Lumen® Media Transformation

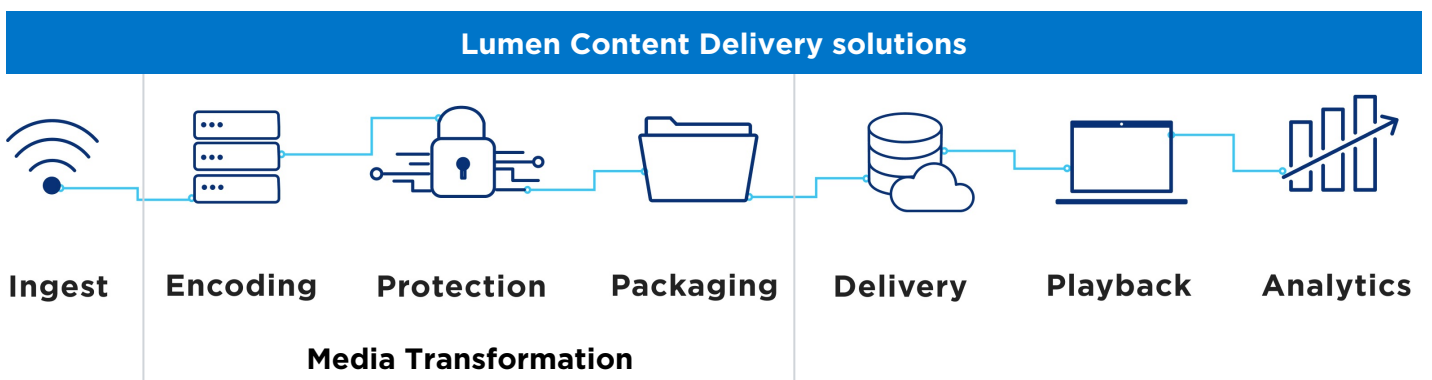## Media processing, transformation and enrichment for broadcast-grade quality

Over-the-top (OTT) media streaming is increasingly becoming the right solution to deliver content to viewing and listening audiences. However, matching the "broadcast experience" when leveraging streaming delivery remains a struggle.

Challenges such as latency, picture quality, delivering to multiple devices, and delivering across a wide geography to audiences inside and outside of the home continue to persist for service providers already in the streaming world or new to the market.

Lumen provides the end-to-end solution set for the ingest, transformation, processing, storage and delivery of video content for OTT consumption.

Lumen Media Transformation provides high performance cloud encoding, protection, advertising and enrichment services in a flexible solution, thereby addressing the need to provide high-end user experience and profitable revenue streams while also streamlining operational costs.

With Media Transformation, Lumen empowers media operators to deliver unique and immersive video experiences across devices.

Lumen Content Delivery solutions

Ingest | Encoding | Protection | Packaging | Delivery | Playback | Analytics

Media Transformation

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Key benefits

High quality video

Leverage cutting-edge technology for high-definition video and performance across multiple codecs (MPEG-2, H.264 & HEVC).

Faster time to market

Flexible provisioning means that services can be turned on and off as needed. A simple interface reduces the learning curve.

End-to-end managed solution

Combine media processing with the Vyvx suite of contribution solutions and the Lumen CDN for end-to-end customer distribution.

Reduced total cost of ownership

Cut infrastructure costs by reducing reliance on local equipment in favor of the cloud across the globe. Microservice architecture maintains a low technology footprint.

Designed to deliver exceptional user experience while streamlining cost

Media Transformation is designed to offer viewers a rich user experience across all devices, while optimizing bandwidth usage to minimize cost.

- Excellent picture quality across codecs and resolution up to UHD

- Rich subtitle management including ingest of DVB subtitles, teletext and closed caption and their translations for each format.

- Wide player and device support for all major segment and manifest formats (HLS, SS, DASH, CMAF).

- Shared CMAF segments and Common Encryption of HLS and DASH designed to reduce DVR storage and CDN caching.

- Constant Video Quality (CVQ) technology minimizes bandwidth and storage usage without impacting video quality.

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Technical specifications

Input

Compressed Input	Type: Dual source redundancy (active /active & active / passive modes), Pro-MPEG FEC support, Secure reliable Transport (SRT) Monitoring: ETR 290, Packet loss statistics Protocols: MPEG-2 TS (MPTS & SPTS), RTMP Codec: MPEG-2, H.264, HEVC – MPEG-1 LII, Dolby Digital (AC-3), Dolby Digital Plus (E-AC3), AAC, HEAAC v1 and v2, Dolby E Data rate: SD/HD up to 50 Mbps, UHD up to 80 Mbps

Pre-processing

Aspect Ratio	WSS, AFD, Video index
Metadata	SCTE 104, SCTE-35, IA 608/708 Closed Caption, SCTE-20, DVB Teletext, DVB-VBI, SCTE-27, OP47, SMPTE 2031, 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(1), Deblocking filter(1), Spatial Denoising filter(1), Cross Talk filter(1) , Sharpening(1), Diamond filter(1) Audio: Automatic loudness control (A/85), audio gain adjustment, mute
Image Overlays	Image insertion on input loss

Video encoding

Video Codec	HEVC Main 10, HEVC Main Profile, H.264 Baseline/Main/High profile, MPEG-2 HDR: HDR10, HLG10, PQ10. Dolby Vision 8.1 pass-through
Rate Control	CBR, VBR, Constant Video Quality
Data Rate	From 10 kbps to 30 Mbps
Resolutions	Progressive: From QCIF to 4K, up to 60 fps
Multi-Stream	Shared encoding for ABR outputs
Templates	Channel templates creation and management Default profiles templates for SD, HD & UHD services

Audio encoding

Audio channels	Up to 8 stereo pairs
Audio encoding	MPEG-4 / MPEG-2 AAC, HE-AAC v1 and v2, AMR-NB, AMR-WB, Windows Media
Pass-through	MPEG 1 LII, AC-3, Dolby Digital Plus (E-AC3) 5.1-ch or stereo, Dolby E
Data rate	From 4.75 kbps to 320 kbps (from 64 to 1024 kbps for DD+)

Metadata

Subtitle pass-through and translation	EIA 608/708 closed caption SCTE-20, DVB teletext DVB subtitles SCTE-27
Ad insertion	EBIF / EISS / AITSCTE-35 pass-through
Nielsen	Watermark extraction for multi-screen devices

Output processing

Formatting	Apple HTTP Live Streaming (Over CMAF or TS), Microsoft Smooth Streaming, DASH Common CMAF segment delivery for HLS and DASH, low latency chunking support for DASH (near-term roadmap)
Subtitling	Closed Captions: WebVTT for HLS, DFXP for HSS, WebVTT or SMPTE-TT for DASH DVB-Teletext page 888: WebVTT for HLS, DFXP for HSS, WebVTT or SMPTE-TT for DASH DVB-Subtitles: DFXP for HSS, SMPTE-TT for DASH
Multi-Audio	Multiple audio streams per output for HLS, Smooth Streaming and DASH
Content Protection	Microsoft PlayReady DRM support for HLS / TS, Smooth Streaming and DASH Apple Segment for HLS / TS FairPlay support for HLS / TS and HLS/CMAF Adobe Primetime Access support HLS / TS Widevine, PlayReady and Marlin support in CTR mode for DASH Widevine and PlayReady support in CBC mode for DASH Key provisioning interface to leading CAS & DRM vendors

Monitoring & control

Control interface	Access through API & GUI is provided by Lumen
Control and system protocols	REST, HTTP, NTP
High availability	High availability managed by Lumen based on agreed uptime
Content replacement	SCTE-35 in-band/ ESAM out-of-band Triggers: time signal, splice-out / splice-in, alternate command, or manually triggered from GUI