HOME Apps —
Think Outside The Box

With the exception of the world’s first IP-native processing platform, launched in 2015, most evolutionary steps in the broadcast, AV, house of worship, theater and live sectors have been incremental.

But the industry is changing faster than ever before. New delivery channels, a variety of source and destination formats, and ever tighter budget constraints are the new reality. Five- to ten-year purchasing cycles may be just a little long when planning your next infrastructure overhaul, especially since no-one appreciates a lot of hardware sitting idle for the best part of that period.

Chances are that new formats will emerge which are not supported by the dedicated hardware you own. Purchasing more bespoke hardware that may be obsolete faster than we like, simply no longer makes sense. The only way out of this conundrum is a flexible, instantly scalable processing solution that can run anywhere.

Meet Lawo’s HOME Apps—the abstraction of broadcast and media functionality from the hardware that does the compute heavy lifting. When you need it, where you need it, with a revolutionary commercial model.

The Abstraction of Broadcast and Media Functionality from the Hardware that does the Compute Heavy Lifting.

When you Need it, Where you Need it, With a Revolutionary Commercial Model.
Microservices for Macro Agility

Select, Configure, Spin Up/Down

HOME’s three existing pillars—Connectivity, Security and Management—are joined by a fourth building block—Processing—that will future-proof your operation and inflate it with a striking amount of agility and flexibility.

Along with the new “Processed” element of HOME, Lawo releases four video processing apps that will soon be joined by additional audio and video applications:

- HOME Multiviewer
- HOME UDX conversion with HDR processing
- HOME Stream Transcoder
- HOME Graphic Inserter

Designed for Lawo-grade processing quality in a nifty, containerized software guise, HOME Apps can be spun up and down instantly via HOME’s intuitive user interface, which will conveniently preserve your settings for future use. App usage is based on permanent licenses for constant, long-term availability, if so desired. The Lawo Flex model, on the other hand, offers peak-time relief and frees operators from the pressure (and budget constraints) of getting the project planning right for the life of the CapEx period, with little or no wiggle room once the budget has been approved.

Intuitive and Fast

Thanks to the native integration of Lawo’s apps with HOME, operators enjoy a straightforward, fast and streamlined user experience. Plus, users are free to run HOME Apps only when they need them and where they need them, without any long-winded configuration sessions or expert knowledge.

Running apps only when they are needed has the distinct advantage of freeing up budget credits that can be spent on other functionality.

360° FLEXIBILITY

- Run apps on standard servers where it makes most sense: on premise, in private data centers or in the cloud.
- Cater to all formats and requirements at the click of a button.
- Mix and match the SMPTE 2110, NDI®, JPEG XS and SRT protocols on a single network.
- Decide for yourself whether and how much to invest upfront.
- Complement your existing hardware pool with software apps.
- Remain nimble despite tight budget control.
- One overarching solution for private datacenters and public clouds eaters to the building blocks of your processing infrastructure.

Lawo Flex: Choose Your Model

Depending on how you plan your server infrastructure, three flexible usage models, collectively called Lawo Flex, can be leveraged with Lawo’s HOME Apps: see the middle and right illustrations below.

- **Permanent availability:** Staple processing capability can be acquired with perpetual licenses, which is similar to purchasing dedicated hardware, except that the processing is performed by apps running on standard servers.
- **Lawo Flex subscriptions:** Licenses for processing resources with a high degree of flexibility and frequent temporary capacity top-ups where needed. This scheme covers all current and future HOME Apps—not just a specific one.
- **Hybrid Permanent and Flex licensing:** Perpetual licenses for cruise-speed usage, and subscriptions for temporary capacity top-ups at peak times.

As every operation is different, the perfect mix depends on your specific requirements and can be changed at any time.

Usage models that involve occasional top-ups are handled via a temporary subscription model in HOME. Top-ups can be expanded quickly and have a minimum validity of one month. After using the available budget to run a multiviewer for a week, for instance, users still have approximately three weeks for graphics insertion, format and stream conversion, and a lot more, with the exact same budget.

The subscription budget is only consumed while the app it is assigned to is running. And it covers all present and future HOME Apps, in any combination. Don’t need format conversion during the whole day? Simply spin down the corresponding app in the morning and use the associated budget for something else.

Traditional model: enough hardware used to be purchased to cover anticipated peak-time requirements. Long idle times for some devices.

Hardware + software model: hardware for device-dependent processing and control, software for processing. Each license is permanent.

Lawo Flex subscriptions: similar approach as the hardware + software model for cruise-speed requirements. Subscription licenses for ad-hoc processing needs.
The Flexibility to Make it Happen

Containers to Instantly Unleash Your Processing Capability

Based on a series of deliberate choices, HOME Apps processing is provided by means of microservices running in containers to ensure maximum agility. Containers are cloud-native, standalone executable software packages comprising the applications and their dependencies. They run on standard servers and offer the following benefits:

- The ecosystem is based on a modern, agile system architecture;
- Containers and apps are fast to boot;
- They are easy to scale and are portable;
- They are optimized for performance, memory and space requirements;
- They operate in isolation (no interference from other apps);
- They are quicker to update (short compilation times) and manage: switching off one microservice has no effect on others that may be running simultaneously.

Containers can be moved to most hardware platforms, whether CPU- or both CPU- and GPU*-based, whether on-prem, in a remote datacenter (fog) or in the cloud. Plus, HOME Apps command compute resources and energy only when they are in use, which is good news for the environment.

Amid the growing diversity of deliverables and the race towards ever more content, Lawo recognizes the benefits offered by NDI® and SRT, and is pleased to support its customers in search of the right production tools for the job at hand, enhancing their functionality with unbridled Lawo expertise.

Thanks to their support for NDI® and SRT, in addition to SMPTE ST2110 and JPEG XS, Lawo’s HOME Apps allow broadcasters and media producers to select the tools they require to tell compelling stories from the largest possible pool.

(* GPU support is a future product development.)
HOME Apps

AVAILABLE APPS

Four Essential Apps for Starters

Lawo’s HOME Apps run on standard servers with CPU processors as well as CPU + GPU** processor combinations, and in any public cloud. Operators are free to select the processing combination they are most comfortable with.

HOME Multiviewer

High-quality multiviewer functionality for monitoring UHD, 3G, HD and SD video as well as audio sources, with pixel-perfect mosaics and ultra-low latency.

This app generates the required number of PiPs for one multiviewer mosaic head. Spinning up additional instances allows operators to provide as many heads as are required for a given production. The multiviewer can be configured using the theWALL app and its wealth of widgets for level metering, clock, tallies, etc.

The input and output formats can be specified independently (SMPTE ST2110, SRT, JPEG XS or NDI®).

HOME UDX (with HDR processing)

The UDX app with HDR processing provides video format and aspect ratio conversions with support for up to four audio send and receive streams. In addition to up, down, cross and aspect ratio conversion, it features frame synchronization and non-linear edge enhancement.

The input and output formats can be specified independently (SMPTE ST2110, SRT, JPEG XS or NDI®).

HOME Stream Transcoder

The Stream Transcoder app allows operators to convert incoming video streams to one of the supported output formats. It is the perfect tool for a variety of applications: transcoding content to the required delivery or transport format; stream preparation for dedicated hardware processors that do not support the source’s video format; and—more importantly—signal compression (or decompression) before (or after) long-haul WAN stream transport.

The following input and output formats are supported: SMPTE ST2110, NDI®, SRT, and JPEG XS.

HOME Graphic Inserter

The HOME Graphic Inserter app allows users to turn 2D or 3D animated graphics into video streams. Simply add the URL of your HTML5 graphic, pick your output resolution and specify the required output format.

The following output formats are supported: SMPTE ST2110, NDI®, SRT and JPEG XS.

Summary of Key Features:

**HOME Apps**: Run on standard servers with CPU processors as well as CPU + GPU** processor combinations, and in any public cloud. Operators are free to select the processing combination they are most comfortable with.

**HOME Multiviewer**: High-quality multiviewer functionality for monitoring UHD, 3G, HD and SD video as well as audio sources, with pixel-perfect mosaics and ultra-low latency. Generates the required number of PiPs for one multiviewer mosaic head. Spinning up additional instances allows operators to provide as many heads as are required for a given production. Configurable using theWALL app.

**HOME UDX (with HDR processing)**: Provides video format and aspect ratio conversions with up to four audio send and receive streams. Offers frame synchronization and non-linear edge enhancement.

**HOME Stream Transcoder**: Converts incoming video streams to supported output formats. Perfect for transcoding content, stream preparation, and signal compression before or after long-haul WAN stream transport.

**HOME Graphic Inserter**: Allows users to turn 2D or 3D animated graphics into video streams. Requires an HTML5 graphic URL, output resolution, and output format specification.

**Available Formats**: SMPTE ST2110, NDI®, SRT, and JPEG XS.

(*) Please ask your Lawo contact for details about the system requirements.
(**) GPU support is a future product development.
(*** JPEG-XS only supports the HD, 3G and UHD formats.)

Note: All information on these two pages refers to preliminary product specifications and is subject to change.
Broadcast-Grade Protocol Support

Lawa’s HOME Apps interface with all widely used protocols, allowing operators to adapt their equipment pool to the production at hand. Additional refinements of these preliminary specifications will be communicated as they become available.

### SMPTE Specifications

**STANDARDS**
- SMPTE 2110 Professional Media Over Managed IP Networks
- ST2210-10: System Timing and Definitions
- ST2110-20: Uncompressed Active video
- ST2110-21: Traffic Shaping and Delivery Timing for video
- ST2110-22: Constant Bit-Rate Compressed Video
- ST2110-30: PCM Digital Audio (Levels A, B & C)

**ADDITIONAL SUPPORT**
- SMPTE ST2022-7: Seamless Protection Switching (Class A & B)

**REFERENCE STANDARD**
- IEEE1588 (PTPv2)

**SUPPORTED FORMATS**
- SD: 525i59.94 (NTSC) and 625i50 (PAL)
- HD: 720p50, 720p59.94, 720p60, 1080i50, 1080i59.94, 1080p60
- 3G: 1080p50, 1080p59.94, 1080p60
- 12G: 2160p60, 2160p59.94, 2160p50

### SRT Specifications

**STANDARDS**
- MPEG-TS
- H.264, H.265/HEVC
- Accelerated via GPU (optional)

**SUPPORTED FORMATS**
- SD: 525/59.94 (NTSC) and 625/50 (PAL)
- HD: 720p50, 720p59.94, 720p60, 1080i50, 1080i59.94, 1080p60
- 3G: 1080p50, 1080p59.94, 1080p60
- 12G: 2160p60, 2160p59.94, 2160p50

**DATA FORMATS**
- 8-bit 4:2:0 YCbCr
- 10-bit 4:2:2 YCbCr (decode only)
- 12-bit 4:2:0 (decode only)

### JPEG XS Specifications

**SUPPORTED FORMATS**
- HD: 720p50, 720p59.94, 720p60, 1080i50, 1080i59.94, 1080p60
- 3G: 1080p50, 1080p59.94, 1080p60
- 12G: 2160p50, 2160p59.94, 2160p60

**DATA FORMATS**
- 16-bit 4:2:2 YCbCr
- 10-bit 4:2:2 YCbCr (decode only)

### NDI® Specifications

**STANDARDS**
- NDI
- NDI-HX2 (H.264)
- NDI-HX2 (H.265)

**SUPPORTED FORMATS**
- SD: 525/59.94 (NTSC) and 625/50 (PAL)*
- HD: 720p50, 720p59.94, 720p60, 1080i50*, 1080i59.94*, 1080p60*
- 3G: 1080p50, 1080p59.94, 1080p60
- 12G: 2160p50, 2160p59.94, 2160p60

**DATA FORMATS**
- P126 16-bit 4:2:2 YCbCr
- UYVY 8-bit 4:2:2 YCbCr (decode only)
- PA16 16-bit 4:2:2 YCbCr, alpha discarded (decode only)

(*): NDI only (not NDIHX2)

### edge — Hyper Density as a Service

(edge’s) compact 2RU housing accommodates up to 192 HD-BNC connectors for SDI and MADI interfacing and can be clustered to provide matrices well beyond 1152 x 1152 crosspoints. Your next large SDI router can be IP-native, 24RU small, consume only 24x 100G network ports—a third of what other offerings require—and still be more powerful, scalable and future-proof.

Support for the SMPTE ST2110 suite of standards with SMPTE ST 2022-7 redundancy is built in, providing not only advanced essence-based handling, but also ensuring seamless protection switching of audio, video and ancillary data streams in both local and wide-area network operations.

Basic video and audio processing functions come as standard, whilst power-user features can be added as and when you need them—even for a limited time.

The HOME-native .edge unit is one of the only gateway solutions to boast high-capacity symmetrical IP ingress and egress, providing the sender and receiver count you expect from an IP pro.

Best of all, each .edge unit can be placed close to the sources and destinations users need to connect—and still be part of a planet-spanning network.

(*) Licensable option – future product development. (**): Calculation based on 1152 x 1152, 100G format and non-redundant operation.

### edge KEY FEATURES

- IP-native virtualized, highly modular SDI routing system, based on high-capacity generic compute processing blades.
- Supports SD, HD and UHD input as well as output.
- Compact footprint, lightweight, low power requirements.
- Software-defined, flexibly licensable features for budget-effective performance.
- Hardware/software bundles for easy, out-of-the-box SDI router replacement.
- HOME-native, with operator- and expert-level parameter control and more for time-critical, intuitive operation. Ember+ and REST API control support.
- High-density IP conversion for SDI equipment (up to 192 SDI connectors per 2RU).
- Designed for (de)centralized, distributed, remote and cloud operation.
- Fully based on open industry standards: ST2110, ST2022-7, RAUVENNA, AES67, and more.