SONY

nevion

Nevion
VideoIPath

Media Orchestration Platform
for broadcast and telecoms

April 2025

What is VideoIPath?

As viewers have more and more choice, distribution rights are skyrocketing and the pressure on the production efficiency is increasing, broadcasters and media organizations must be increasingly nimble to remain competitive. To achieve this, they need to be able to orchestrate their media in a way that will support increasingly flexible, dynamic and complex workflows.

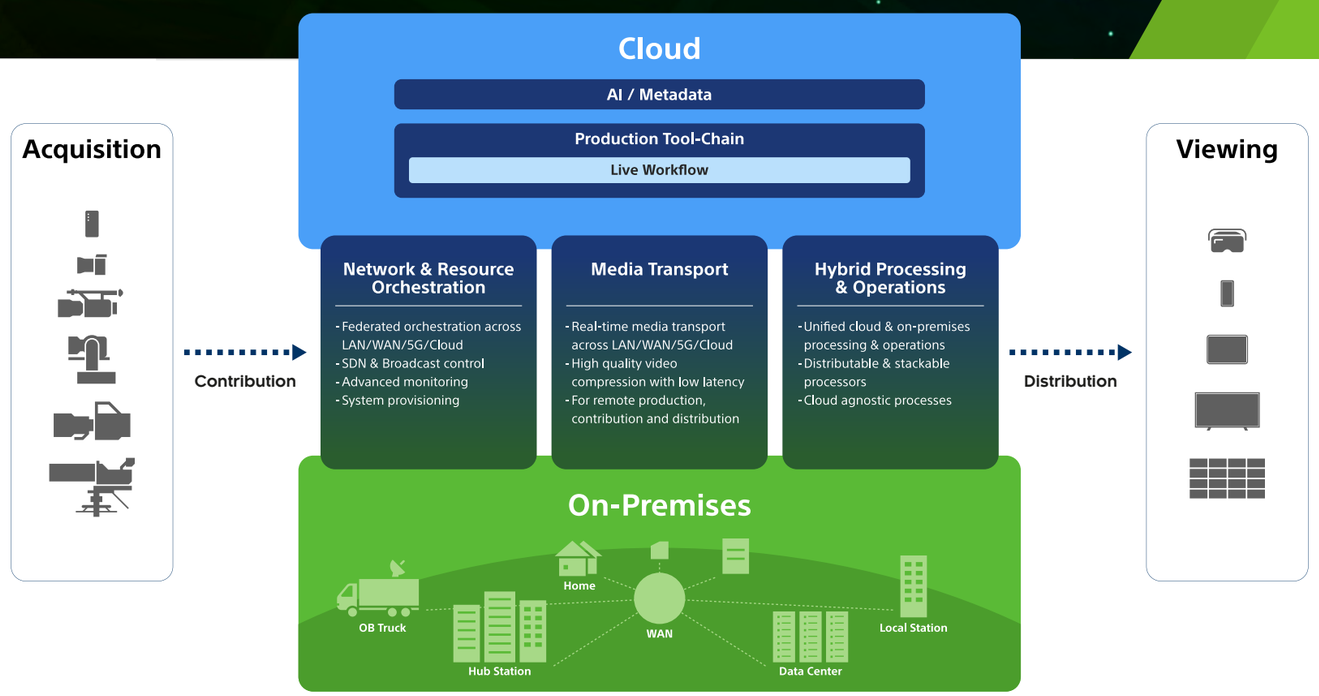
VideoIPath is a media orchestration platform that uniquely combines broadcast control, orchestration and monitoring capabilities, while giving customers full freedom to deploy all or parts of the capabilities as an integrated part of their environment. This vendor-agnostic and highly scalable system supports hybrid workflows across SDI and IP – enabling a smooth migration towards IP-optimized workflows.

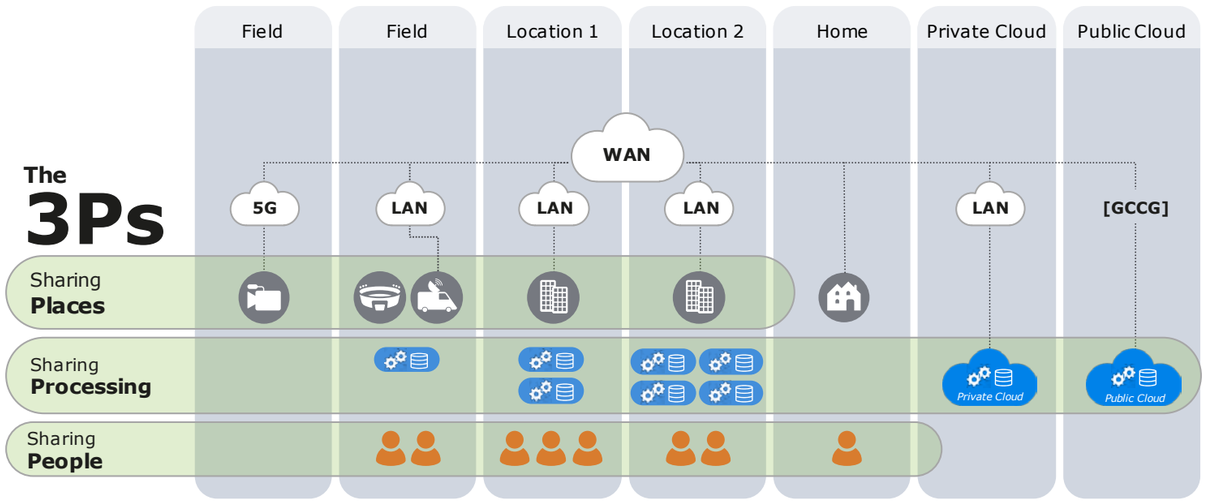
Live Production is changing

The future is distributed production

Content production is moving progressively towards a distributed model whereby workflows can tap into production resources (places, processing and people) almost anywhere on the ground and in the cloud. This is transforming the logistics and economics of production, enabling multiple models for production, which can best suit medium/ long term business needs and short-term production requirements.

The right orchestration is the key to enabling flexible, distributed environments – as well as helping to get there. It can make sure signals reach the right locations, whether on the ground or in private or public clouds – across LANs, WANs and 5G networks; it can control all the equipment in the production; it can check that everything is working as planned; and much more.





NETWORKED LIVE

Networked Live is an ecosystem of solutions, products, services and partners that combines hybrid on-premises (on-prem) and cloud processing with network connectivity to transform the logistics and economics of high-quality mission critical live production.

Networked Live is based on 3 main pillars, supported by Sony's and Nevion's experience and expertise.

- **Network and Resource Orchestration**
- **Media Transport**
- **Hybrid Processing and Operations**

The VideoIPath media orchestration platform is a key component of the Network and Resource Orchestration pillar of Networked Live.

Where is VideoIPath used?

With its ability to combine LAN/WAN/5G/cloud orchestration and handle both IP and SDI, VideoIPath is suitable for facilities, outside broadcast, major events, contribution, remote production and distributed production (a combination).

Facilities and OB-trucks (LAN)

In facilities (studios, control rooms, MCR, etc) and OB-trucks, VideoIPath can support operational workflows to prepare and execute live production. This includes advanced routing of signals, control of broadcast devices, GPIO and tally workflows, resource scheduling and customized operational interfaces. The system helps streamline daily operation and use media resources most effectively.

Contribution (WAN)

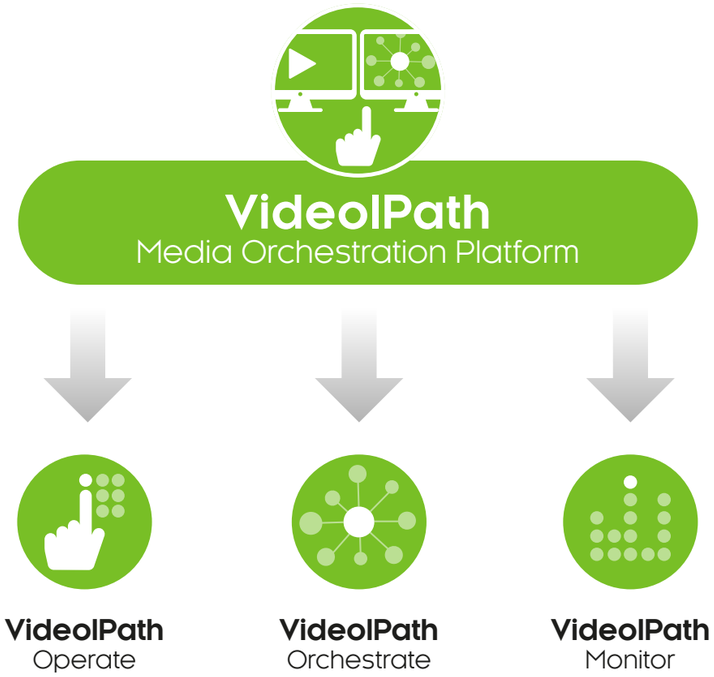
VideoIPath can be used to connect media devices (encoders/decoders) across WAN networks. This includes support for protection mechanisms that are typically used in WAN environments and flexibly handling a wide variety of compressed formats, including format conversion and bridging between LAN and WAN networks (typically between uncompressed and compressed worlds).

Remote production (LAN/WAN)

In the context of remote production, all the capabilities applicable to the facilities, OB-truck and contribution apply. In addition, VideoIPath can combine this with the capability to support remote locations as if they were on-prem, hiding the impact of distance from the operational workflows.

Cloud

Private and public cloud processing and transport is becoming ever more important in live production and VideoIPath provides the ability to seamlessly connect resources on-prem and in the Cloud. It can allocate processing resources in a cloud infrastructure and support the ground-to-cloud-cloud-to-ground routing. Cloud is a rapidly evolving area and VideoIPath provides a path towards hybrid ground/cloud workflows.



Why VideoIPath?

As media networks move to IP/cloud technology and workflows are created from logical rather than physical connectivity, the management layer needs to have a much closer relationship with the network and broadcast control needs to undergo a reinvention.

VideoIPath is unique in combining orchestration, broadcast control and monitoring, and is designed specifically to take full advantage of IP and IT technology in LAN, WAN, 5G and cloud, while hiding the underlying technical complexities of the infrastructure from the users.

Benefits

VideoIPath brings real benefits to production:

Workflow transformation

- Puts users in control by hiding complexity
- Easy connection management
- Supports existing workflows
- Enables new efficient workflows by unifying in-house, remote and cloud production
- Supports the progressive transition from SDI to IP

Resource optimization

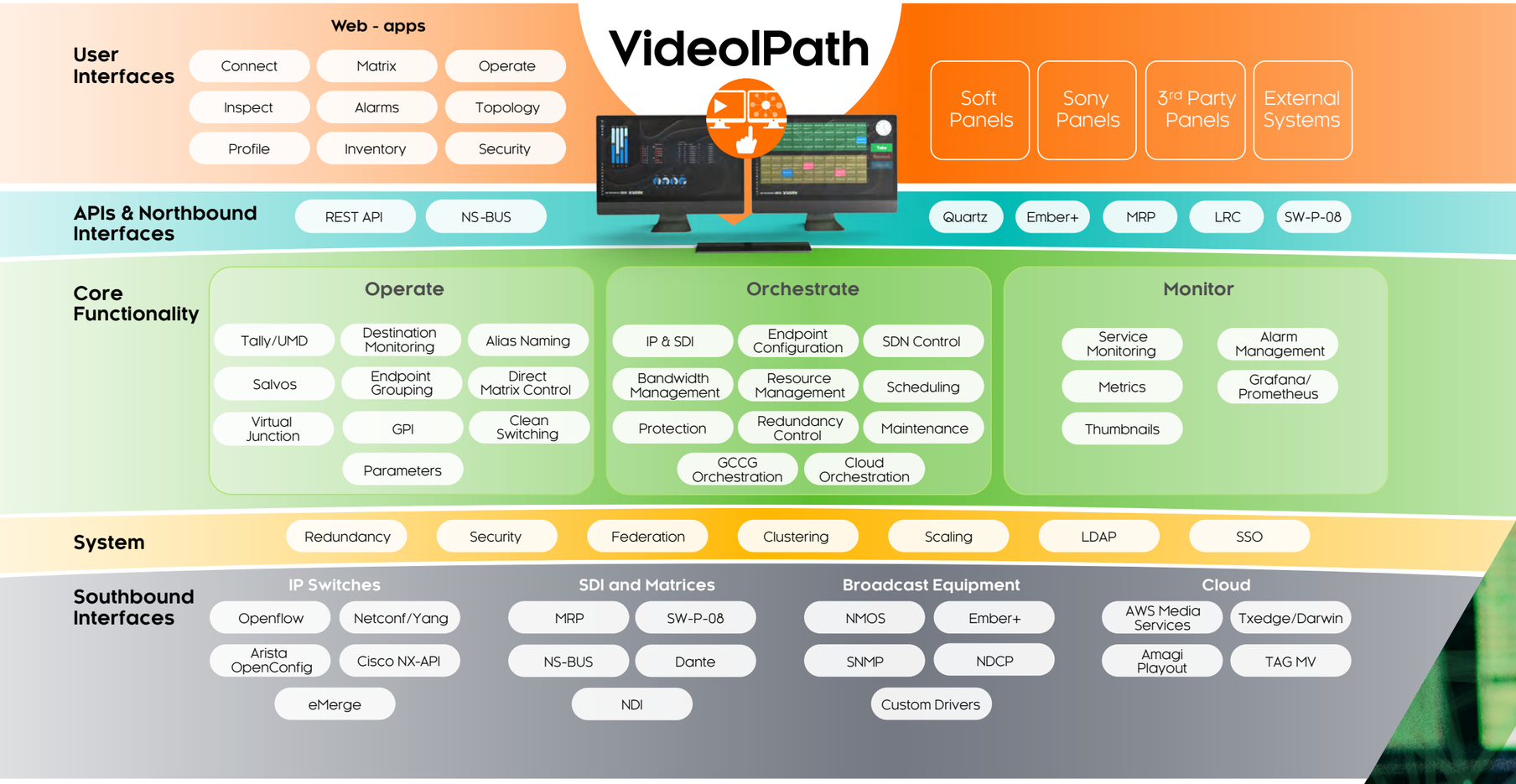
- Resource sharing in distributed production
- Bandwidth reservation with load sharing in the network
- Avoid overprovisioning with explicit routing
- Advanced routing finds the right resource

Investment for now and the future

- Proven platform
- Vendor agnostic
- Based on open standards
- Handles SDI and IP
- Designed to support multiple production video and audio formats
- Highly scalable

Features and functionality

VideolPath is a media orchestration platform that provides broadcast control, vendor-agnostic orchestration and monitoring.



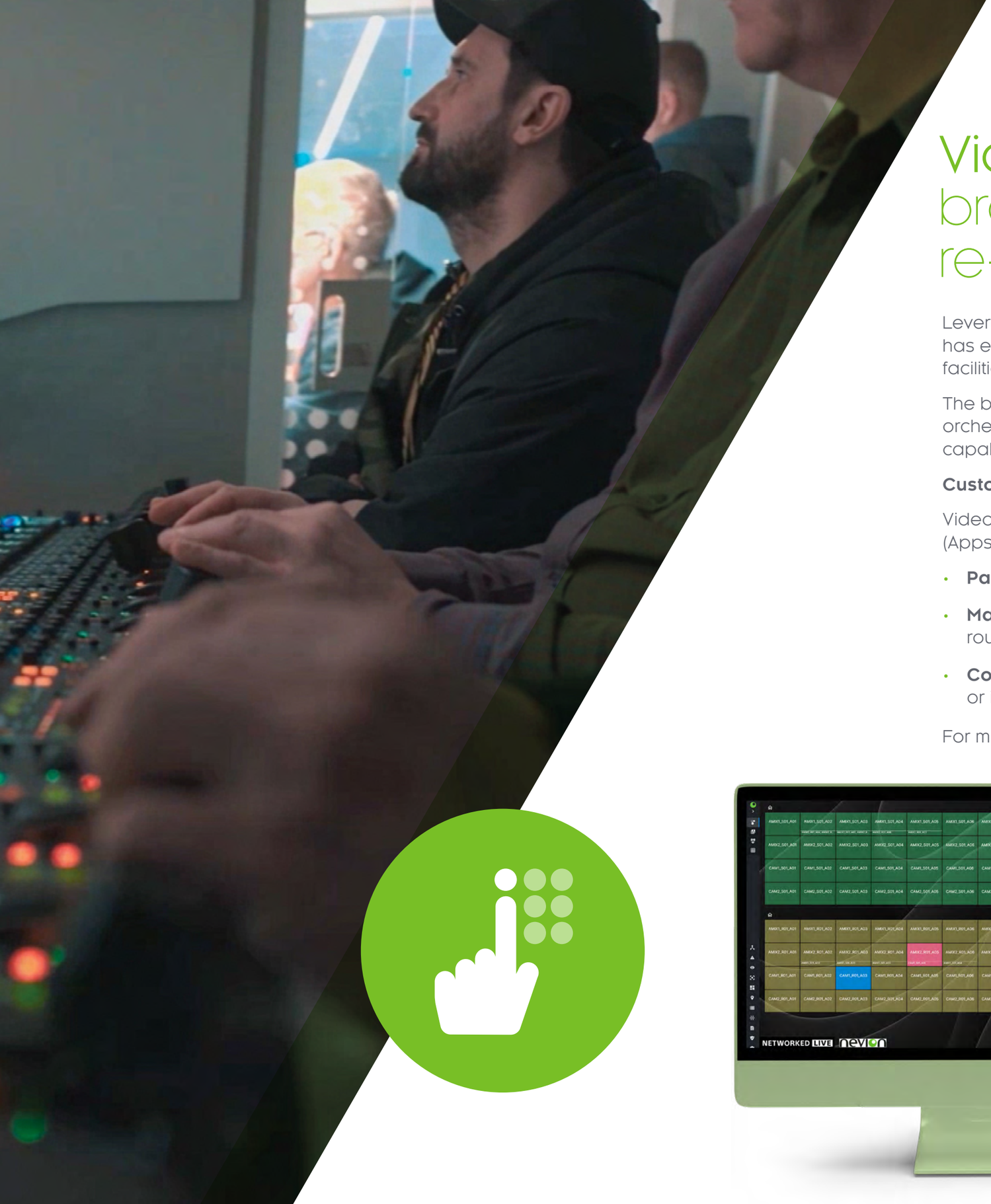
Integrated with Networked Live

VideolPath comes with tight integrations with other Networked Live products from Sony and Nevion, including Virtuoso, eMerge, MLS-X1, XVS-series, CNA-2 and a whole range of Sony control panels, e.g. MKS-R4020. This reduces the cost of integration and time taken to deploy the VideolPath media orchestration platform.

At the same time VideolPath is also a vendor agnostic system that allows integration with any kind of network and production equipment, giving our customers complete freedom of choice.

Scalability

VideolPath has been designed to handle the largest production infrastructures, with features like clustering and federation (see **IT-centric platform and interfaces**) ensuring unparalleled scalability. This has been proven in the field, with some deployments handling 100,000s of sources and destinations and peaks of 10,000s of simultaneous connections.



VideoIPath Operate broadcast control re-imagined

Leveraging Sony's extensive experience in broadcast operations, VideoIPath has evolved to provide broadcast control functionality for IP based broadcast facilities, MCR, PCR, outside broadcast (OB), etc.

The broadcast control functionality may be used in combination with orchestration or independently. The system focuses on the broadcast control capabilities that maximize the benefits of an IP based infrastructure.

Customizable user interfaces

VideoIPath provides several customizable user interfaces (Apps) for broadcast control:

- **Panel** – widget-based software control panel interface
- **Matrix** – matrix style interface that can display logical routing views
- **Connect Studio** – advanced routing interface for scheduled or immediate workflows

For more information about Apps, see "Modern and ergonomic user interface".

The choice of control panels

VideoIPath can 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 pick their favorite way to control their resources, including extending the use of the panels they have for their SDI environment to control a new IP network (thereby providing a smooth transition for the operators).

Tally/UMD

VideoIPath can be a tally master or get tally information from external tally masters. VideoIPath can also handle multiple tally systems at the same time. The system supports TSLv5 to exchange tally information with other systems.

VideoIPath supports multiple tally domains and colors. The tally color can be calculated and propagated from the destination to the source and then to all destinations connected to that source.

GPI with RCP preview

VideoIPath supports GPI (General Purpose Interface) workflows where GPI inputs can be connected to one or more GPI outputs. There also exists some special GPI blocks to make connections based on GPI.

VideoIPath can detect changes on the GPI input and generate an event that is propagated to the GPI output. For more advanced GPI workflows, logical building blocks like AND, OR, XOR, inverter or latches can be added.

Parameter control

VideoIPath allows the control of parameters in production devices using standard protocols or via custom protocols supported by drivers. Operators may use this capability to adjust relevant parameter values on-the-fly during setup and live production.

The Panel app supports widgets like sliders, get/set buttons and toggle switches to perform parameter control all from a no-code interface. Parameter control widgets may also be combined with widgets for connection management, service listing, monitoring thumbnails, and so on to support entire workflows.

Virtual junction

Often equipment or groups of equipment will be used by different locations at different times in an identical manner (i.e. connected in the same way). It can be time-consuming to recreate all the logical connections between the pieces of equipment every time.

VideoIPath offers the possibility to create virtual sources and destinations, which create the workflow logic common to each location, without specifying the exact devices used. The specific pieces of equipment can simply be associated with these virtual endpoints, and the desired workflow will automatically be established, making the process simpler, faster and more consistent.

Grouping of endpoints

VideoIPath includes an advanced function to group endpoints into source or destination groups (e.g. combining multiple video and audio signals). When doing connections between these groups, VideoIPath will match equivalent endpoints (e.g. type, format) to enable smarter and faster connections based on endpoint tagging.

For example, the grouping concept can help establish SMPTE ST 2110 connections, while hiding the individual essence streams for the operator. The VideoIPath grouping concept is highly flexible though and can be used to group any combination of individual endpoints making it suited also for other workflows besides SMPTE ST 2110.

Direct matrix control

VideoIPath is able to switch between different sources by controlling flows in the IP media fabric. This allows a large number of sources to be switched efficiently without additional resources (e.g. equipment). The switching speed depends on the IP fabric and endpoint characteristics though. For applications that require very fast switching during production, VideoIPath can also control directly the internal matrices provided by devices such as video and audio switchers.

For instance, as part of a camera shading workflow, sources can be routed to a central resource where fast switching is done between pre-routed sources. This functionality is known as “direct matrix control” and requires specific driver support for each type of device.

Other broadcast control functionality

VideoIPath also offers familiar broadcast control functionality adapted to work in an IP or mixed IP/SDI environment, including:

- Salvos (macros)
- Alias names
- Destination monitoring

VideolPath Orchestrate market leading orchestration for IP media networks and cloud

VideolPath is a comprehensive orchestration system that provides connection management (SDN and IGMP) across a variety of networks ranging from international or national contribution networks (WANs and 5G) to broadcast facility, OB-vans or campus infrastructures (LANs, both SDI and IP). It can also be used to control the flow of signals to private or public cloud infrastructures (GCCG) and within a private or public cloud.

The orchestration functionality may be used in combination with the broadcast control capability or independently. It manages end-to-end video, audio and data services across any IP infrastructure. Media nodes are managed using NMOS or vendor specific APIs, while streams are routed across the underlying IP infrastructure using SDN (or alternatively IGMP/PIM). The system is proven to scale to thousands of nodes, transporting 100,000s media streams across the network.

Connection management

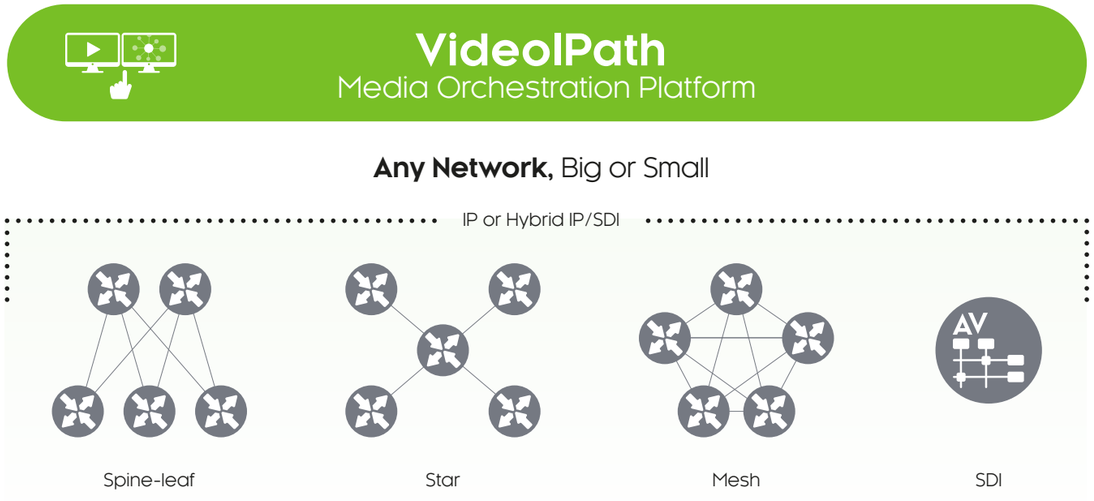
In the past, production workflows usually involved devices connected by cables carrying just one signal each. With IP, workflows are no longer simply defined by the cabling, as pieces of equipment, often located in datacenters, are effectively always physically connected with each other and only the “logical” connectivity determines whether signals flow between devices. Connection cables now carry multiple signals – with bandwidth being the only limitation.

These new workflows require a more advanced connection management tool that simplifies the task of connecting sources and destinations across an IP or mixed IP/SDI based infrastructure and the cloud – which is exactly what VideolPath is. While establishing connections and using the network resources efficiently are complex tasks, with VideolPath it is as simple as setting a cross-point on an SDI router from an operator’s point-of-view.

SDN control

VideoIPath can make intelligent routing decisions across any network topology (including spine/leaf commonly used in IP facilities). The system takes full control of both existing and planned media flows, enabling the most efficient utilization of the IP infrastructure, at any point in time.

The system comes with a highly optimized routing engine and can provision routes across all major switch vendors (Cisco, Arista, Nvidia, etc). This gives customers the deterministic performance needed in broadcasting and also simplifies maintenance and troubleshooting of the IP infrastructure.



Cloud orchestration

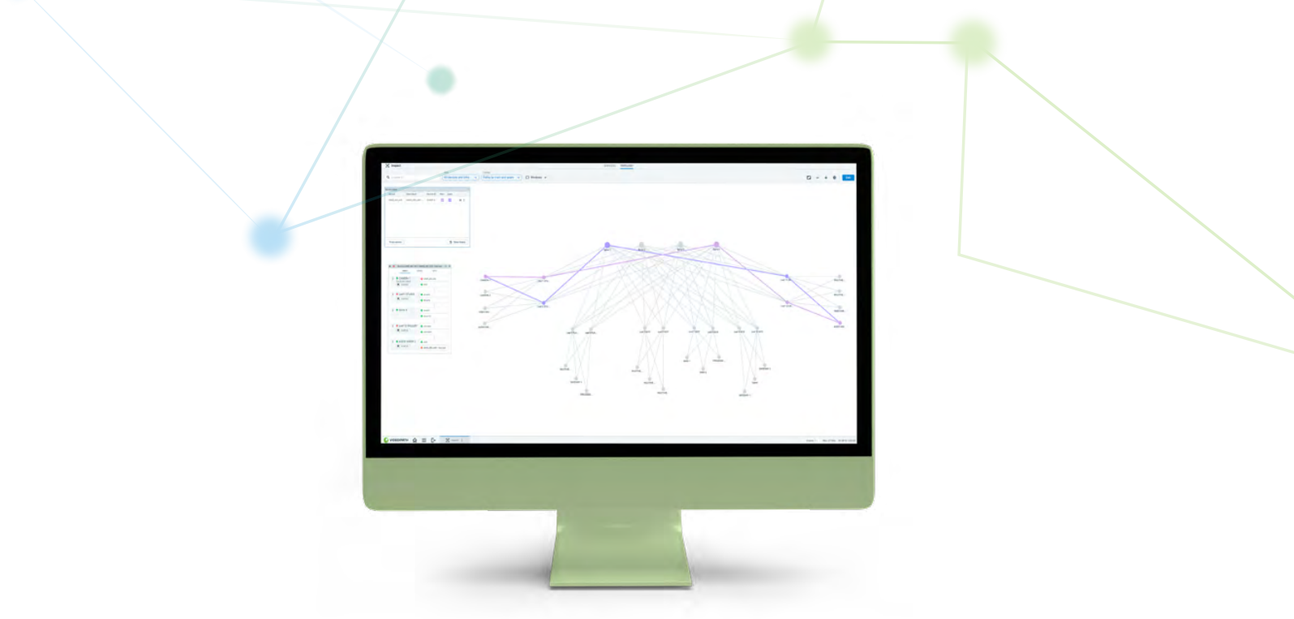
Hybrid production requires a seamless solution for coordinating live video, audio and data signals between production facilities and the cloud.

VideoIPath provides an innovative combination of advanced network orchestration and cloud integration. Not only does VideoIPath facilitate the transport of media signals between ground and cloud, it also enables the efficient management of signals and processing resources in the cloud.

VideoIPath offers interfaces with leading services such as AWS's MediaConnect for high-quality live video transport and MediaLive for professional-grade video processing, as well as cloud-based multiviewers from TAG Video Systems, playouts from Amagi and more.

VideoIPath is able to route signals between instances (e.g. NDI). It can even spin-up/down and start/stop instances as needed, to ensure cloud usage and therefore costs are kept down.

VideoIPath hides the complexity underlying media flows, empowering users to harness both on-prem and cloud production resources in the most optimal manner.



Resource and bandwidth management

On the ground, VideoIPath manages media resources (e.g. encoders, decoders, audio processors, etc) and network resources such as bandwidth and ports optimally. It is aware of existing and planned usage and can route signals accordingly.

Scheduling

VideoIPath includes a scheduling engine that works in conjunction with the resource and bandwidth management to guarantee that scheduled services can be delivered at the activation time. The scheduler supports both recurring and one-time services.

Protection

VideoIPath has multiple functions to help guarantee connections of mission-critical services. From simple SMPTE ST 2022-7 to more advanced dual encoder protection, senders, paths and receivers can be configured based on one connection in the VideoIPath GUI.

Redundancy control

The system includes a redundancy controller that can intelligently re-route services when failures occur in the network or at the edge. The behavior of the redundancy controller is customizable to fit a wide variety of redundancy scenarios.

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.

Multicast and VLAN management

VideoIPath can be configured to auto-assign multicast and VLANs to connections from one or multiple pools. When a connection is ended, the multicast or VLAN is released so it can be reused for other services. This removes the possibility of human error in assigning addresses and also gives a more optimized way of using addresses.

NMOS

VideoIPath comes with a built-in NMOS RDS (Registration and Discovery Server) for easy onboarding of NMOS IS-04 devices. An external 3rd party NMOS registry can also be used.

NMOS IS-05 is also used extensively by VideoIPath to perform connection management for media devices. This can be combined with device specific drivers when specific functionality is required. There is even the possibility to combine NMOS with other APIs for flexible integration.

VideoIPath provides true end-to-end capability for all your orchestration needs. The table to the right highlights the substantial difference between what VideoIPath provides and other systems are capable of.

Nevion VideoIPath provides the end-to-end capability for all your orchestration needs.

	VideoIPath	Others
Multicast routing (with bandwidth awareness)	✓	✓
Bandwidth management (reservation now)	✓	✓
Link load balancing	✓	✓
Red and blue spine/leaf topology	✓	✓
Flow policing (restrict ingress bandwidth for flows)	✓	✓
Alarm management	✓	(✓)
Co-exist with PIM/IGMP networks	✓	(✓)
Any network topology (Including purple spine/leaf)	✓	
End-to-end service monitoring correlate alarms to affected media services)	✓	
Multi-vendor network (Cisco, Arista, Nvidia, Huawei, Nevion)	✓	
Scheduling and future reservation	✓	
Device and link maintenance (plan for outages and move critical flows)	✓	
Hybrid IP and SDI support (route end-to-end across hybrid IP/SDI networks)	✓	
Automatic multicast assignment (avoid configuring senders with static addresses)	✓	
Multicast NAT support	✓	
Data service tunneling (bi-directional routing of VLAN across network)	✓	
Two stage clean switching (avoid double bandwidth)	✓	
Media-aware re-routing (prioritize re-routing of critical flows)	✓	
Routing constraints (steer different traffic profiles certain way)	✓	
Cloud orchestration (GCCG, cloud routing, instance control)	✓	

✓ - full support (✓) - partial support

VideoIPath Monitor
integrated monitoring of IP based services

IP technology introduces more flexibility to establish new production set-ups on-demand by utilizing the same underlying infrastructure. This enables broadcasters to make better use of available resources and work more efficiently, but at the same time introduces more complexity.

VideoIPath is there to help tackle this complexity, to proactively prevent problems and assist in the troubleshooting process to quickly identify the root cause of problems in the infrastructure and how it impacts ongoing operations.

Inspection

VideoIPath provides a real-time view of the status of equipment and connectivity (including PTP), clearly highlighting any concerns.

VideoIPath combines alarm monitoring for integrated devices with control of services, which means that broadcasters do not need to consult multiple systems to get an accurate overview of the current status. The system keeps track of all open alarms on integrated devices and maintains a log of historic alarms with appropriate retention mechanisms.

Service assurance

VideoIPath provides extensive service assurance building on the alarm management functionality in the system. The system automatically correlates alarms with running services.

This allows operators to focus on problems that affect services.

Customized monitoring and connection management GUIs can be created for easier action when a fault is happening.

The system also includes service-templating functionality that enables customization of how alarms are correlated against services. This includes the ability to generate summary alarms such as loss of service, loss of protection, etc.

Grafana/Prometheus integration

VideoIPath allows integration with Grafana and Prometheus for external analysis of collected data both regarding the system itself and services managed by the system.

This allows customers to create customized Grafana dashboards combining data from VideoIPath and other systems. Nevion professional services can also assist with the creation of dashboards.

Modern and ergonomic user interface

A key focus of Nevion VideoIPath is accessibility and ease-of-use for users.

VideoIPath offers an ergonomic HTML5-based web-interface, which is divided into different modules called “Apps”. Each App is dedicated to a particular type of functionality – whether it’s handling operations, connectivity, monitoring or managing the system’s settings.

All the Apps are combined onto a common desktop (available in light and dark themes), which provides a consistent look-and-feel and the possibility to exchange data between them.

Web-apps highlights

The apps that are within VideoIPath are as follows:

Connect Studio
Allows the operator to connect endpoints and/or groups, including scheduling of connections and viewing of on-going and scheduled connections.

Matrix
Allows the operator to connect multiple endpoints and/or groups from a familiar matrix oriented interface. VideoIPath does not restrict the user to statically defined matrixes, but these may be created dynamically on-demand by the user.

Panel
A customizable user interface where the operator can build their own user experience using pre-defined widgets. This no-code approach to UI customization allows operators to create their control panels combined with widgets that display monitoring and other information.

Inspect
Advanced monitoring application that allows the operator to perform high-level monitoring of services combined with the ability to drill-down and inspect details to pinpoint service-affecting problems.

Inventory
Manage devices that are on-boarded into the system. This includes backup/restore and software upgrade for supported devices.

Topology
Manage the network connectivity model that is fundamental to the system’s advanced SDN functionality, in addition to metadata edit for media devices added to the system.

Profile
The system allocates a profile to each connection. This application allows customization of different profiles for uncompressed and compressed services, including video, audio and anc types.

Security
VideoIPath has an advanced security model that can be managed using this application. This allows administrators to define access rights for users, authorization roles, support multiple tenants and integrate with directory and SSO providers.

Import/Export
This is a powerful tool for administrators to quickly import and export larger amounts of data to/from the system.

Maintenance
This application allows operators to define maintenance intervals for different system resources, which provides a controlled way to plan upgrades and other potential service-affecting activity.

IT-centric platform and interfaces

Hosting platform

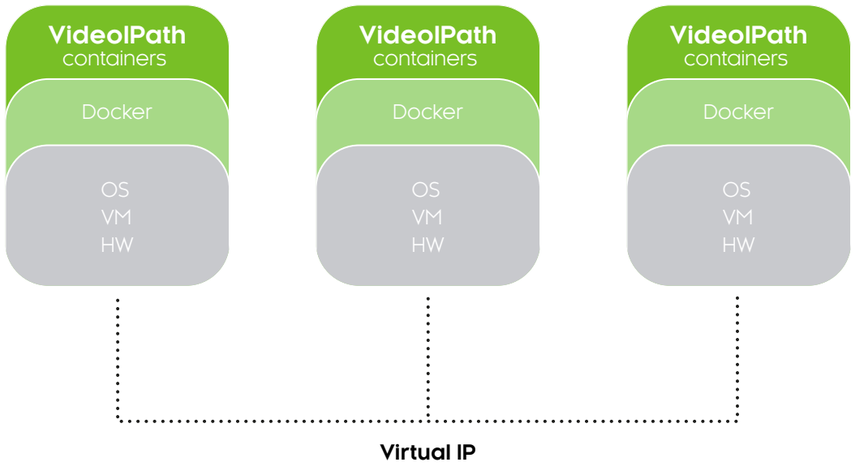
VideoIPath can be hosted on standard suitably sized and powered COTS hardware (either bare metal or virtualized), or in the cloud. VideoIPath has been deployed on all major clouds and hypervisors.

VideoIPath can be deployed on Red Hat Enterprise Linux for customers seeking a commercially supported OS or Rocky Linux for customers looking for a free OS alternative.

Clustering

VideoIPath can work in clusters, meaning multiple instances of the system can share the workload. Clustering adds resilience against server failure and enhances scalability.

The cluster is based on standard components like Docker, HAProxy and Zookeeper with a Cockroach datastore. All necessary software components are installed.



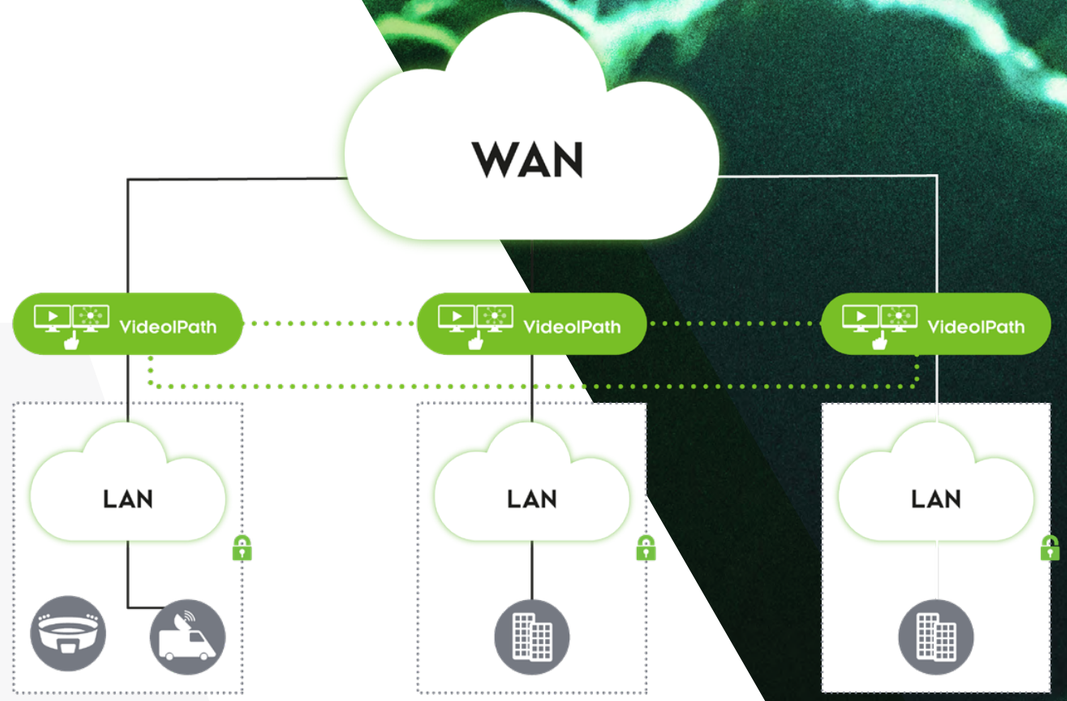
Federation

VideoIPath's federation is a unique capability that enables multiple autonomous instances of VideoIPath to collaborate within and across locations.

As each system is autonomous and in charge of its own resources, it continues to function and collaborate, even if problems occur in other parts of the federation. It can be used to compartmentalize several locations, or indeed areas within facilities, for example ingest, production and playout.

The federation capability also enables VideoIPath to reach new heights in scalability, to handle all the production resources and all the media streams involved.

The federation capability also enables **VideoIPath** to reach new heights in scalability



Security

VideolPath software is designed to be secure in accordance with OWASP guidelines for secure coding. The software and third-party libraries are continuously scanned for vulnerabilities and security fixes are rolled into the next release or made available immediately if critical. The software is also compliant with EBU recommendations.

All external system communication, within a VideolPath cluster, between federated systems, northbound with other systems and user interfaces, and southbound with equipment, may be encrypted using TLS or similar.

The federation concept also adds a layer of security by compartmentalizing the infrastructure, enabling different parts of an organization or different organization to cooperate in an autonomous and secure way.

Role-based access control

Given the central part played by VideolPath in controlling media networks, security is paramount. VideolPath has a role-based system, which ensures that authorized personnel can only access the resources they have been assigned to. The role-based security function allows a user to be assigned to only part of the system.

Single sign-on of users (SSO)

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

Multi-tenanting

An important aspect of VideolPath's security and role-based access, is that it is possible to do multi-tenanting, i.e. provide restricted access to specific departments or outside organizations. This feature can be used, for example, by broadcasters to provide access to certain production capabilities to production companies they are working with. It can also be used by telecom service providers to allow multiple media companies to control some part of the network, for example to set-up their own connection. In all cases, each tenant is only able to "see" the resources to which they have been granted access.

Northbound APIs

VideolPath can interface northbound with a variety of systems and panels thanks to its own API and its support for interfaces such as NS-BUS (for Sony equipment), Ember+ and MRP. This allows existing and familiar user interfaces or broadcast control surfaces to be used together with the network orchestration part of VideolPath.

Southbound APIs

VideolPath interfaces to network and broadcast devices, as well as to cloud services. This allows the system to handle networks built on combinations of switches from leading vendors, including Arista, Cisco and Nvidia (Mellanox), and media nodes from a variety of vendors. It also allows it to control production equipment, such as cameras and video and audio mixers from Sony and other vendors.

Software updates

VideolPath has one Long Term Support (LTS) release per year. Security updates and corrections will be provided for LTS releases for a 3-year time period following its release, before the LTS version is discontinued. This is the best choice for systems in a production setting.

In addition, Nevion provides stable intermediate releases every quarter. These releases are for customers in the implementation phase or who need access to new functionality not available in the current LTS. Normally systems are upgraded to an LTS release as soon as this is available.

All updates are provided to customers that have a valid maintenance agreement. In addition, customers with premium support get upgrades performed by experienced Nevion engineers.

VideolPath has multiple functions to help guarantee connections of mission-critical services

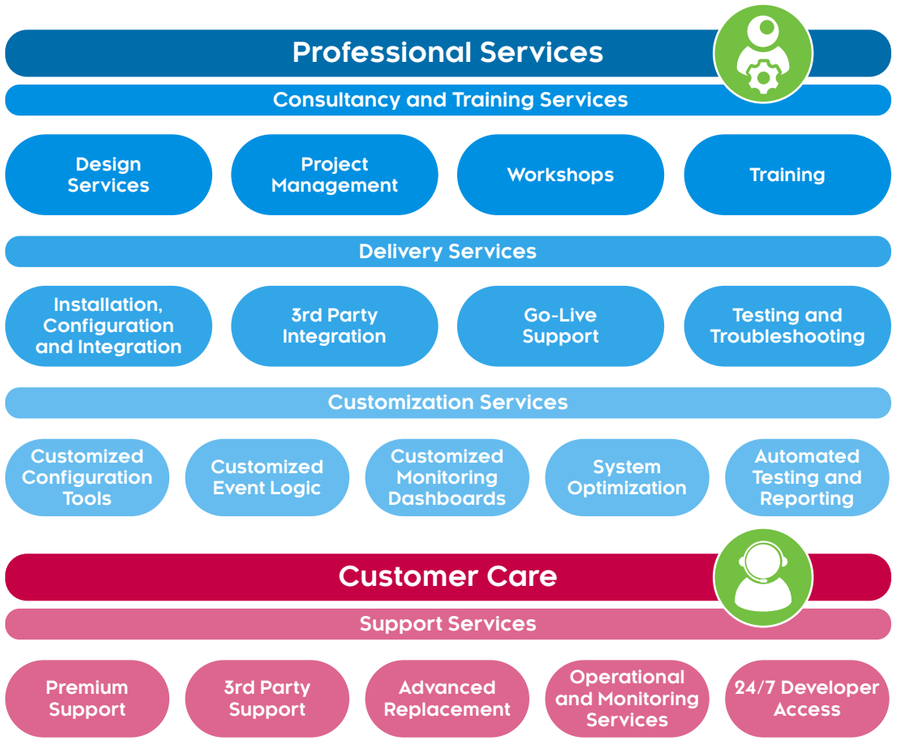
Services

Sony and Nevion provide an extensive portfolio of services before, during and after product or project delivery.

Specifically relating to VideoIPath, Nevion's services include:

- **VideoIPath setup and installation**
- **VideoIPath configuration** ie network, topology, nodes, endpoints, NAT, users etc
- **3rd party device integration** where the device(s) are not already supported by VideoIPath
- **Training**
- **System testing**
- **Monitoring and reporting**
- **System optimization**
- **Handling software upgrades**

And much more...



For a full overview of the support offered by Nevion, visit nevion.com/services

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