Software defined networks for media production

Broadcasters around the globe are looking for ways to produce more content using less resources. In addition to looking for ways to use their resources more efficiently, broadcasters are searching to explore the cost benefits related to using standard IP networking equipment instead of tailor-made broadcast solutions.

Pica8 and Nevion have put together a joint solution allowing broadcasters to start deploying IP based infrastructures for media production, both inside the facilities and for media contribution purposes.

The joint solution

The solution consists of the following three core elements

- Pica8 Ethernet switches
- Nevion Media Nodes
- Nevion VideoIPath management and orchestration

IP network

For IP studio applications, we recommend a leaf-spine architecture for the IP networks. This architecture is typically deployed in state-of-the-art data centers to provide scalability and redundancy. The smaller leaf switches are installed in the studio or in the studio control room whereas the high capacity spine switches are installed in the central data control room. Pica8 provides a range of Ethernet switches offering the flexibility to tailor the network to your current and future needs.

IP interfaces

We see a rapid evolution in the support of IP interfaces in traditional broadcast equipment such as cameras, video and audio mixers and monitoring equipment. To support IP connectivity on equipment not currently providing IP interfaces, Nevion offers standards compliant Media Nodes for this purpose. The Media Nodes provide video, audio and data connectivity to IP, in addition to compression and signal processing.

Management and orchestration

IP based production networks require management and orchestration to ensure proper operation and Nevion's VideoIPath provides inventory management, service fulfillment and service assurance. VideoIPath provides easy to use interfaces for making and scheduling media connections. Users have the choice of web-based applications or external hardware based control panels in establishing connections. VideoIPath builds all connections with awareness of current and scheduled connections, preventing interruption to any service that is currently active or scheduled in the future. In the event that resources are not available to build a connection, VideoIPath will send an alert the operator.

Benefits snapshot

- Cost efficient solution built on latest IT technologies
- Scalable to thousands of input and output streams
- Designed for 24/7 operation
- Expendable across facilities, campus and remote locations
- Easy to use management and orchestration
- Built on open standards ensuring interoperability

VideoIPath provides service assurance by monitoring, alarm management and SLA reporting. As VideoIPath becomes aware of all network processes, it is able to automatically re-route media in the case of a failure in the network, thus ensuring high availability.

Scalable

The leaf-spine architecture is scalable to thousands of inputs and outputs. Although the example provided below may appear to be initially compact, it is highly scalable enabling broadcasters to quickly deploy more streams or locations by adding more switches or IP media equipment as needed.

Redundancy and protection

The joint solution provides high availability with redundancy built in. The leaf-spine architecture provides equipment and path redundancy and all equipment can be delivered with dual power supplies. Additional redundancy can be built into the system by deploying protection mechanisms such as dual path.

Geographically expandable

The solution is highly expandable and works whether the network is for one studio, in the same building, on the same campus or expands over larger geographical distances. This means that the solution can also be deployed for remote production.

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VideoIPath SDN

STUDIO • MCR • STUDIO • CONTROL ROOM • STUDIO
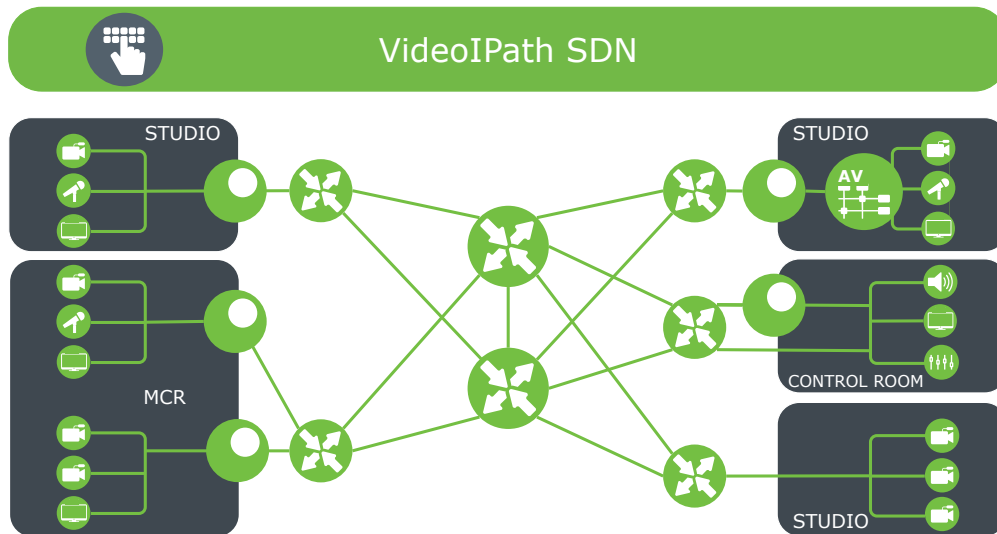
Roadmap to the future

The joint solution supports the three stages in the collaborative roadmap, which incrementally advance the implementation of IP technology in media solutions.

- **SMPTE 2022-6**: This most widely implemented standard in the industry is recommended for continued use and adoption as a baseline for interoperability. Because the SMPTE 2022-6 payload is identical to SDI, it is seen as an effective way to create hybrid IP/SDI systems and will continue to serve that purpose for the foreseeable future.

- **VSF TR-04**: VSF TR-04 is a technical recommendation to use two existing standards—SMPTE 2022-6 for video with embedded audio and AES67 for separate IP addressable audio streams. In VSF TR-04, AES67 effectively operates as the "discrete audio" equivalent in IP. This makes TR-04 an ideal solution for systems that require both the compatibility benefits of SMPTE 2022-6 and the flexibility of discrete audio.

- **VSF TR-03**: This is the third stage in the standards-based roadmap. TR-03 recommends the transport of uncompressed elementary stream media over IP. TR-03 is about essence and separating out the media type, whether video, audio, metadata or timing events. With TR-03, video, audio and metadata are individually packetized into separate IP streams.

- **SMPTE 2110**: SMPTE is currently working on a new standard, SMPTE 2110, which is based on the VSF TR-03 and TR-04.

Key features

- Software defined networking for media production

- Standards based IP solution

- Migration path from traditional to next-generation IP networks (SDN)

- Enable non-specialist users to manage services and network

- Scalable from small to large networks

At IBC we are showing a joint solution with the VideoIPath SDN management and orchestration system performing Openflow control of Pica8 and Nevion switches. This demonstrates the capability to control and transport media flows across switches from different vendors under Openflow control.

Visit Pica8 at Hall 6 – A15 on the Stordis stand

Visit Nevion at Hall 1 – B71