

Introduction

Transcode Multiscreen includes transcoding software specifically designed for adaptive bit rate encoding using both GPUs and CPUs. It simultaneously produces multiple bit-rate variants of H.264 video and containers for deployment to HTTP adaptive streaming players from Adobe, Apple, Microsoft, and players compatible with MPEG DASH.

This document outlines the tested operating specifications for this product.

Input Format Support

All of the following container and essence combinations have been tested as Multiscreen Inputs, with preservation of video, audio and closed captions (where applicable) to the output format.

Video Input

Container Type	DV ¹	IMX	MPEG2 ¹	ProRes	DNxHD	AVCI	J2K	H.264	HEVC	Y4M
TIFO	•	•		•	•				•	
AVI	•									
LXF			•							
MOV	•	•		•	•			•	•	
MP4								•	•	
GXF	•	•	•			•				
MPEG2 PS			•							
MPEG2 TS			•					•	•	
MXF OP-1a	•	•	•		•	•	•			
MXF AS02 ²	•	•	•			•	•			
Y4M										•

Audio Input

Container Type	PCM	MPEG	302M	331M	AAC	AC3 ³	DolbyE
TIFO	•						•
AC3						•	
AVI	•						
LXF	•						
MOV	•				•		•
MP4	•				•		•
GXF	•						•
MPEG2 PS		•					
MPEG2 TS	•	•	•		•		•
MXF OP-1a	•			•			•
MXF AS02 ²	•						•
WAVE	•						•

¹ DV includes DV25, DVCPro25, DV50/DVCPro50, and DVCProHD. MPEG2 includes long GOP and I-Frame only

² Files produced by Omneon Media Subsystem (6.1) and Amberfin ICR (7.8) were tested

³ AC3 includes Dolby Digital and Dolby Digital Plus (E-AC3)

Flip Input

The Flip Input allows Transcode Multiscreen to take advantage of the expanded file format support available in Transcode Pro. The following additional formats have been validated using the Flip input:

- Avid Mediastream
- Omneon MXF (self-contained)
- Omneon MOV (self-contained, reference)
- Seachange MPEG-2
- Windows Media WMV

Please refer to the Transcode / Transcode Pro Format Sheet for supported video and audio codecs for each format.

Pass-through Support

The following video and audio essences can be passed directly from Input to Output, without requiring a Transcode:

- H.264 video
- AAC audio
- AC3 audio

Caption Support

Transcode Multiscreen inserts CEA-708 closed captions into all H.264 encoded streams in compliance with ATSC A/72.

Caption extraction and preservation has been validated from the following input sources:

- Apple ProRes – Embedded VANC (SMPTE 291M)
- Avid DNxHD – Embedded VANC
- GXF – VANC
- H.264 – ATSC A/72
- MPEG-2 – User Data
- QuickTime MOV – caption track ('c608' or 'c708')
- TIFO – VANC

Output Format Support

All of the following output formats have been tested and validated with third party tools:

Output Format	YUV	H.264	PCM	AAC	AC3 ¹	HEVC
Adobe HTTP Dynamic Streaming (HDS)		•		•		
Apple HTTP Live Streaming (HLS)		•		•		•
Microsoft HTTP Smooth Streaming (HSS)		•		•		
MPEG Dynamic Adaptive Streaming over HTTP (DASH)		•		•		
ISO Base Media File Format (MP4)	•	•	•	•	•	•
QuickTime (MOV)	•	•	•	•		•
Elementary Video		•				•
Matroska (MKV)		•		•		•
MPEG-2 Transport Stream (Simple)		•		•		

CDN Delivery and Playback

For each of the supported output formats, delivery and playback have been validated on the following:

Akamai (FTP delivery; HLS playback tested)

HTTP servers (file copy, FTP; HLS, HDS, Smooth Streaming, MP4 tested)

Playback has been validated using the following devices and player technologies:

Apple iPhone 4 (HLS)

Apple iPhone 4s (HLS)

Apple iPad 2 (HLS)

Apple iPad 3rd Generation (HLS)

Flash Player 11.9 for Mac (HDS)

Flash Player 11.9 for Windows (HDS)

Silverlight Player 5 for Windows (Microsoft)

Silverlight Player 5 for Mac (Microsoft)

¹ AC3 includes Dolby Digital and Dolby Digital Plus (E-AC3)

Audio Program Support

AAC Programs

The following channel configurations have been verified using the AAC encoder:

Program	Channel Order								Notes
1.0	C1								Will mix L/R if no C is available on input
2.0	L	R							Will duplicate C if no L/R is available on input
3.0	C	L	R						
3/1	C	L	R	BC					BC: Mix of BL and BR input channels
3/2	C	L	R	BL	BR				
5.1	C	L	R	BL	BR	LFE			
7.1	C	L	R	SL	SR	BL	BR	LFE	

AC-3 Programs

The following channel configurations have been verified using the AC-3 encoder:

Program	Channel Order								Notes
1+1	C1	C2							
1.0	C1								Will mix L/R if no C is available on input
2.0	L	R							Will duplicate C if no L/R is available on input
3.0	L	C	R						
2/1	L	R	BC						BC: Mix of BL and BR input channels
3/1	L	C	R	BC					BC: Mix of BL and BR input channels
2/2	L	R	BL	BR					
4.1	L	R	BL	BR	LFE				
5.0	L	C	R	BL	BR				
5.1	L	C	R	BL	BR	LFE			

Dolby E Programs

The following channel configurations have been verified using the Dolby E decoding filter:

Program	Channel Order							
5.1 + 2.0	L	C	BL	L4	R	LFE	BR	R4
4 x 2.0	L1	L2	L3	L4	R1	R2	R3	R4
5.1	L	C	BL	R	LFE	BR		
7.1	L	C	BL	SL	R	LFE	BR	SR

Encryption

Content protection (encryption) and playback (decryption) have been verified using the following device, player and Digital Rights Management (DRM) technologies:

- Adobe Flash Player 11.2 with Adobe Flash Access (HDS)
- Apple iPhone and iPad (HLS)
- Microsoft Silverlight 5 with Microsoft PlayReady (HSS)

High Volume Transcoding

Two Multiscreen Servers (Transcode Multiscreen running on Lightspeed Server) in an Array successfully performed 100,000 transcode jobs with 100% up-time.

Notes: Performed by Transcode Multiscreen on two Lightspeed Servers with SQL Standard. Each job included a 5-second transcode to 3Mb MP4 from an MOV ProRes source; jobs were set to expire after one hour to avoid excessive database growth.

One Multiscreen Server successfully performed non-stop transcoding of 3-hour input files for one week. Each input file was converted to 10 independent output video streams and 14 output packages (150 hours of output video per input). Outputs were randomly checked for lip sync and video/audio quality.

Notes: Performed on one Multiscreen Server with SQL Standard as the primary database. Each job included converting a 3-hour MOV ProRes source, creating 10 independent output streams (1080p24 3Mb, 2Mb, 1Mb; 720p24 2Mb, 1Mb, 480p 2Mb, 1Mb, 240p 1Mb, 700Kb, 400Kb) and packaging into the following containers (one MP4 for each stream, HLS, HSS, Dash, HDS including all above streams)

Large-Scale Deployments and Load Balancing

Vantage Array has been tested on a 20-node cluster, with full utilization of all servers and 100% up-time, using Vantage Transcode products.

Routing of Lightspeed server jobs to the Lightspeed servers has been tested and confirmed.