



Internationally distributed production with shared resources

Discovery increases live production effectiveness and efficiency by centralizing its European storage and processing capabilities into “private Clouds”

Background

Discovery is a leading global leader in real-life entertainments, with a presence in Asia Pacific, EMEA (Europe, Middle East and Africa) and Latin America. The broadcaster’s output is varied and includes documentaries and sports coverage (Discovery owns Eurosport and Setanta Sports).

The requirements

Discovery wanted to create two new synchronized hubs (one in the UK the other in The Netherlands) which would house resources that the various production centers across Europe (aka “markets”) could use and share. Effectively, those hubs would act as private Clouds towards these markets.

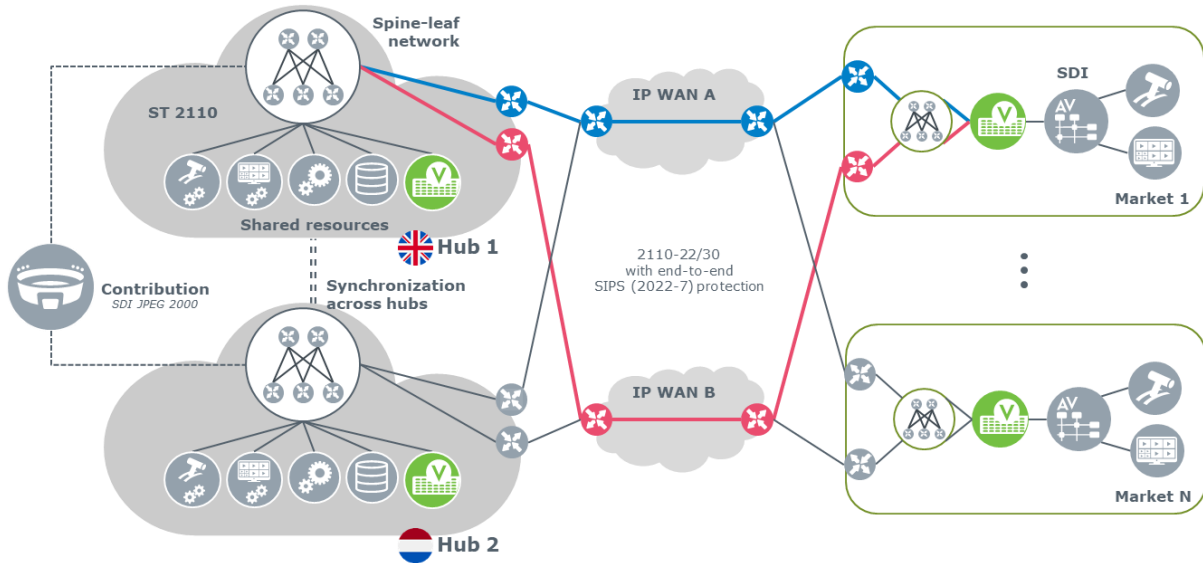
The key concept of this project is one labelled “dynamic affinity”. It means that any production room in any location could be connected to either hub to use the resources there. Within a production center or market, two different control rooms could be connected to different hubs at the same time. Indeed, a control room could be connected to one hub in the morning and the other hub in the afternoon. The connectivity to either hub is down to resource availability. Production teams needed to be able to reserve resources for a planned production, and the system would allocate these from either hub.

The hubs would be IP based (SMPTE ST 2110), and the connection from the hubs with the markets would also be based on IP. Most of the 10 main production centers and the 11 commentary-only centers are SDI based.

The project was a large IP LAN/WAN network, connecting many locations and involving many devices from many suppliers – in total over 100,000 IP endpoints needed to be accommodated. At the same time, this being a network for real time production, it needed to be able to handle the huge number of video (HD and UHD/4K) and audio flows, with a very low latency.

This led to the decision to base the networks in the hubs on a spine-leaf architecture, and a software defined network (SDN) control. Where possible the NMOS industry standard was used to control equipment for consistency and ease of integration. Finally, JPEG XS was chosen as the video compression for transport between the markets and the hubs.

The initial phases of the project took place in 2019-2020, going live in late 2020.



The solution

The project team involved in delivering the was DB Broadcast as the prime contractor, Nevion and Techex (Nevion’s partner in the UK), as well as many 3rd party vendors (especially for equipment integration and interfacing).

The solution delivered to Discovery was an SMPTE ST 2110 compliant IP SDN (software defined network) with a spine-leaf architecture, based on Arista switches (10G/25G/100G/400G). The WAN between locations is an existing network based on Juniper switches.

Nevion Virtuoso, the software defined media node, provides the reliable media transport between the locations, including SDI/IP adaption, protection, JPEG XS encoding, audio embedding/de-embedding, and video/audio synch. The media layer also involves many (largely existing) devices from other vendors, e.g. gateways, encoders, etc.

Nevion VideoIPath orchestrates and controls the whole media network, using a combination driver and NMOS interfaces to over 40 different types of equipment. Multiple synchronized instances of VideoIPath are distributed across both hubs to spread the computational load and provide extra resilience.

The management interface for the production staff was the BNCS broadcast control, with which they were familiar, which interfaces to VideoIPath.

The diagram above shows how equipment in the hubs, including Virtuosos, are shared resources in a spine-leaf IP SDN. It also illustrates how video and audio signals are transported across the SMPTE St 2110 WAN network with full protection (blue and pink links). This deployment is one the very first live

projects in the world to use JPEG XS video encoding technology.

As well as equipment and software, Nevion also provided professional services for the project, including pre-design, configuration (with the local Nevion partner) and a full support package.

Benefits

Through this project, Discovery was seeking to get a greater flexibility in production, enabling the production staff to work from any of the locations. The set-up allows equipment and other resources to be shared, meaning their usage levels are higher than they would be in a conventional production set-up. Finally, the bandwidth usage was to be kept down through video encoding, to reduce the cost of connectivity.

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