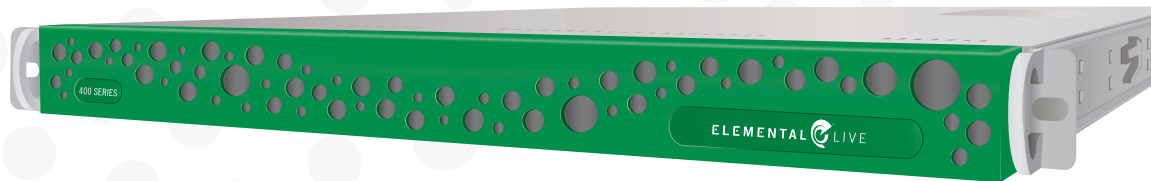# ELEMENTAL LIVE

VIDEO PROCESSING SYSTEM FOR LIVE STREAMING

Elemental® Live is a video processing system that provides real-time video and audio encoding for linear pay TV broadcast as well as live streaming to new media platforms. The system combines the benefits of massively parallel hardware with the flexibility and forward compatibility of upgradable software, reducing total cost of ownership for video compression. With unprecedented density, Elemental Live performs simultaneous processing and encoding of multiple adaptive bitrate outputs, delivering the high-quality, high-efficiency performance required for streaming live video to any device. Elemental Live is designed to integrate seamlessly into an end-to-end real-time workflow, eliminating configuration complexity and optimizing multiscreen video delivery.

EXPERIENCE THE BENEFITS

High Efficiency
Deliver content via Apple HLS, Adobe Primetime (HDS and RTMP), Microsoft Smooth Streaming, MPEG-DASH or IP transport streams. Alternatively, create mezzanine deliverables for wrapping with a separate packager such as Elemental Stream. Simultaneously encode up to 12 1080p streams, 24 720p streams or a range of adaptive outputs in a single appliance.
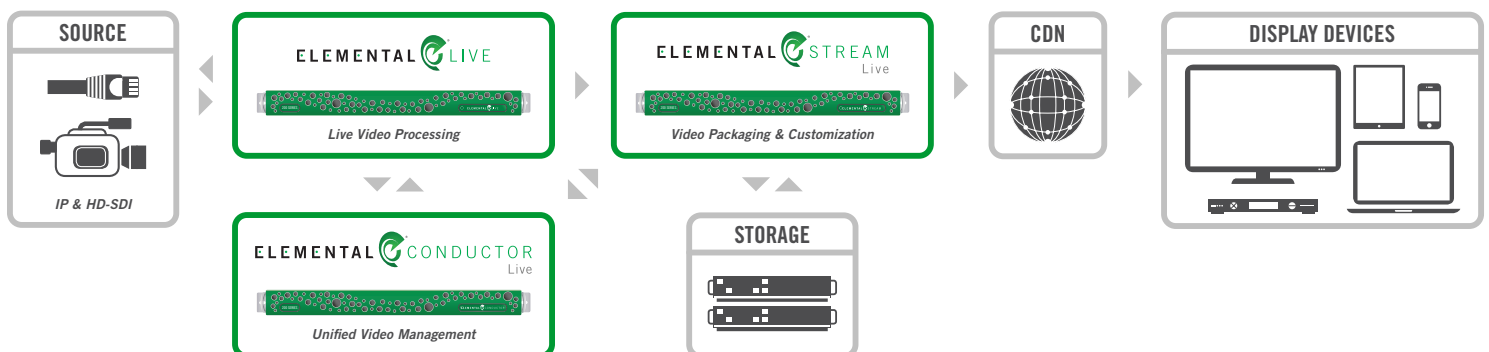
Ease of Management
Control the Linux-based system through an intuitive web interface or REST / XML APIs for quick and simple integration into existing workflows. Unified control and management with Elemental Conductor reduces setup time, simplifies maintenance tasks and allows for centralized upgrades of multiple deployments.

Future Ready
Address today's multiscreen challenges while laying the foundation for future video delivery requirements. Create room to grow with highly upgradable video infrastructure and take advantage of flexible software to adhere to regulations such as the CALM Act and rules for IP closed captioning while transitioning to new standards such as HEVC / H.265.

REAL-TIME WORKFLOW

SOURCE
IP & HD-SDI

ELEMENTAL LIVE
Live Video Processing

ELEMENTAL STREAM Live
Video Packaging & Customization

CDN

DISPLAY DEVICES

ELEMENTAL CONDUCTOR Live
Unified Video Management

STORAGE

WHY ELEMENTAL LIVE

High-Density Encoding
Patented technology maximizes the power of a massively parallel architecture to perform large-scale video processing. Realize a smaller hardware footprint, lower power consumption and reduce cooling requirements with high-density encoding.

Uncompromised Video Quality
Deliver the highest quality encoding using codecs developed by Elemental including HEVC / H.265, H.264, VC-1 and MPEG-2.

Produce Multiple Outputs
Simultaneously output a mix of streams at different resolutions and bitrates for multiple target platforms. Wrap streams in popular formats or retain content in a base container for downstream packaging.

Adaptive Bitrate Support
Stream live adaptive bitrate broadcasts via Adobe, Apple, Microsoft and MPEG-DASH protocols without the need for multiple units or signal splitting equipment, reducing both cost and complexity.

High Performance Processing
Advanced image processing functions, such as anti-alias scaling, MPEG-2 deblocking and motion adaptive deinterlacing, improve performance and deliver professional quality output.

Real-Time Controls
A web-based user interface offers real-time controls for linear video delivery coupled with catch-up TV features as well as live event ad insertion capabilities and one-click access to popular content delivery networks.

Real-Time Archiving
Start and stop control of archive streams enables instant creation of high-quality VOD files, saving editing cycles and lowering the cost of content delivery.

Monetize Multiscreen Video
Support for current and future ad insertion platforms, including Adobe Primetime, ESAM and HLS-based insertion methods, allows for targeted monetization.

Secure Valuable Content
Encrypt content using traditional AES and SAMPLE-AES for HLS, PlayReady for HLS and Smooth Streaming, Adobe Access for HDS and HLS or Adobe pHDS or pHLS. Alternatively, use content protection systems such as Widevine and NDS or Civolution forensic watermarking to meet requirements for pay TV operators and content owners.

Seamless Cloud Integration
Expand video processing as needed to flex with variable demand. Integration with Elemental® Cloud replicates the profiles, capabilities and formats used on premise so that video outputs are identical regardless of where they are processed.

MEDIA MULTIPLIED™

- Deliver video to any screen, at any time, all at once - with a single system
- Generate all the profiles needed for adaptive streaming from one appliance
- Use real-time controls for event management and archiving content
- Lower total cost of ownership with a reduced hardware footprint

Elemental's unified software architecture offers the ability to implement real-time video processing in on-premise, cloud-based or hybrid ground-cloud deployments.

SPECIFICATIONS

Video & Audio Inputs

Video Codecs:
- Apple ProRes 422 (up to HQ)
- AVC / H.264 (Baseline, Main, High)
- HEVC / H.265
- MPEG-2 (4:2:0, 4:2:2)
- VC-1 (Simple, Main Advanced)

Audio:
- AAC
- AC-3 (Dolby Digital)
- Dolby-E
- E-AC-3 (Dolby Digital Plus)
- MPEG-1 Layer 2
- MP3
- PCM (AIFF or WAV)
- WMA

Video & Audio Outputs

Video:
- Apple ProRes 422 (up to HQ)
- AVC / H.264 (Baseline, Main, High)
- HEVC / H.265
- MPEG-2 (4:2:0, 4:2:2)
- VC-1 (Simple, Main Advanced)
- Frame Capture to JPEG (Thumbnails)

Audio:
- AAC-LC / AAC-HEV1 / AAC-HEV2
- AC-3 (Dolby Digital), AC-3 Passthrough
- Dolby-E Passthrough
- DTS Express
- E-AC-3 (Dolby Digital Plus), E-AC-3 Passthrough
- PCM (AIFF or WAV)
- WMA2

Video Processing
- Adaptive Quantization
- AFD-Driven Output Scaling
- Anti-Aliasing Scaler
- Deblocking Filter
- Frame Rate Interpolation
- Inverse Telecine Support
- Lanczos Scaling
- Logo Insertion
- Look Ahead Rate Control
- Motion Adaptive Deinterlacing
- MPEG-2 Error Concealment
- Noise Reduction
- Scene Change Detection

Input Stream Formats & Containers
- ASI
- Elementary Streams
- GXF
- IP: UDP / RTP / HLS / RTMP (MPEG-TS)
- MXF Op-1A
- QuickTime Self-Contained (.mov)
- SD, HD, 3G SDI with Upstream Router Control
- Transport Stream File (.ts, .m2t)

Other:
- 4K Ultra HD via IP
- CEA-608/708 Closed Captions
- OP-42 Subtitles
- Standard & User-Defined Frame Rates
- Standard & User-Defined Frame Geometry

Output Stream Formats & Containers
- 3GP (3GPP)
- Apple HLS
- Adobe Media Server (RTMP / F4F / F4V)
- Adobe HDS
- CableLabs Compliant Option (MPEG-TS)
- Elementary Streams
- Microsoft Smooth Streaming (ISMV)
- Microsoft Windows Media (WMV / ASF)
- MP4
- MPEG Transport Streams (.ts, .m2t)
- MPEG-DASH (MP4 and ISO)
- QuickTime Self-Contained (.mov)
- Save as File to Local or Network Storage
- TCP / IP
- UDP Unicast or Multicast
- Ultraviolet (CFF, UVU)

Other Features
- Ad Avail Blanking & Black-Out Capability
- Audio Channel Mixing
- Audio Loudness Management (CALM Compliant)
- Burned-In Timecode
- Caption Extraction and Passthrough
- Comprehensive Encryption / DRM Support
- Forensic Watermarking
- Integrated CDN Support
- Mutliple Audio Tracks (Languages, Surround, SAP)
- Nielsen ID3 Support
- Open Caption Support
- SCTE-35 and SCTE-104 Support
- Support for Auxiliary Data (EBIF / KLV / V-Chip / CGMS-A)

System Control
- Web-Based User Interface
- Elemental Conductor Live
- SNMP (Control and Status)
- REST XML API
- System Resource & Statistics Monitoring
- Notifications and Alerts
- Automated Load Balancing
- Event Prioritization and Planning
- Multiple Authentication Tiers
- Video and Audio Preview

System Hardware / Software
- Linux CentOS
- 4-16 CPU cores
- 500 GB RAID-1 Local Storage
- Up to 8 HD-SDI Inputs
- Up to 4 High Performance GPUs
- Up to 16 GB Main Memory
- Up to 6 Gigabit Ethernet ports
- 3 ASI Inputs (Option)
- Fibre Channel Interface (Option)
- Hot-Swappable Power Supplies (Option)

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