

SONY

**NETWORKED
LIVE**

Contribution Solution

Networked Live Contribution Solution

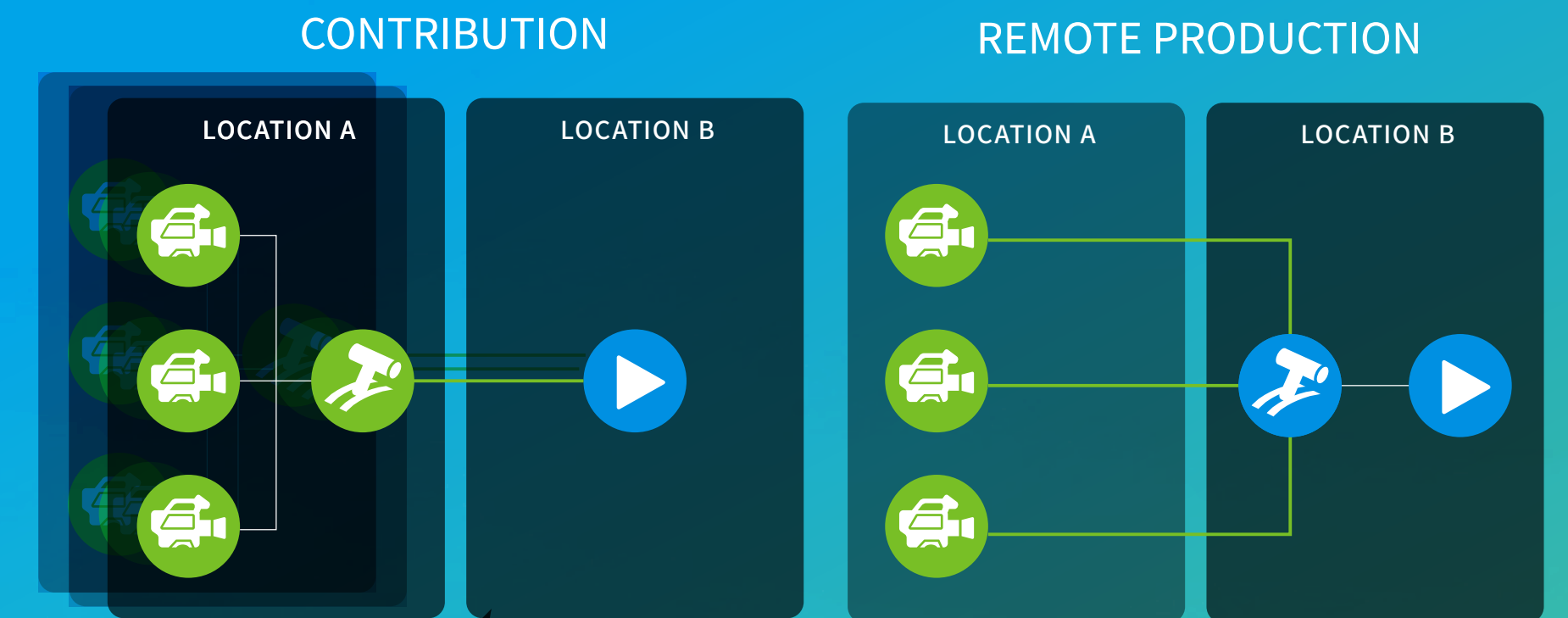
Introduction

Live contribution in TV broadcasting is a critical component of modern media production, enabling real-time delivery of produced audio and video content from remote locations to central production facilities.

As viewer expectations for immediacy and quality continue to rise especially during live events such as sports,

news coverage and special events – the need for reliable, low-latency and high-quality contribution solutions has become more pressing than ever.

This document provides an overview of Sony's Networked Live Contribution Solution.

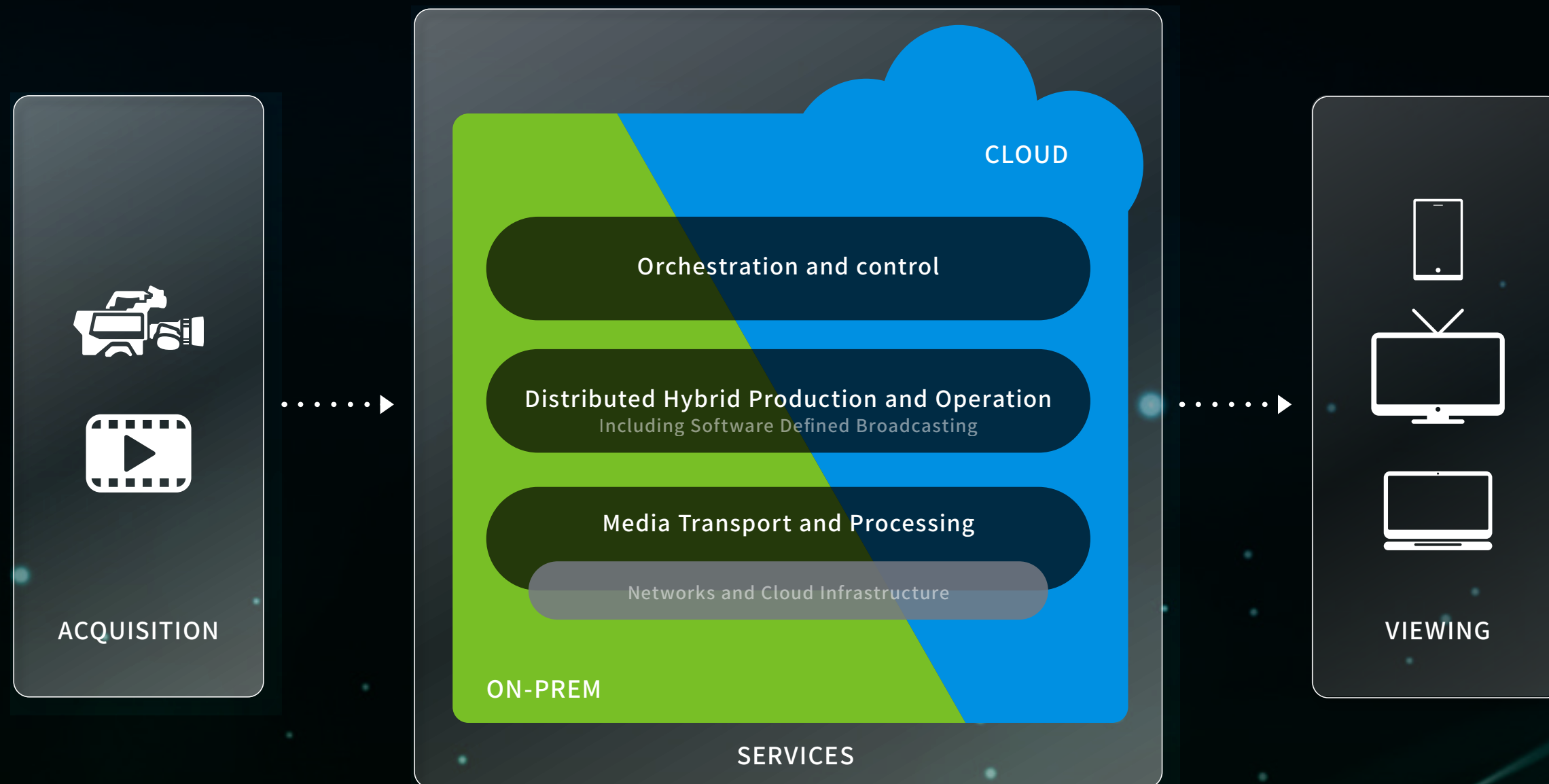


Contribution vs. Remote Production

Live contribution refers to the real-time delivery of produced signals from the field to a central facility (and return feeds in the opposite direction), while remote production uses multiple incoming signals from the field to produce centrally. Although both rely on similar media-transport methods, remote production involves a wider set of requirements – beyond the scope of this description.

Solution Overview

About Networked Live



Networked Live is an ecosystem of integrated solutions, products, services and partners that simplifies the transition to more agile and cost-effective distributed (on-prem, cloud and hybrid) operations.

Built with security at its core, Networked Live is designed to work seamlessly with existing equipment, familiar control surfaces and systems, and third-party technologies. Backed by unmatched experience and

expertise, Networked Live enables an incremental migration that protects investments and supports scalable growth.

Through Networked Live, Sony provides workflow transforming solutions for facilities, contribution, remote production and more.

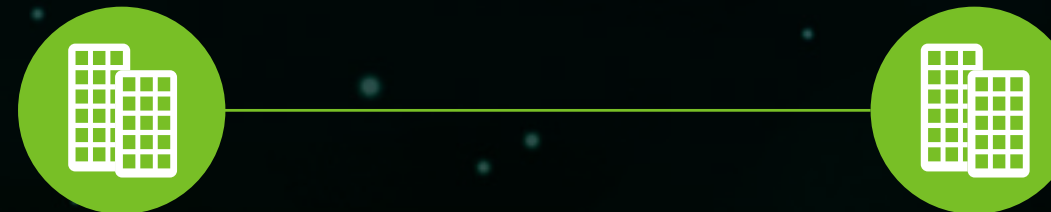
Proven video, audio and data contribution solution

The Networked Live contribution solution leverages the experience and expertise of Nevion (a Sony Group company) and is widely deployed across the globe. It is engineered to transport not only high-quality video, but also audio and data, reliably and with low latency over IP-based wide-area networks (WANs).

VENUE CONTRIBUTION



INTER-FACILITIES CONTRIBUTION



CLOUD CONTRIBUTION



Putting users in control

Designed to hide the underlying complexity of the infrastructure, the solution puts the production staff in control – allowing them to set-up connections when they need them using familiar control panels or modern web-based control surfaces. Access control mechanisms allow administrators to share only relevant connection resources.

Choice of CODECs

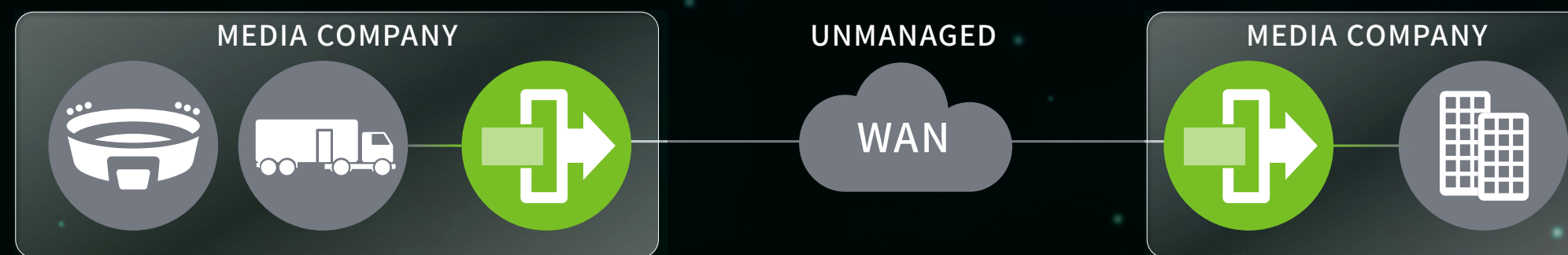
The solution offers a comprehensive choice of CODECs and protection mechanisms to suit any contribution application, including venue, inter-facility and cloud contribution.



WAN connectivity by Telco.
Contribution infrastructure by Media Company.



WAN connectivity by Telco.
Contribution infrastructure by Telco.



Unmanaged WAN connectivity.
Contribution infrastructure by Media Company.



Unmanaged WAN connectivity or by cloud provider.
Contribution infrastructure by Media Company.

For broadcasters and telcos

The solution can support multiple contribution models, including:

- Infrastructure owned by the media company (broadcaster, production company, etc)
- Infrastructure provided as a service by a telecommunication service provider (telco)
- Use of managed or unmanaged WANs

Services to help

Sony and Nevia have vast experience of supporting customers before, during and after the deployment of the project, with a variety of services including professional and support services.

Solution Benefits

High-quality & performance



The Networked Live contribution solution delivers reliable, secure, real-time transport and processing of professional-grade media. Its software-defined, standards-based architecture allows flexible functionality, rapid updates, and fast deployment for demanding live production environments.

Proven expertise & reliability



Since Nevion's first IP contribution deployment in 2006, the solution has been trusted by major broadcasters and service providers worldwide for their high-profile productions. Its track record, including large-scale and time-critical deployments for some of the biggest events on the globe, demonstrates consistent reliability and industry-proven performance.

Ease of management & operation



The advanced orchestration platform at the core of the solution simplifies the complexity of IP media transport through automation, faster setup, proactive issue detection and resolution, and self-service network control – reducing operational effort and overall costs.

Solution Product Building Blocks

The Networked Live contribution solution is built around 3 main products.

The products are based on industry standards, so they can work with other products in the contribution solution.

VideoPath



Media orchestration platform

VideoPath is a media orchestration platform that uniquely combines broadcast control, orchestration, and monitoring capabilities, that can be deployed together or individually. This vendor-agnostic and highly scalable system supports hybrid workflows across SDI and IP networks (LAN/WAN/cloud/5G) – enabling a smooth migration towards IP-optimized workflows.

For more information, see nevision.com/videoipath/

Virtuoso



Software-defined media node

Nevion Virtuoso is a standards-based, virtualization-ready, software-defined media node that can perform a variety of real-time functions for a wide range of applications including IP contribution and wide-area media transport, IP production facilities and converged LAN/WAN networks for remote & distributed production.

For more information, see nevision.com/virtuoso/

eMerge



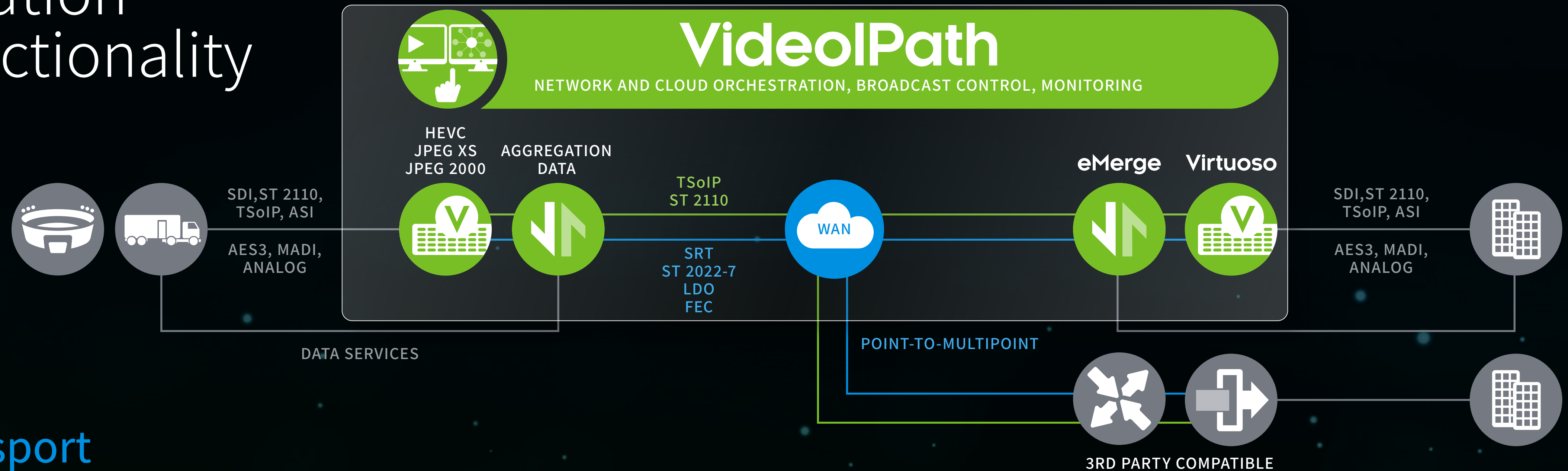
IP media fabric

The Nevision eMerge IP media fabric is a portfolio of high-capacity IP switches carefully engineered to fulfill specific broadcast requirements for both LAN and WAN networks. The eMerge can work in SDN (software defined network) mode fully orchestrated by VideoPath, media orchestration platform, and can also operate in dynamic multicast mode utilizing PIM and IGMP protocols.

The switches' advanced features, such as flexible programming of NAT rules, give unprecedented control of media flows in the network.

For more information, see nevision.com/emerge/

Solution Functionality



Transport

INGEST AND EGRESS

The Networked Live solution can accept and deliver video, audio and data feeds in a variety of formats, including:

- Video (SDI or ST 2110)
- Transport stream (ASI or TSoIP)
- Digital audio (AES3 or MADI)
- Data (VLAN)

Virtuoso will ensure that the media feeds are appropriately adapted to meet the WAN transport requirements. Data traffic can also be encapsulated and transported via eMerge.

ENCODING AND DECODING

The Networked Live solution allows video to be transported uncompressed or encoded with very low latency and pristine picture quality using a variety of codecs, suited for different applications:

- The H.265/HEVC codec is the perfect low bit rate option
- The JPEG XS codec is appropriate where very low latency and lossless compression are required
- The JPEG 2000 has been an established codec in contribution for over a decade.

Virtuoso, which handles the encoding/decoding, has been tested for interoperability with other major providers of media gateways.

TRANSPORT AND PROTECTION

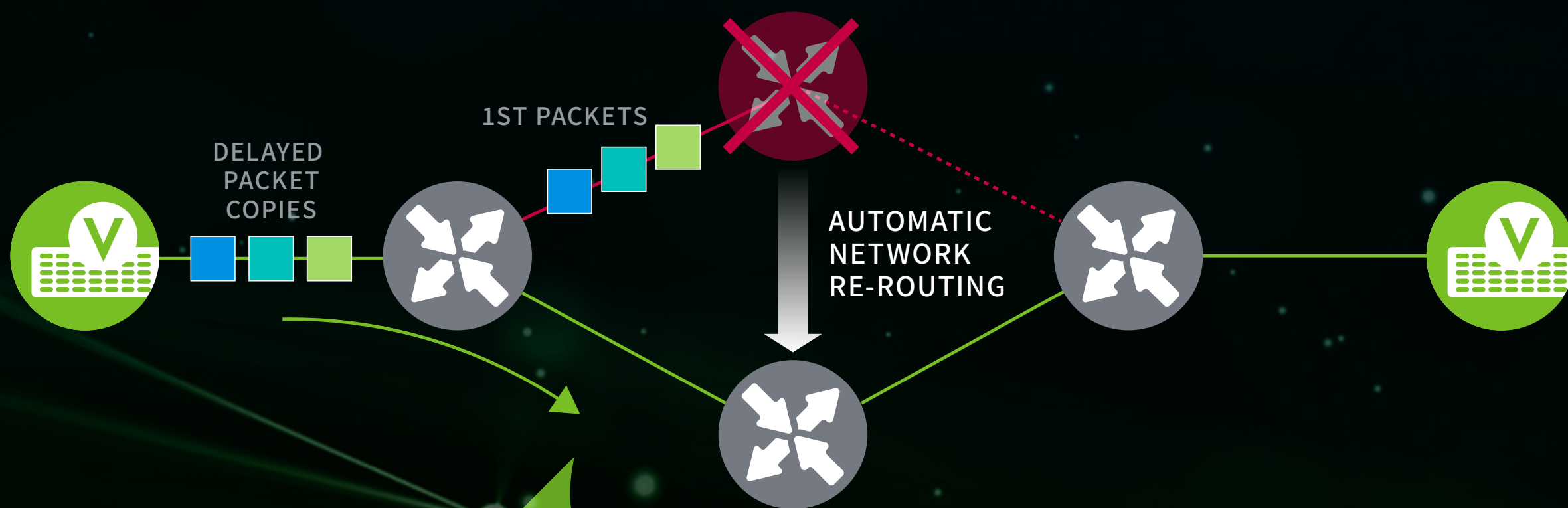
The signals are typically transported over the WAN using TSoverIP.

It is also possible to use SMPTE ST 2110 (e.g. with JPEG XS), but this is not common as it can create sync issues with video, audio and data essences.

A variety of protection mechanisms may be used, including SMPTE ST 2022-7, SRT (Secure Reliable Transport), FEC (Forward Error Correction) and LDO (Launch Delay Offset – see below).

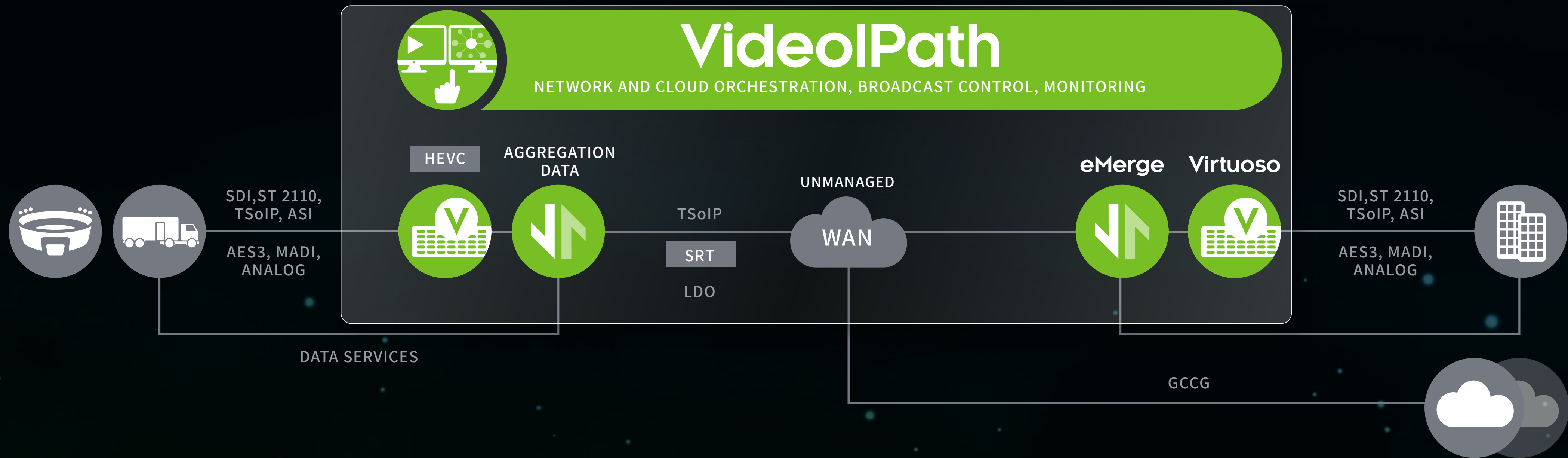
The choice of protection mechanism largely depends on the WAN infrastructure (e.g. whether dual paths are available).

The transport and protection are handled by Virtuoso. Aggregation can also be provided via eMerge.



LDO - Launch Delay Offset

LDO is a unique protection mechanism for single link transport. It works by sending IP packets twice, with a slight delay. The idea is that, if a network experiences a problem and needs to re-route automatically causing the packets to drop in the initial path, then the copies of the packets will go through on the new path. The delay between packets is set to exceed the path reconfiguration time of the network to ensure the new path is used by the copies.



UNMANAGED NETWORKS

Unmanaged networks are networks that do not have an SLA (Service Level Agreement) that is sufficient for real-time media transport. Examples of such networks include the public Internet or enterprise data services.

The Networked Live solution supports contribution over unmanaged networks, using HEVC in combination with SRT (or LDO). This combination is ideal for

unmanaged networks because bandwidth is usually limited, so a high degree of video compression is needed, and dual paths cannot be guaranteed so single-path protection methods are required.

Ground-to-cloud transport (GCCG) may be seen as a variant of unmanaged networks as the connectivity often does not provide sufficient SLA for media.

POINT-TO-POINT AND POINT-TO-MULTIPOINT

The solution supports transport of media signals from one location to one or more locations, allowing it to be used, for example, to provide feeds to multiple takers, or to copy feeds to a NOC (Network Operation Center) for monitoring purposes.

VIDEO AND AUDIO PROCESSING

Virtuoso can also be used optionally to process video and audio signals before delivery to the destinations.

Video processing covers up/down/cross-conversion and color correction, while audio processing includes shuffle, delay, mixing and gain.

TRUST BOUNDARY

Virtuoso offers IP media edge or trust boundary functionality that is designed to create a secure boundary between the production LANs of the locations and the WAN used to transport between these locations

Functionality includes service monitoring, network isolation, media firewall, network stream protection and translation for UDP and RTP IP media flows, NAT translation and fan-out.

eMerge also offers network isolation, NAT translation and fan-out distribution (replication).

Management

ORCHESTRATION

The Networked Live contribution solution includes VideoPath, the world leading media orchestration platform.

VideoPath is used to provision video, audio and data connections across WANs. As a vendor-agnostic and media-aware system, VideoPath is able to identify intelligently the best route, taking into account the connection requirements (e.g. type of media, what codec to employ, etc) and available capacity (e.g. bandwidth and ports). Setting up transport protection and redundancy control are also handled by VideoPath as part of that provisioning process.

GCCG SUPPORT

VideoPath supports orchestration of ground-to-cloud (GCCG) connectivity. Not only is it able to set-up connections to resources in the cloud (AWS, Google, Azure and others), but it is able to spin-up/down resources in the cloud as needed for the connection. It can also handle routing within the cloud to support contribution across cloud networks.

AD-DOC OR SCHEDULED CONNECTIONS

Contribution link set-ups and take-downs can be ad-hoc or scheduled; scheduled connections can be one-offs or recurring.

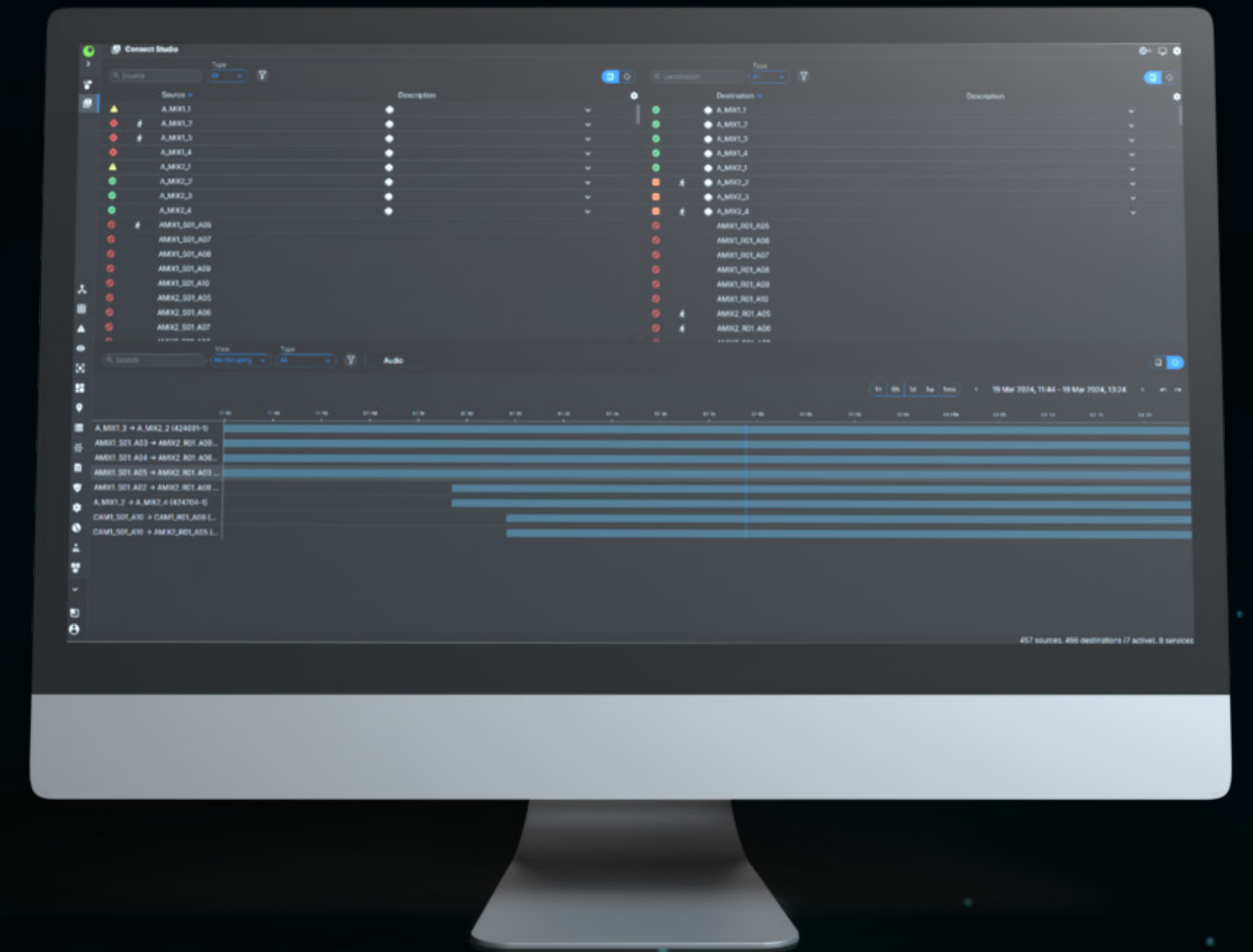
Scheduling is especially relevant for sports events, most notably league competitions, for which connections to stadiums are required at specific dates and times.

SECURITY

VideoPath has a role-based security system, which ensures that only authorized personnel can provision contribution services.

VideoPath also offers the concept of multi-tenanting, whereby resources are restricted to specific departments within a broadcaster, or to specific customers of a telco.

VideoPath supports different types of user accounts and sign-ons, including local accounts, LDAP and using a corporate SSO (SAML).



USER FRIENDLY INTERFACE

VideoPath hides the underlying complexity of the contribution infrastructure allowing non-experts (for example the production team) to set-up and tear-down contribution links on their own. VideoPath can also be used in combination with a variety of panels, including the system's own configurable soft panels (using touch screens), or hardware panels from Sony (e.g. the MKS-R4020) and 3rd party vendors. This allows users to operate the system with panels that are easy to use or familiar.



Monitoring and maintenance

MONITORING

The Networked Live contribution solution offers comprehensive monitoring capabilities, both at the level of individual products and also overall.

Virtuoso provides comprehensive monitoring across all signal hand-off points, whether using uncompressed SDI, IP signals, or network flows. Its monitoring capabilities span input/output, IP/Ethernet, PTP and device performance, giving

broadcasters a detailed view of system health at the media node level.

VideoIPath complements this with real-time visibility into equipment status, connectivity and PTP performance, consolidating alarms and service control into a single interface. It tracks current and historical alarms and supports integration with Grafana and Prometheus, enabling deeper external analysis of system and service data.

MAINTENANCE

VideoIPath allows maintenance on links, devices, modules or even ports to be scheduled. VideoIPath will inform the user about services affected by the maintenance and provide the option to reroute these sources affected by the maintenance.

Conclusion

The Networked Live Contribution Solution from Sony, with Nevia's expertise, transforms live media transport for broadcasters and media companies. It delivers secure, real-time transport of professional-grade video, audio and data over IP-based wide-area networks, supporting both managed and unmanaged.

The solution is built on three core products, all designed for seamless integration with third-party technologies: VideoIPath for orchestration, Virtuoso for media processing and transport, and eMerge for IP media switching.

It provides a broad choice of codecs and protection mechanisms, including HEVC, JPEG XS, JPEG 2000 and advanced features like SRT and LDO for single-link protection.

Operational simplicity is a core advantage: production staff can manage connections themselves through familiar interfaces and automated orchestration, while robust monitoring and maintenance tools ensure system health. Security features include role-based access and support for corporate authentication standards.

Ultimately the Networked Live Contribution Solution offers high performance, reliability and ease of management, making it an optimal choice for organizations seeking adaptable and efficient live production workflows.



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