SONY

nevion

Nevion
Virtuoso

Real-time media
transport and processing

April 2026

Virtuoso

Media Transport
Real-time
Processing
Highly Versatile
Monitoring

What is Virtuoso?

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 a real-time media transport, processing and monitoring solution that's highly versatile and adaptable.

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.
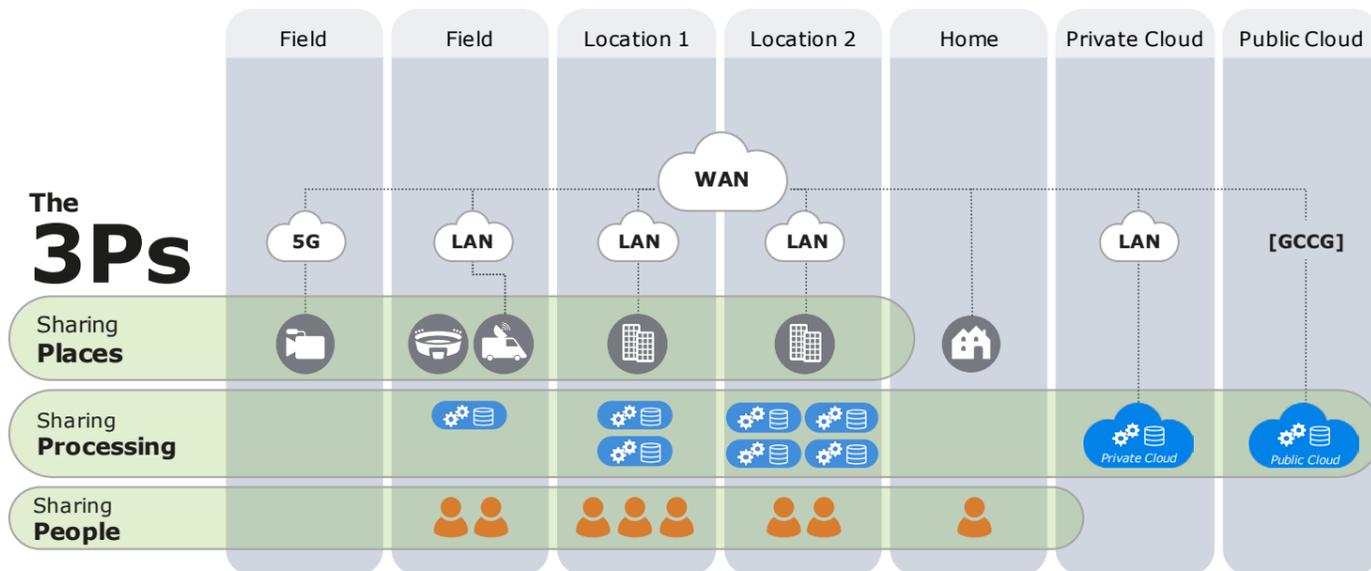
Live Production is changing

The future is distributed production

Content production is moving progressively towards a distributed model whereby workflows can tap into production resources almost anywhere on the ground and in the cloud. These production resources can be characterized by "the 3Ps":

- **Places,** such as studios, control rooms, OB production trucks, live venues.

- **Processing,** in other words all the tools that can manipulate media signals, including mixers, record and playback, video and audio processing.

- **People,** i.e. the production staff – The most important resource in a production.

Technology now allows all of these to contribute to the production regardless of their location.

ACQUISITION

CLOUD

Orchestration and control

Distributed Hybrid Production and Operation
Including Software Defined Broadcasting

Media Transport and Processing

Networks and Cloud Infrastructure

ON-PREM

SERVICES

VIEWING

	Field	Field	Location 1	Location 2	Home	Private Cloud	Public Cloud

The 3Ps

5G | LAN | LAN | LAN | | LAN | [GCCG]

WAN

Sharing **Places**

Sharing **Processing**

Private Cloud | Public Cloud

Sharing **People**

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.
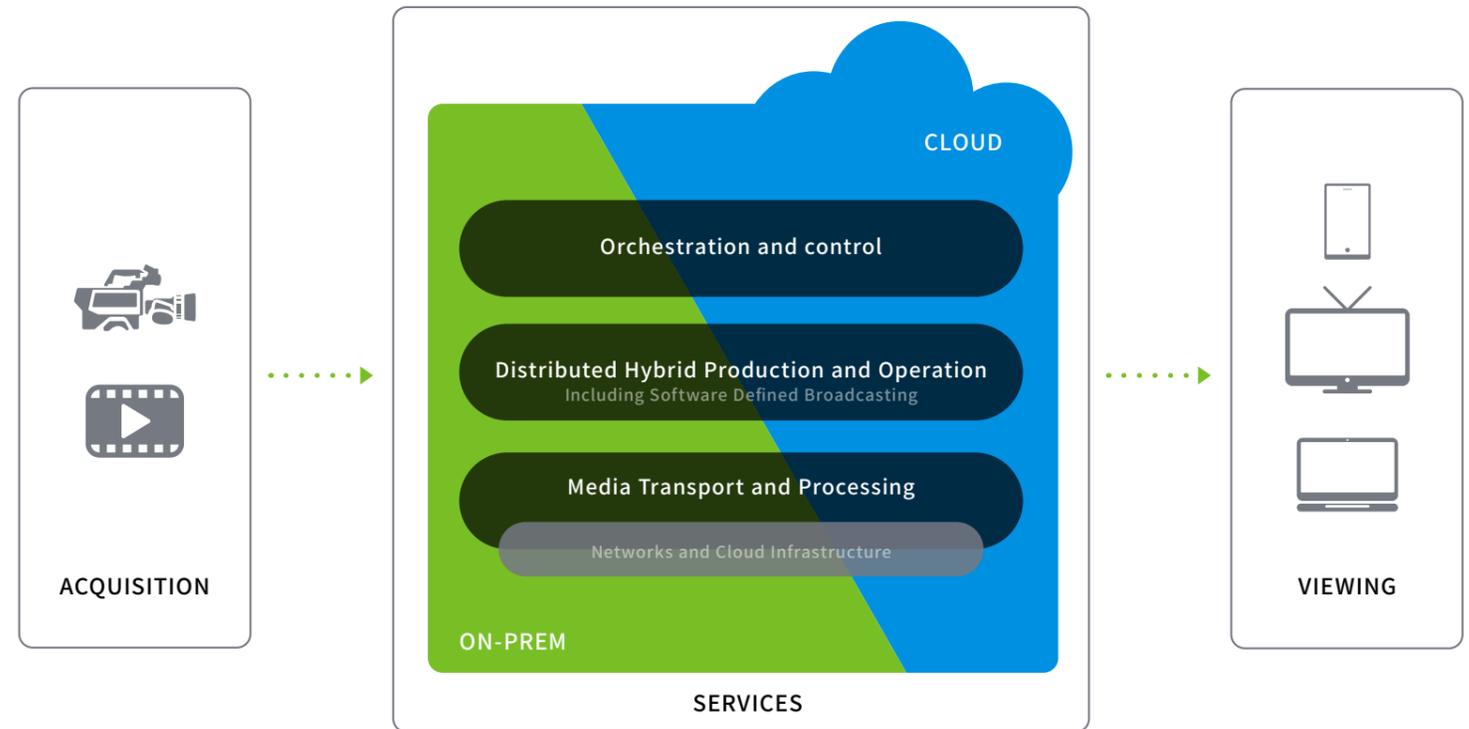
NETWORKED LIVE

Networked Live is an ecosystem of solutions, products, services and partners that combines hybrid on-premises 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,** including network orchestration, broadcast control, advance monitoring.

- **Media Transport,** i.e. the reliable real-time transport of video, audio and data over LAN, WAN, 5G and GCCG (ground-to-cloud-cloud-to-ground).

- **Hybrid Processing and Operations,** in short on-premises and cloud video and audio processing.

The Virtuoso software defined platform is a key component of both the Media Transport and Hybrid Processing & Operations pillars of Networked Live.

Where is Virtuoso used?

Nevion Virtuoso can be used for a variety of solutions and applications, including in the facilities, in outside broadcast trucks, for contribution, remote production and for cloud connectivity.

Facilities and OB-trucks (LAN)

In the facilities (studios, control rooms, MCR, etc.) and OB-trucks, Virtuoso can perform a variety of media transport and processing functions. For example, it can be used to connect SDI, AES3, MADI and GPI equipment to the IP infrastructure (adaption) with support for conversion to/from SMPTE ST 2110 and control via NMOS. Virtuoso also provides video processing functions such as monitoring, de-interlacing, scaling, legalization, frame synchronization, delay, frame rate conversion and color space conversion. Virtuoso also offers a unique combination of audio processing such as audio monitoring, embedding, mixing, shuffling and control of polarity, gain and delay.

Contribution (WAN)

Virtuoso is commonly used to reliably transport signals over managed and unmanaged IP networks between locations, offering a variety of media transport and video encoding options (JPEG 2000, JPEG XS, TICO, and soon HEVC) for both HD and UHD formats. Virtuoso offers flexible video/audio/data interfacing options for SDI, digital/analog audio, ASI/TSoIP and IP (SMPTE ST 2110/2022) connectivity. In addition, the platform provides advanced protection and monitoring functionality to ensure reliable hand-off of signals both at ingress and egress.

Remote production (LAN/WAN)

In the context of remote production, all the capabilities applicable to the facilities, OB-truck and contribution apply. In addition, Virtuoso can protect the media edge (where WAN meets LAN) to ensure an optimum protection of the production capabilities. Virtuoso offers the flexibility to adapt to different remote production workflows and requirements like bandwidth, sync, latency, interfaces, etc.

Move to the cloud (Ground-to/from-Cloud)

Virtuoso provides the ability to transport signals fast, reliably and efficiently from the ground (e.g. facilities) to the cloud and from the cloud to the ground (GCCG), in particular using JPEG XS or HEVC video compression and SRT transport protection. This is a key requirement for the integration of cloud processing into live production workflows.

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Why Virtuoso?

Today's live production calls for extremely versatile equipment that can evolve with needs, be it new media transport technologies or media processing capabilities.

Benefits

Virtuoso brings real benefits to production:

Superior Quality and Efficiency

One of the most powerful platforms on the market, Virtuoso combines high-density media transport and processing with a focus on delivering top-quality signals, ensuring broadcasts are of the highest standard.

Unmatched Reliability and Security

With thousands of units deployed worldwide, Virtuoso delivers unparalleled reliability with built-in modularity, redundancy and hot-swap capabilities, together with compliance to the latest security protocols and recommendations, ensuring live broadcasts remain uninterrupted and protected.

Flexible and Designed to Evolve

Whether managing routine broadcasts or high-demand live events, Virtuoso's versatile and software-defined architecture adapts easily to various scenarios. Its design adapts to changing requirements, providing long-term value.

Features and functionality

Capabilities

Virtuoso is a very versatile platform that can provide a variety of video, audio and data transport and processing capabilities.

These capabilities are grouped into functionality that is commonly needed in deployments, i.e. making existing equipment work with a new IP environment, transporting media including video encoding, video processing, audio processing and protecting production facilities.

Adapt	Compress	Transform	Tune	Secure
Make your SDI/AES video/audio equipment ready for interfacing with an IP infrastructure	Use compression to transport your media safely and reliably between locations (WAN)	Convert and transform your video signals (format, standard and color)	Process and manage your audio channels (embed, shuffle, delay, gain, mix)	Secure your production environment where your local network (LAN) meets the transport network (WAN)
Facilities, OB truck	Remote production, contribution and GCCG	Facilities, OB truck	Facilities, OB truck	Remote production, contribution

Choice of broadcast or carrier-grade appliances

Media functions, accelerators and appliances

Virtuoso's functionality is virtualized, and delivered by software modules known as Media Functions – all designed to perform with ultra-low latency. These licensed-enabled functions can be installed, activated and changed on demand – meaning there is no need to switch equipment when a change of functionality is required.

Most of the Media Functions run on generic Media Accelerator cards, which are housed in a Media Appliance. Accelerator cards provide the required processing resources for Media Functions ranging from IP adaption and compression to advanced video/audio processing.

Standards-based

Sony and Nevion are actively involved in the development, adoption and promotion of open standards by established industry bodies (e.g. AMWA, SMPTE, VSF, AIMS). Virtuoso is built on those standards and has proven interoperability both through regular industry interoperability tests (e.g. JT-NM and many live deployments.
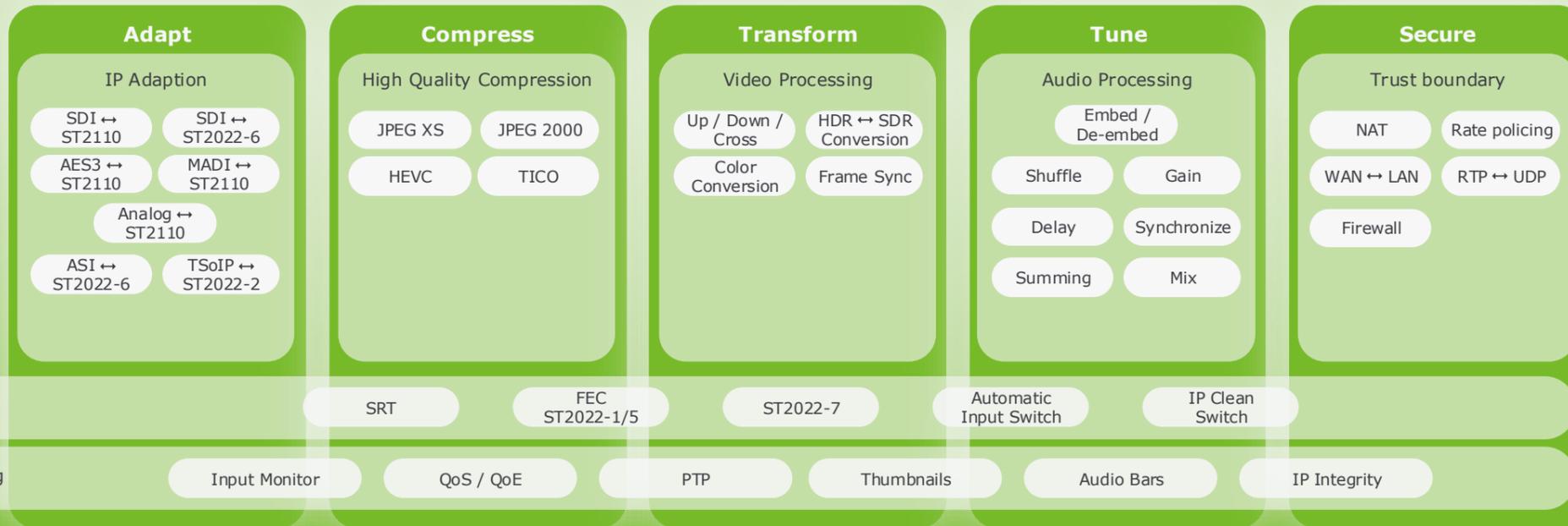
Integrated with Networked Live

Virtuoso comes with a tight integration with other Networked Live products from Sony and Nevion, such as the Nevion VideoIPath Media Orchestration Platform. This reduces the cost of integration and time taken to deploy solutions.

At the same time, Virtuoso is based on industry standards and can therefore interact with products from other vendors giving our customers complete freedom of choice.

MADI. AES3, Analog	SD , HD, 4K/UHD Cinema (2K/4K)	SDR, HDR, HFR	ANC, GPI,RTP, UDP, etc

Virtuoso Media Functions

Adapt	Compress	Transform	Tune	Secure
IP Adaption	**High Quality Compression**	**Video Processing**	**Audio Processing**	**Trust boundary**
SDI ↔ ST2110 · SDI ↔ ST2022-6	JPEG XS · JPEG 2000	Up / Down / Cross · HDR ↔ SDR Conversion	Embed / De-embed	NAT · Rate policing
AES3 ↔ ST2110 · MADI ↔ ST2110	HEVC · TICO	Color Conversion · Frame Sync	Shuffle · Gain	WAN ↔ LAN · RTP ↔ UDP
Analog ↔ ST2110			Delay · Synchronize	Firewall
ASI ↔ ST2022-6 · TSoIP ↔ ST2022-2			Summing · Mix	

Protection

	SRT	FEC ST2022-1/5	ST2022-7	Automatic Input Switch	IP Clean Switch

Monitoring

Input Monitor	QoS / QoE	PTP	Thumbnails	Audio Bars	IP Integrity

Virtuoso OS

HTML5 GUI	User Authentication	Device security		REST API	SNMP	NMOS

Choice of broadcast or carrier-grade appliances

Virtuoso platform

The Nevion Virtuoso platform concept has been designed to allow for the provision of Media Appliances with different characteristics, such as size, number of Media Accelerator cards that can be accommodated and level of modularity and redundancy, to fit any deployment scenario.

Virtuoso MI media appliance

Nevion Virtuoso MI is a carrier-grade 1RU modular platform with dual AC load-sharing power supplies, supporting hot-swap and full internal redundancy for element management and control, high speed internal communication and timing/sync distribution. Nevion Virtuoso MI holds up to 8 Media Accelerator cards.

Virtuoso RE media appliance

Nevion Virtuoso RE is a compact 1RU media node targeted to broadcast applications. With dual AC load-sharing power supplies, integrated element manager, a high-speed internal communication fabric and built-in timing/sync distribution. Nevion Virtuoso RE holds up to 6 Media Accelerator cards.

Nevion Virtuoso platform concept has been designed to fit any deployment scenario

Virtuoso Element Manager

For day-to-day operations, the Nevion Virtuoso Element Manager offers an intuitive and easy to use HTML5 web user interface, a modern and open RESTful API, alarm management, alarm and event notification and logging.

Further, it manages the role-based access control, authentication and overall security of the platform, as well as timing/sync distribution with built-in PTP best clock selection. The ease-of-use simplifies operations and allows for fast reconfiguration for occasional use applications.

Generic Media Accelerator cards

Nevion Virtuoso Media Accelerator cards are designed to provide optimum performance for software defined Media Functions, providing general compute/storage/networking and high-performance FPGA acceleration.

SFP-based interfacing allows flexible connectivity to 1G, 10G or 25G Ethernet, optical and electrical SDI video up to 12G/UHD and MADI audio signals.

Analog and digital audio

While IP based audio (AES67, SMPTE ST 2110-30) is handled natively on the generic Media Accelerator cards, analog audio as well as balanced/unbalanced digital AES3 is handled via special adapter cards and breakout panels to facilitate higher density audio interconnects.

The AES3 Digital Audio Card is designed for AES3 digital audio interfacing, while the RPRO Audio Card is designed for a mix of AES3 digital audio, analog audio and GPIO. The RPRO card in addition can generate legacy video and audio sync signals using the Virtuoso PTP-locked system clock as reference.

Network aggregation up to 100G

Virtuoso supports internal service routing and aggregation of video, audio and MPEG Transport Streams (see Generic Media Accelerator Cards).

The 100G interface is provided by the Virtuoso UplinX add-on, which is designed to aggregate IP streams from up to 6 Virtuoso MI or 8 Virtuoso RE appliances (up to 192 video signals in both directions). More cost-effective than in-appliance interfaces or a dedicated IP switch, Virtuoso UplinX is a highly flexible and scalable solution, with a choice of 2, 4 or 8 100G interfaces to fit the requirements of the specific deployment. Virtuoso UplinX allows customers to move to 100G (and in time even to 400G), without the need to upgrade their Virtuoso appliances or disrupt their configurations.

If data aggregation is required, a further option is to use Nevion eMerge IP SDN Media Fabric.

Management and orchestration

Virtuoso offers its own HTML5-based web-interface, to enable it to be configured and monitored.

Virtuoso is also closely integrated with Nevion's media orchestration platform, enabling multi-unit field deployments to be managed centrally. VideoIPath can manage Media Functions on those appliances, change software configurations or update to the latest available functionality. It can also collect and present monitoring information generated by the appliances.

Virtuoso UplinX enables network aggregation through multiple 100G interfaces up to 800G
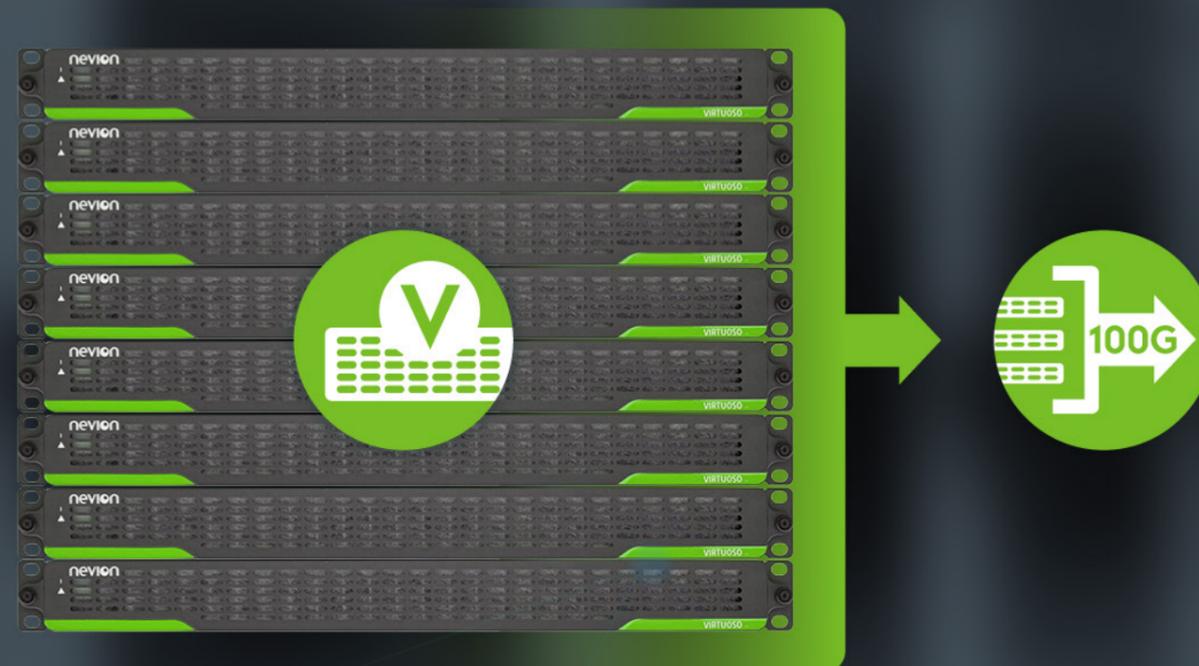
Virtuoso Adapt

With production workflows becoming more distributed, broadcasters have the need to transport more media content with high quality and high reliability over Wide Area Networks through high density solutions. Nevion Virtuoso can serve as the Swiss army knife for media transport across WAN and LAN networks.

SDI over IP, using SMPTE ST 2110

The SMPTE ST 2110 Media Function supports adaptation, synchronization and processing of uncompressed video and audio signals. The software supports up to four channels of bidirectional conversion, per accelerator, between baseband 3G/HD/SD-SDI and SMPTE ST 2110 IP, with flexible audio processing and routing, PTP/ SMPTE ST 2059 frame synchronization and delay management.

SDI over IP, using SMPTE ST 2110 UHD

Nevion Virtuoso's SDI-IP UHD SMPTE ST 2110 Media Function offers a powerful set of video and audio adaptation and processing functions for use in live IP production applications, supporting 12G-SDI and SMPTE ST 2110 over 25G infrastructure. The software supports dual channel conversion, per accelerator, between 12G/3G/HD-SDI and SMPTE ST 2110, with built-in frame synchronization and flexible audio routing/shuffling, gain and delay processing.

SDI over IP, using SMPTE ST 2022-6

The SDI-IP SMPTE ST 2022 Media Function enables reliable adaptation and transport of SD, HD and 3G-SDI signals over IP without any quality degradation.

For wide-area contribution applications, the software supports adaptation of baseband SDI signals to IP according to SMPTE ST 2022-6.

For adaptation in IP-based MCR or production environments, the software includes a built-in frame synchronizer with PTP/SMPTE ST 2059 support and audio embedding/ de-embedding to AES67 and SMPTE ST 2110-30/31 IP audio.

ASI and TS over IP Gateway

Nevion Virtuoso's ASI and TS over IP Media Functions provides high density ASI-IP adaption, Transport Stream monitoring and redundancy switching.

The ASI Media Function runs on the Virtuoso HBR accelerator card providing up to 8 ASI inputs and 8 ASI outputs. Transport Streams are routed to/from an Uplink HBR card in Virtuoso that provides high density IP aggregation.

Audio over IP

Nevion Virtuoso's Audio Processor Media Function offers an attractive set of audio adaptation, processing and mixing functions for use in contribution, remote production and live audio production applications.

The audio processor Media Function provides conversion of two bidirectional optical MADI signals to/from AES67 / SMPTE 2110-30/31 audio.

The AES3 digital audio adaptor card and Media Function provides additional AES3 interfacing capability, while the RPRO adaptor card provides interfacing to a mix of digital and analog audio signals.

Nevion Virtuoso can serve as the Swiss army knife for media transport across WAN and LAN networks

Virtuoso Compress

While IP and fiber connectivity and bandwidth is ever improving, video compression can provide large cost-savings or enable a higher number of video feeds on the same links, while providing low end-to-end latency and excellent video quality. Nevion Virtuoso offers a variety of compression capabilities (CODECs), to suit different compression ratio, latency and multi-generational requirements.

HEVC UHD/HD encoder/decoder

Ideal for bandwidth-limited live and remote production, the HEVC codec offers high compression, high picture quality and low latency, achieving over 100:1 compression ratios for UHD with around 200ms latency. In combination with SRT, it provides the perfect solution for unmanaged network and GCCG (Ground-to-Cloud-Cloud-to-Ground) applications.

The Sony HEVC ASIC on which it is built also supports Ultra Low Latency (ULL) of about 2 frames end-to-end – a capability that will be added in a future Virtuoso software update.

Nevion Virtuoso's HEVC media function enables multi-channel HD/UHD encoding or decoding with SDI interfaces, supporting up to 28 HD or 7 UHD channels per appliance, with multiple instances running on a single platform using standards-compliant IP Transport Stream encapsulation.

JPEG-XS UHD/HD encoder/decoder

Nevion Virtuoso's JPEG XS UHD/HD Media Function offers multi-channel JPEG XS encoding or decoding with native SMPTE ST 2110 video or SDI baseband interfaces, with SMPTE ST 2110-22 compressed JPEG XS essence transport compatible with VSF TR-08.

JPEG XS (ISO/IEC 21122) is a modern light-weight image and video encoding standard that achieves pristine visually lossless video quality even for multiple concatenated compression cycles. The ultra low sub-millisecond (sub-frame) latency of JPEG XS encoding is a key benefit, and enables end-to-end delays of less than one video frame period. This makes JPEG XS extremely attractive for low latency real-time transport of HD and UHD/4K video over wide-area networks (WANs). It also makes it suitable for bandwidth-constrained campus and facility local area networks (LANs) when uncompressed transport is not a viable option.

JPEG XS in TS encoder/decoder (TR-07)

Nevion Virtuoso's JPEG XS in Transport Stream Media Functions offers multi-channel JPEG XS encoding or decoding for HD and UHD signals with SDI baseband or SMPTE ST 2110 IP interfaces, with multiplexed MPEG TS (SMPTE ST 2022-1/2/7) transport over IP compatible with VSF TR-07.

Nevion Virtuoso can run multiple instances of the JPEG XS in TS Media Function on a single platform with built-in network aggregation.

A single JPEG XS instance supports encoding or decoding of up to 4 HD or 2 UHD signals, providing up to 28 HD channel or 14 UHD channel encoding/decoding in the Virtuoso MI platform.

HFR and Super Slow Mo

Virtuoso supports compression for HFR (High Frame Rate) and Super Slow Mo video, using Nevion's Multi Link Sync technology.

Nevion Virtuoso offers a variety of compression capabilities to suit different compression ratio, latency and multi-generational requirements

JPEG-2000 HD/UHD encoder/decoder

Nevion Virtuoso's JPEG 2000 Media Function saves bandwidth while providing visually lossless compressed video, transparent audio and data, at ultra-low latency.

Nevion Virtuoso can run multiple instances of the JPEG 2000 Media Function on a single platform with built-in network aggregation to 10G Ethernet.

The VSF TR-01 compliant TS over IP encapsulation ensures perfectly synchronized transport of video, audio and ancillary data, as well as interoperability with 3rd party equipment.

JPEG-2000 DCI encoder/decoder

Using JPEG 2000 encoding and decoding, Nevion's Virtuoso allows film studios and production companies to share pristine-looking content in real-time across the world, improving cooperation and production workflows.

The Virtuoso JPEG 2000 DCI (Digital Cinema Initiative) low-latency encoding and transport solution provides visually lossless video quality, full-color fidelity and accuracy while using a fraction of the bandwidth of uncompressed transport.

TICO UHD encoder/decoder

The Virtuoso TICO UHD Media Function provides visually lossless lightweight 4:1 compression for the transport of UHD and 4K signals with sub-frame latency.

The Nevion TICO UHD Media Function enables cost-effective transport of 12Gb/s 4K/UHD video over 10G IP networks using SMPTE ST 2022-6/7 or over existing 3G-SDI infrastructure.

Virtuoso Transform

Nevion's Virtuoso provides video and audio processing functions that are essential for live production applications, whether it's a live event outside broadcast (e.g. with OB-trucks) or centralized glue or processing infrastructure for studios, production control rooms or master control rooms.

The versatility, performance and low latency makes Virtuoso the ideal platform for live broadcast and media production applications.

Up/Down/Cross Media Function

Nevion Virtuoso's Up/Down/Cross (UDC) Media Function offers a variety of high-quality format conversions for HD and UHD with native SMPTE ST 2110-20 uncompressed video in/out on 25G interfaces.

A single Up/Down/Cross instance running on an HBR25 card in Virtuoso MI supports two independent video converters. Each converter can perform de-interlacing, scaling, 3D LUT color conversion, HDR/SDR conversion, legalization, frame synchronization and delay. Any-to-any conversion is supported for HD 720p, 1080i, 1080p and UHD 2160p video formats.

Virtuoso Tune

Audio processor Media Function

Nevion Virtuoso's Audio Processor Media Function (AUD-PROC-MADI-IP) offers an attractive set of audio adaptation, processing and mixing functions for use in live audio production applications.

The AUD-PROC-MADI Media Function provides bidirectional MADI and SMPTE ST 2110/AES67 IP audio interfacing, monitoring, routing and processing of audio signals.

Four audio processor engines, each with 64 output channels, are available for flexible routing/mono shuffling and per-channel control of polarity, gain and delay. Each of the processing engines can also be configured as an audio summing matrix mixer with up to 512 cross-points.

Separate adapter cards and breakout cables are available for unbalanced/balanced AES3 and analog audio interfacing.

High-density Analog/AES3/MADI conversion

The latest addition to the Virtuoso family, Virtuoso SoniX provides a cost-effective way to interface a mix of digital (AES) and analog audio signals, as well as GPI, bidirectionally to Virtuoso (via a MADI stream).

The near silent Virtuoso SoniX has an optical interface that allows it to be conveniently placed in low noise areas, away from the noisier processing equipment.
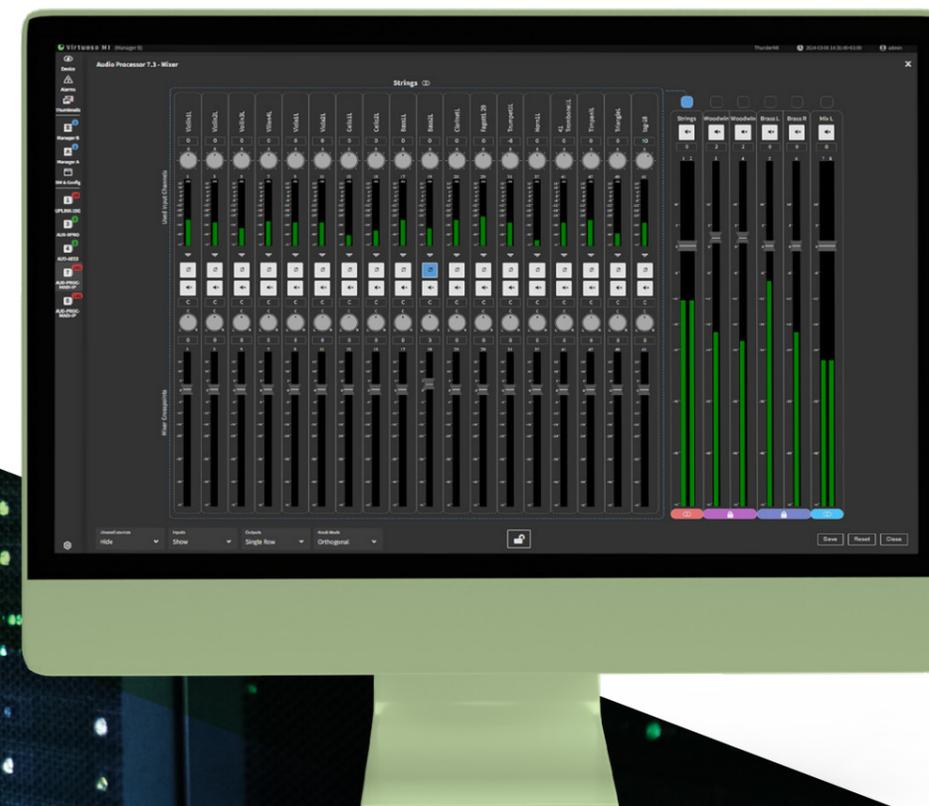
Virtuoso Secure

Virtuoso's IP Media Edge (IPME) functionality is a key addition to the platform, focused entirely on processing IP media flows to secure networks and optimize their performance. While the original implementation of IPME predates SMPTE RP 2129 "Trust Boundary" proposal by some years (underlying Nevion's pioneering leadership in this matter), it adheres to its recommendations.

The IPME capability is ideal for protecting the media network edge (e.g. where LAN meets WAN), thanks to its dedicated hardware packet processing and complete isolation between ethernet ports.

IP Media Edge Media Function

Nevion Virtuoso's IP Media Edge Processor offers network isolation, media firewall, network stream protection and translation for UDP and RTP IP media flows.

The IP Media Edge (IPME) Processor incorporates advanced techniques for processing and protection of RTP/UDP/IP media flows.

Processing features include Network Address Translation (NAT), bitrate policing, stream duplication, flow linearization / de-jittering and UDP/IP to RTP/UDP/IP conversion.

Protection features include SMPTE ST 2022-7 hitless switching for RTP stream redundancy and SMPTE ST 2022-1/5 Forward Error Correction (FEC). For more information about Virtuoso's transport protection functionality, see the Protection section next.

Protection

For live production, transporting high-quality signals reliably is paramount. No loss of signal can be tolerated.

Protection mechanisms in media networks are essential for ensuring continuous media services in the event of hardware or network link failures thus removing any potential disruption.

In practice, network-related issues, such as packet loss and link failures, occur more often than media/network node failures. Therefore, to achieve high availability, media services should ideally be implemented with redundant diverse network paths. However, where full path redundancy is not possible, other options exist.

Virtuoso offers protection functionality which are applicable to most of the core capabilities.

SRT (NEW)

The latest addition to Virtuoso's suite of protection mechanisms is SRT (Secure Reliable Transport), the most widely used ARQ (Automatic Repeat reQuest) system in broadcasting.

Like other ARQ systems, SRT uses two-way error detection and acknowledgment mechanisms.

In conjunction to Virtuoso's HEVC functionality (see Virtuoso COMPRESS), the hardware-accelesrated SRT protection provides the scalable solution to meet the increasing demand for secure and reliable transport over unmanaged networks and the public Internet.

FEC and SMPTE ST 2022-7

Virtuoso includes support for industry-standard RTP level FEC (Forward Error Correction and Seamless Protection Switching (SMPTE ST 2022-7), which uses dual path transmission.

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.
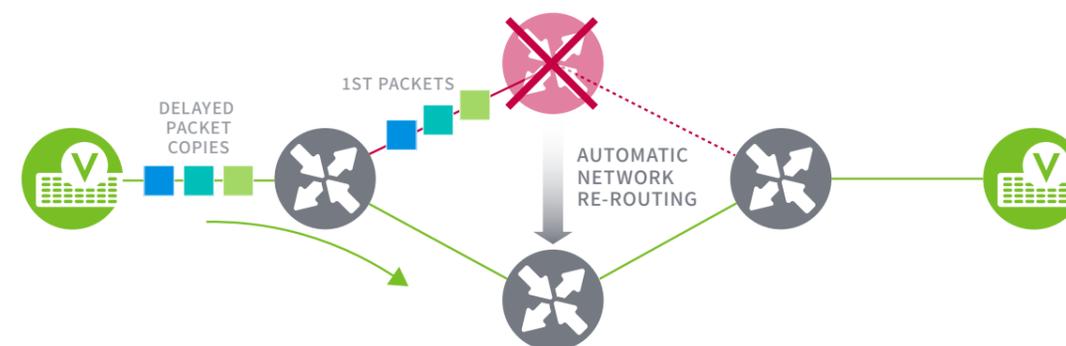
IP clean switching

Not strictly speaking a protection mechanism, IP clean switching enables Virtuoso to switch cleanly between sources. A typical application would be camera shading, whereby the output of 2 cameras can be switched quickly to align their settings. Virtuoso supports both Make-Before-Break (MBB) and Break-Before-Make (BBM) methods of switching.

Automatic Input Switching

Virtuoso can switch automatically between different sources, video or audio, based on any of the alarms supported (see Monitoring in the next section). For example, the switching would be triggered by a loss of signal on one of the inputs. The sources need not be identical. Whilst input switching is designed to be automatic, manual switching is also possible to enable planned maintenance to be completed.

Monitoring

Monitoring goes hand-in-hand with protection and is important for any network, whether WAN or LAN. Monitoring becomes especially relevant when different entities are involved, such as a broadcaster and a service provider. For example, it helps ensure service level agreements (SLAs) are being met.

Monitoring is a wide-ranging subject, that covers any aspect of signal/flow integrity throughout the signal path. It can be performed through probes (additional equipment which means extra cost) or be integrated into the equipment, such as media nodes.

Virtuoso offers extensive monitoring capability at all hand-off points whether it is as uncompressed SDI or IP signals or network IP flows, Tx or Rx, at the media node Ethernet interfaces.

Device level monitoring is also important to be able to detect any hardware issues that have occurred with the media node itself.

Input/Output monitoring

Virtuoso provides in-depth video and audio monitoring of all uncompressed inputs and outputs in SDI or IP. The parameters being monitored are often referred collectively as the QoE (Quality of Experience) as they relate directly to what the end user sees or hears. These include the detection of video freeze/black frame and audio silence.

Video thumbnails and audio level meters are also provided in the Virtuoso GUI, to give the operator confidence that the signals are present as expected.

In the case of Transport Streams, conformity to the ETSI TR101 290 (priority 1-3) standard is measured and reported.

IP/Ethernet monitoring

At network hand-off points in any media node, it is important to be able to monitor active network traffic, and raise alarms if necessary. Virtuoso monitoring can monitor the IP layer (IP/UDP/RTP monitoring) and report traffic bitrates, packet and error counts. These parameters are often referred to as the QoS (Quality of Service) as they relate to the quality of the service being transported.

Virtuoso also provides the means to monitor network parameters over a period of time (min/hour/day/week), which enables assurance against service level agreements.

PTP monitoring

Virtuoso can monitor PTP (Precision Time Protocol, IEEE 1588) sources, which is important for the synchronization of the essence flows in SMPTE ST 2110 networks.

Device monitoring

Virtuoso provides data on its own operating status, including the running temperatures, internal power rails, cooling fan speeds and more. This enables the operator to arrange maintenance of a piece of equipment which shows signs of potential failure, or route away if necessary.

Alarms

All parameters monitored by Virtuoso have associated alarms. Each of these alarms has a default severity level which can be overridden by the user as required.

When an alarm is raised it is recorded in an alarm log which is stored on the unit along with associated information about when the alarm was raised (and cleared). Virtuoso can perform Automatic Input Switching based on these alarms for example (see the Protection section).

A RestAPI and SNMP (Simple Network Management Protocol) are available to remotely control the unit, monitor all alarms and for integration into external systems.
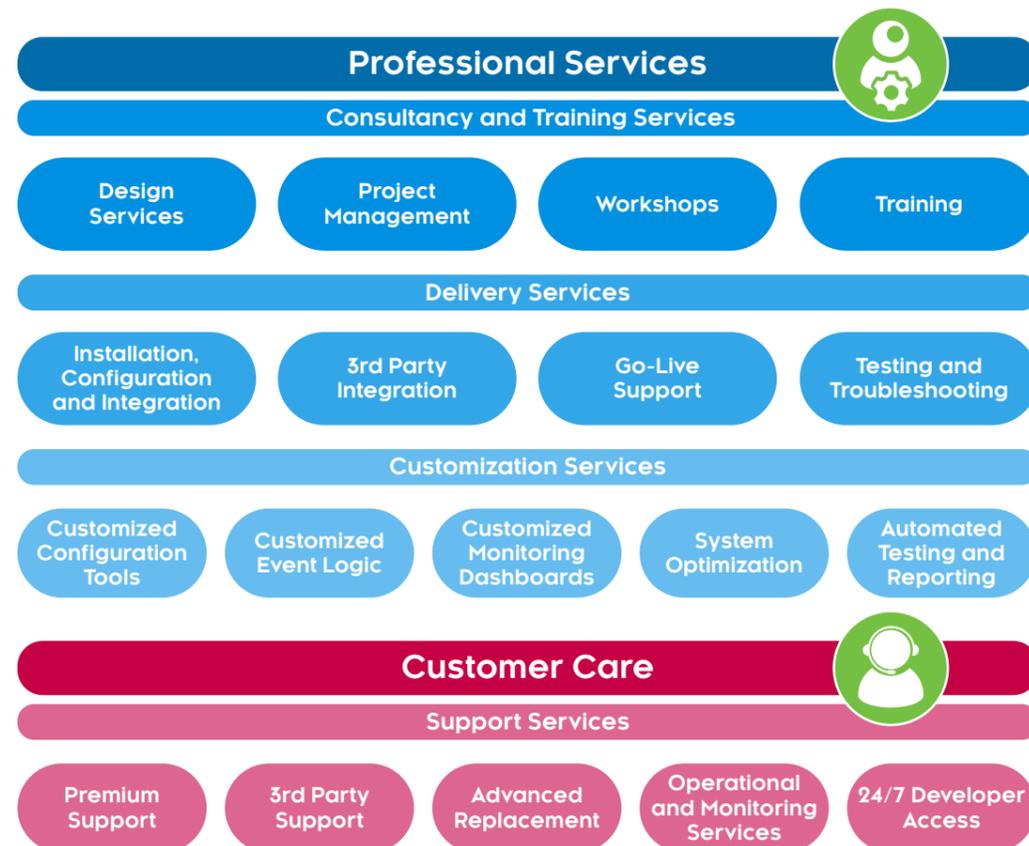
Services

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

Specifically relating to Virtuoso, Nevion's services include:

- **Configuration,** i.e. setting up the appliances with the correct media accelerator cards and the required media functions

- **System testing,** prior to shipping and onsite, stand-alone and in the context of the complete system deployment

- **Training** on the devices and their specific deployment

- **Commissioning** of the Virtuosos and the complete solution

- **Active monitoring and reporting** of the appliances within the solution

- **Support,** such as answering questions and concerns, solving issues, upgrading software versions, etc.

And much more…

Professional Services

Consultancy and Training Services

Design Services	Project Management	Workshops	Training

Delivery Services

Installation, Configuration and Integration	3rd Party Integration	Go-Live Support	Testing and Troubleshooting

Customization Services

Customized Configuration Tools	Customized Event Logic	Customized Monitoring Dashboards	System Optimization	Automated Testing and Reporting

Customer Care

Support Services

Premium Support	3rd Party Support	Advanced Replacement	Operational and Monitoring Services	24/7 Developer Access

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

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