. This aids with performance tuning, troubleshooting and to allow for a single point of integration and network-wide visibility and analytics.

The integration of already existing components such as the Nevion SDN into the new network was performed seamlessly by the Arista Services team, which took a macro perspective and ensured that the solution as a whole (Arista and non-Arista components) was successful.

Conclusion

With tpc having completed exhaustive testing, the new facility will formally open in autumn of 2019. At the end of this year, tpc and SRF will be moving production teams from legacy facilities to the new centre to utilise the new SMPTE 2110 compliant, IP-based infrastructure. This includes various TV studios, post production, the new nationwide master control room (MCR), and a central ingest and playout centre. However, Radio has a new project as they are currently located on a second campus in Zurich and this will be moved to Metechno later in 2020

Sandro Furter concludes: "This was a new and, in many ways, ground-breaking undertaking and having Arista on-board as an expert partner with a deep understanding of what we wanted to achieve was invaluable in helping us deliver a successful project."

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