envivio®

**Any-screen
Live Encoder/Transcoder**

Envivio Muse Live

High Performance Live Video Processing

Envivio Muse™ is a high-quality any-screen software architecture for live and on-demand video encoding/transcoding to any device. Muse offers an IP-centric and IT-oriented approach to video transcoding, and supports traditional MPEG-2/AVC set-top boxes as well as Apple iOS, Android and 3GPP smartphones, tablets, PCs with Flash or Silverlight, gaming systems and connected TVs.

Envivio Muse Live is ideal for any real-time broadcast application, including IPTV, cable, DTH, Internet and mobile. Thanks to its superior IP statistical multiplexing, operators can fit more MPEG-2 or MPEG-4 AVC (H.264) channels within their available bandwidth (up to 4:1 or 5:1 HD for cable or 8 HD channels in a DTH transponder). Muse also supports advanced services such as advertisement insertion and content protection for personal devices.

Significantly improving efficiency and operations compared to architectures that call for separate headends, Muse is available on the Envivio G5 appliances or industry-standard IT blade servers.

The flexible software architecture of Muse makes upgrades and reconfiguration of the system simple, while the IT-centric approach lowers the operational costs.

Product Highlights

- MPEG-4 AVC (H.264) and MPEG-2 codecs designed by Envivio
- High-quality enhancement filters: deblocking, MCTF, denoising, cross-scaling and audio loudness control
- MPEG-4 AVC (H.264), MPEG-2, VC-1, MPEG-4 SP, H.263 in HD, SD and adaptive bit rate (ABR) formats
- Built-in statistical rate control
- Available on Envivio G5 or industry standard blade servers
- Baseband or compressed video source ingest via SDI, ASI or IP interfaces
- Streaming protocols for Apple iOS, Android and 3GPP smartphones, tablets, PCs, game consoles, connected TVs and STBs
- Embedded encryption with CAS API and built-in interface to CDNs for multi-screen distribution
- Subtitles delivery for all screens, blackout and ad-insertion management with Cablelabs™ ESAM or SCTE interfaces
- Microsoft Mediaroom Certified
- Ingress and egress native IP redundancy and N+M redundancy with Envivio Guru™
- Continuous quality and feature enhancements via software and license upgrades

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Premium Quality, Enhanced Experience

The Extreme™ and Premium™ H.264 codecs engineered by Envivio have been tailored to provide the highest quality video on any device, from 1080p HD to mobile resolutions for smartphones. Muse enables rich end-user experiences with support for picture-in-picture, alternative audio languages, closed captions, DVB-Subtitles and DVB-Teletext. These functionalities are available not only for broadcast TV services, but for any device service supporting the related metadata.

Ideal for any Broadcast Application

Internet & Mobile: Muse seamlessly supports 3GPPv6, Apple HTTP Live Streaming/iOS, Microsoft Smooth Streaming/Silverlight and Adobe Flash for TV Everywhere applications.

Cable: Support for MPEG-2 SD/HD and 4:1 statmux, as well as multi-screen applications, offers outstanding versatility for MSOs.

DTH: Integrated VBR statistical rate control improves bandwidth efficiency by up to 50% compared to CBR.

IPTV: Efficient and high quality CBR and ABR encoding enables telcos to offer all of their video services, from HD to mobile, using a single platform.

OTT: Muse incorporates built-in interfaces to major CDN and CAS providers, enabling faster live OTT video deployments.

Ingest Once and Reach All Devices

By providing the full variety of outputs and formats from a single input source, Muse significantly improves efficiency and density compared to architectures that call for separate broadcast and multi-screen headends.

Muse supports enhanced functionalities for all screens by handling metadata including: subtitles, thumbnails, I-frame playlists, and logo insertions. Muse also enables advanced functions such as alternative audio languages per video stream, multi bitrates and encryption. The higher system density made possible by encoding once for multiple output formats reduces operating cost per channel.

Reliability/Redundancy

Muse is designed and built for top broadcast quality with 24x7 operations. The features include:

- Stream Source error stats (ETR 290)
- Continuous monitoring of encoding video quality
- When available, redundant Ethernet ports for all I/O and control interfaces with source outputs automatic failover mechanism
- Automatic N+M failover protection with Guru

Advanced Advertising, Branding & DRM

Muse supports a variety of advanced features on both traditional TV and mobile devices that enable operators to increase revenue and control content distribution:

- Image overlays for channel branding
- Ad insertion with SCTE 35 and EBIF triggers compliant with CableLabs ESAM specification
- Translation of SCTE 104 baseband video signals to SCTE 35 used in IP systems
- Content blackout for compliance with distribution right management
- Image insertion on input loss

Muse provides integrated encryption and support for a variety of conditional access systems (CAS) to protect assets. Supported technologies include Microsoft PlayReady DRM and AES encryption for Apple HLS encryption.

Envivio has partnered with several ad insertion systems and CDN services. For a complete list of supported systems in Muse, please contact us.

Superior Operations

Muse Live software is designed for linear workflows, while the Muse On-Demand software is for file-based workflows. Both solutions can be run on a single, integrated hardware platform and unified architecture, which unlocks important benefits:

- Streamlined compliance - test once and deliver to any screen
- Common and consistent quality of experience
- Reduced capital expenditures
- Simplified operations with unified management
- Software updates, upgrades and feature enhancements

Muse not only delivers consistency and superior quality; its flexible software architecture makes it possible to enhance the encoder throughout its life.

Support Future Requirements

Envivio's software-focused approach allows operators to seamlessly add support for new formats, profiles and devices as needed, without the need for new hardware. License-based features and updates can be installed easily, and the use of high-performance, IT-centric blades or appliances simplifies system management.

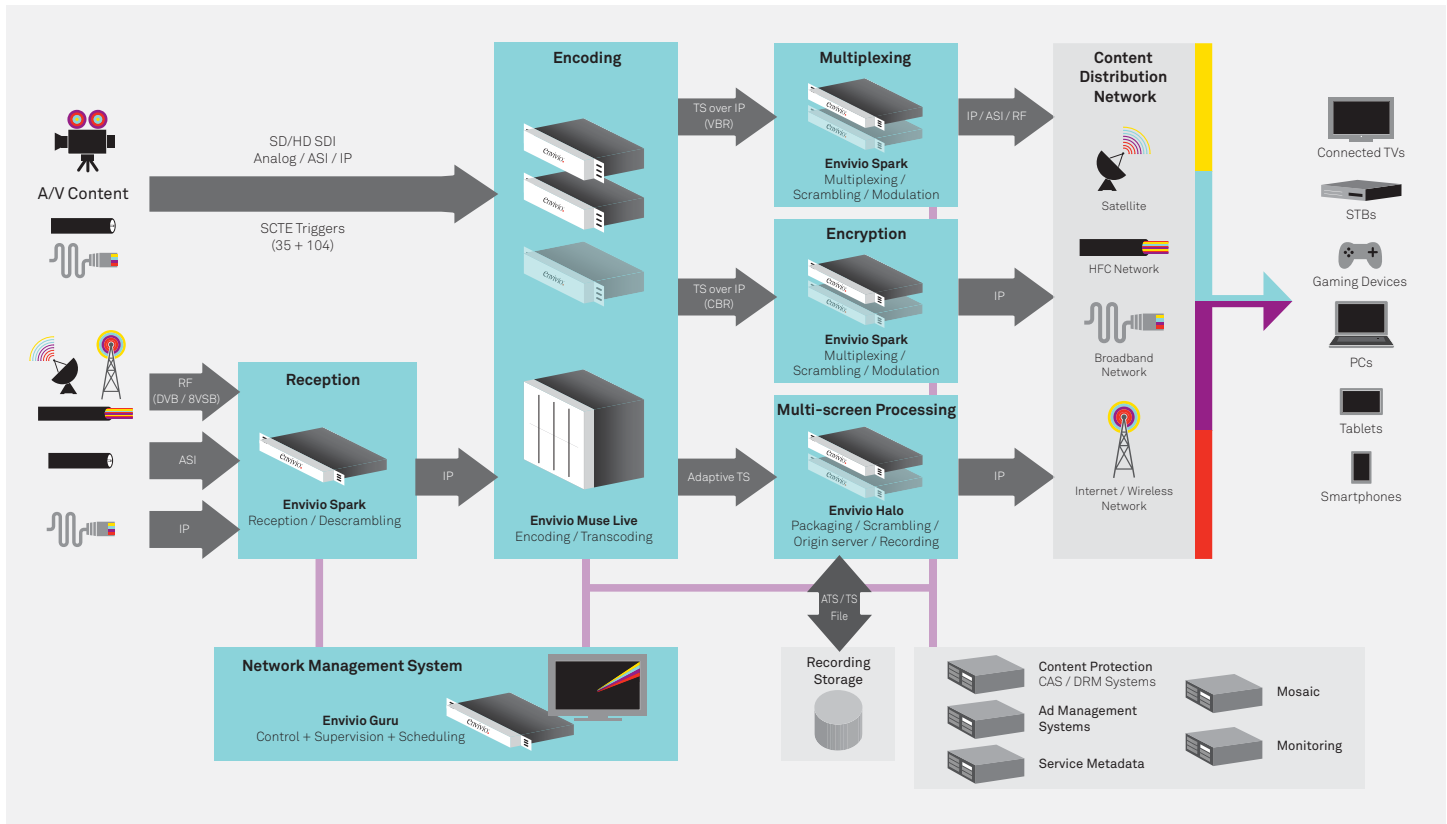# Envivio Muse Live · Any-screen Live Encoder/Transcoder

	Multi-screen	IPTV, Cable TV, DTH / DTT
Input [1]		
Baseband Input	Support for HD/SD-SDI or Analog input[1]	
Compressed Input	**Type:** ASI[1]; IP (IGMPv3-based Redundancy)	
	Protocol: MPEG-2 TS (MPTS & SPTS) over IP or ASI[1] input (check platform for compatibility)	
	Codec: MPEG-2, H.264 – MPEG-1 LII, Dolby Digital (AC-3), Dolby Digital Plus (E-AC3), AAC, HEAAC v1 and v2	
Pre-Processing		
Aspect Ratio	WSS, AFD, Video index	
Metadata and VBI	SCTE 104[2]; SCTE-35; IA 608/708 Closed Caption, DVB Teletext, DVB-VBI; SCTE 27[2]; VITC	
Image Settings	Brightness, Contrast, Saturation, Hue, Gamma; Temperature	
Enhancement Filters	**Video:** De-interlacing, Cropping, Letter boxing, Stretching, SD and HD Cross-scaling; 3:2 Pull down; MCTF[2], Deblocking filter[2], Denoising filter[2], Cross Talk filter[2] and Smart Sharpening[2]	
	Audio: Automatic loudness control (A/85), Audio gain adjustment, Mute	
Image Overlay	Scheduled image insertion; Image insertion on input loss; Logo insertion; Black-out management	
Video Encoding		
Video Codec	H.264 Extreme/Premium Baseline/Main/High profile, H.263 profile 0, MPEG-4 Part 2 Simple profile, VC 1 Simple/Main/Advanced	H.264 Extreme/Premium Baseline and Main profile ; MPEG-2 Main Profile
Rate Control	CBR/Capped VBR/Available bit rate	CBR/Capped VBR/Available bit rate/Statistical VBR
Data Rate	From 10 kbps to 10 Mbps[3]	From 128 kbps to 20 Mbps[3]
Resolutions	Progressive: from QCIF to 1080p, up to 60 fps Interlaced: 480i, 576i, 720i and 1080i	576i and 480i @ 25/29.97/30 fps; 1080i/p @ 25/29.97/30 fps; 720p @ 50/59.94/60 fps
Multistream Output	Common encoding and Adaptive Bit Rate (ABR)	PiP[2]: 96x96, 128x96, 192x192
Audio Encoding		
Audio Channels per Service	Up to 4 stereo pairs	Up to 8 stereo pairs
Audio Encoding	MPEG-4/MPEG-2 AAC, HE-AAC v1 and v2, AMR-NB, AMR-WB, Windows Media Audio/Audio Pro, Transcode to Dolby Digital Plus (DD+)	MPEG-4/MPEG-2 AAC, HE-AAC v1 and v2, MPEG 1 Layer II, Transcode to Dolby Digital (DD) and Dolby Digital Plus (DD+)
Pass-Through	MPEG 1 LII, AC-3, Dolby Digital Plus (E-AC3) 5.1-ch or stereo[4]	MPEG 1 LII, AC-3, Dolby Digital Plus (E-AC3) 5.1-ch or stereo[4]
Data Rate	From 4.75 kbps to 320 kbps (from 64 to 1024 kbps for DD+)	From 32 kbps to 384 kbps and (from 64 to 1024 kbps for DD and DD+)
Post Processing		
Metadata	Thumbnail generation for HLS and Adaptive TS output, Subtitle pass-through, Conversion and Burn-in	Subtitle pass-through, Conversion and Burn-in
	Subtitles pass-through and translation: EIA 608/708 Closed Caption, DVB Teletext, DVB Subtitiles, SCTE 27	**Subtitles:** EIA 608/708 Closed Caption, DVB Teletext, DVB Subtitles, SCTE 27
	Ad insertion: EBIF pass-through, SCTE 35 pass-through, insertion, validation using ESAM-based interface and conversion	**Ad insertion:** SCTE 35 pass-through
	VITC Timecode: available in all formats	**VITC Timecode:** Available in all formats
	Profile-based Blackout from ESAM out of band interface, External Scheduler or SCTE-35 event id-based	
	Nielsen: Watermark extraction for multi-screen devices	
Encryption[2]	**AES Encryption:** compliant with HLS, PlayReady, Windows Media DRM, Internal or external Key generation with Interface with major DRM and CAS vendors	–
Monitoring and Control		
Video Quality Monitoring[2]	MPEG-2 TS input stream monitoring; Output stream monitoring with user-defined qualify thresholds	
Control Interface	Up to 2 IP ports, monitoring and control ports (primary and spare)	
Control and System protocols	SOAP, HTTP, NTP, FTP, IGMP v2/v3, SNMP v2	
Scalability	Automated node redundancy with Envivio Guru NMS	
Output		
Output Type	Redundant IP outputs	Redundant IP outputs
Output Format	HLS, Smooth Streaming, Flash RTMP, 3GPPv6, ISMA, Adaptive TS (ALD, EBP, IDR or RAP-based signaling), TOT/TDT, SDT generation	DVB, ATSC TOT/TDT, SDT generation
Compatible Hardware Platforms		
Envivio Platform	Envivio 4Caster G4 (For additional feature information, refer to the 4Caster G4 datasheet) Envivio G5 1031 (For additional feature information, refer to the G5 datasheet) Envivio G5 2031 (For additional feature information, refer to the G5 datasheet)	
Software Edition	Guaranteed performance on HP BladeSystem and Cisco UCS blades[5]	

(1) Check platform datasheet for availability (2) Option (3) Depends on codec and resolution (4) TS outputs only (5) For more details, please contact Envivio

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Live Encoding and Processing

Envivio Muse Live is a key element of the Envivio multi-screen headend. This solution is fully integrated, supporting all screens simultaneously. The underlying Envivio G5 encoding/transcoding platform extends easily to distribute any combination of TV, mobile and broadband services, ingesting a large number of channels from any sources and encoding/transcoding them for live, near-live and on-demand delivery. The Envivio Guru system eliminates traditional silo views and management of services, replacing it with a single holistic view of the entire service.

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TV without boundaries.