Stan. Specifications

Mezzanine Encoding, Associated Content & Delivery Specification

MEZZANINE 2.7

Introduction

This document specifies the format of mezzanine content files being provided to Stan Entertainment with the intention that they are used as the base to generate renditions that will be delivered to customers.

This specification requires that all titles are delivered in the frame rate and aspect ratio as it was originally shot.

The requirements in this specification are in place to ensure that original artistic intent is maintained.

All files that are to be delivered as source materials must be compliant with the specifications as defined in this document unless otherwise agreed in writing.

Contents

Media Encoding

This section specifies the requirements of the video and audio files being delivered to Stan.

1. Preparation

- The title must contain no more than one (1) second of black video with audio silence appended to the start and end (leader and trailer).

- Any closed captioning (non-embedded), time-sensitive metadata or alternative audio tracks must take into account the actual program to accommodate the start and end of video indicators based on the appended video.

- Mixed mode content must be conformed to a single progressive mode. The audio mode used in the leader and trailer must be the same as the content that follows it.

- If the audio tracks are not in English, English language subtitles must be burnt-in to the primary video track

- Up-resing of content is prohibited e.g. Standard Definition sources cannot be used to create High Definition deliverables.

- The title must not contain any of the following:
  - Production slates
  - Bars and Tones
  - Advertisements
  - Commercials
  - Commercial Blacks
  - Web-Callouts
  - Horizontal or Vertical Blanking lines
  - Overlay Branding
  - VITC (Vertical Interval TimeCode)
  - Classification Cards
  - Pillar, Letter or Window boxing

- The title must be:
  - Delivered in its original aspect ratio.
  - Delivered in its original frame rate.
  - Delivered as a single file, e.g. if the title is 90 minutes in duration it must be delivered as a single file with a duration of 90 minutes, not two (2) files with 45-minute durations.
  - Texted, in English.
  - Uncensored.

2. Ultra-High Definition

All titles should be delivered in Ultra-High Definition.

If the title is available in High Dynamic Range (HDR), a High Dynamic Range (HDR) and Standard Dynamic Range (SDR) version of the title must be delivered.

If the title is available in Dolby Vision, the video material is to be natively graded for HDR10 with Dolby Vision metadata supplied for generating Dolby Vision renderings.

Resolution	Native 4K 4096x2160 or UHD 3840x2160
Pixel Aspect Ratio (PAR)	1:1
Timecode Start	00:00:00:00
Frame Rate	23.976 or 24 or 25 or 29.97 or 30 or 50 or 59.94 or 60
Scan Type	Progressive

2.1. JPEG2000

2.1.1. Video

Image Track File					
Container	MXF Operational Pattern 1(a)				
Image Essence	JPEG2000				

Level	Frame rates up to 30 fps:
	  • IMF Main level 6
	
	Frame rates above 30 fps:
	  • IMF Main level 7				

Bitrate (Peak)	IMF Main level 6 (Sublevel 3):
	  • 800 Mbit/s
	
	IMF Main level 7 (Sublevel 4):
	  • 1,600 Mbit/s				

Dynamic Range	**Standard (SDR)**		**High (HDR10)**		**High (Dolby Vision)**
Component Sampling	4:2:0 or 4:2:2	4:4:4	4:2:2	4:4:4	4:4:4
Component Format	YUV	RGB	YUV	RGB	RGB
Bit Depth	8 or 10 bit		10 bit or 12 bit		12 bit
Colourimetry	BT.709		BT.2020		BT.2020
Transfer Function	ITU-R BT.1886		SMPTE ST-2084 (PQ)		SMPTE ST-2084 (PQ)
Dolby Vision Metadata	n/a		n/a		Embedded or sidecar, DolbyLabsMDF format v2 or v4
Mastering Display Colour Volume Metadata	n/a		SMPTE ST-2086 including MaxFALL and MaxCLL		SMPTE ST-2086
Metadata for Colour Volume Transformation	n/a		SMPTE ST-2094		SMPTE ST-2094

2.1.2. Audio

Audio tracks must be conformed to the primary video asset delivered.

Audio tracks must be delivered in the original production language. If the original production language was not English, an alternative audio file in English should also be provided.

Channel layout information must be included for each track & channel.

Language information must be included for each track & channel.

Audio Track File (Dolby Atmos)	
Container	BWAV ADM
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak To achieve this, we recommend setting True Peak limiters on all beds and objects at -2.3 or lower. Loudness and peaks may be measured via a 5.1 rerender.
Track Limit	Must not exceed 128 individual audio tracks
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround 7. Left Rear Surround 8. Right Rear Surround 9. Left Top Overhead 10. Right Top Overhead

Audio Track File (8 Channels / 5.1 Surround + Stereo)	
Container	MXF
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl

Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround 7. Downmix Left 8. Downmix Right

Audio Track File (6 Channels / 5.1 Surround)	
Container	MXF
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround

Audio Track File (2 Channels / Stereo)	
Container	MXF
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Stereo Left 2. Stereo Right

2.2. Apple ProRes

All titles delivered in Dolby Vision must be delivered in accordance with the JPEG2000 delivery specification outlined in this document.

Delivery of Dolby Vision titles as Apple ProRes is not supported.

2.2.1. Container

Container	
Container	MOV

2.2.2. Video

Image Track				
Codec	Sources with 4:2:2 component sampling • ProRes 422 (HQ) Sources with 4:4:4 component sampling • ProRes 4444 • ProRes 4444 XQ			
Bit Rate	ProRes 4444 XQ up to 30 fps: • 1,989 Mbit/s ProRes 4444 XQ above 30 fps: • 3,977 Mbit/s ProRes 4444 up to 30 fps: • 1,326 Mbit/s ProRes 4444 above 30 fps: • 2,652 Mbit/s ProRes 422 (HQ) up to 30 fps: • 884 Mbit/s ProRes 422 (HQ) above 30 fps: • 1,768 Mbit/s			
Dynamic Range	**Standard (SDR)**		**High (HDR10)**	
Component Sampling	4:2:0 or 4:2:2	4:4:4	4:2:0 or 4:2:2	4:4:4
Component Format	YUV	RGB	YUV	RGB
Bit Depth	8 or 10 bit		10 bit or 12 bit	
Colourimetry	BT.709		BT.2020	
Transfer Function	ITU-R BT.1886		SMPTE ST-2084 (PQ)	
Mastering Display Colour Volume Metadata	n/a		SMPTE ST-2086 including MaxFALL and MaxCLL	

Metadata for Colour Volume Transformation	n/a	n/a

2.2.3. Audio

Audio tracks must be conformed to the primary video asset delivered.

Audio tracks must be delivered in the original production language. If the original production language was not English, an alternative audio file in English should also be provided.

Audio tracks must be included in the same container as the primary image track.

Channel layout information must be included for each track & channel.

Language information must be included for each track & channel.

Audio Track (8 Channels / 5.1 Surround + Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround 7. Downmix Left 8. Downmix Right

Audio Track (6 Channels / 5.1 Surround Only)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak

Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround

Audio Track (2 Channels / Stereo Only)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Stereo Left 2. Stereo Right

2.3. High Definition

Resolution	1920x1080 or 1280x720
Pixel Aspect Ratio (PAR)	1:1
Timecode Start	00:00:00:00
Frame Rate	23.976 or 24 or 25 or 29.97 or 30 or 50 or 59.94 or 60
Scan Type	Progressive

2.4. Apple ProRes

2.4.1. Container

Container	
Container	MOV

2.4.2. Video

Image Track				
Codec	Sources with 4:2:2 component sampling • ProRes 422 (HQ) Sources with 4:4:4 component sampling • ProRes 4444			
Bit Rate	Sources with frame rates of 23.976 or 24 fps: • 176 Mbit/s Sources with frame rates of 25 fps: • 184 Mbit/s Sources with frame rates above 25 fps: • 220 Mbit/s			
Dynamic Range	**Standard (SDR)**		**High (HDR10)**	
Component Sampling	4:2:2	4:4:4	4:2:2	4:4:4
Component Format	YUV	RGB	YUV	RGB
Bit Depth	10 bit		10 bit or 12 bit	
Colourimetry	BT.709		P3 D65 or BT.2020	
Transfer Function	ITU-R BT.1886		SMPTE ST-2084 (PQ)	
Mastering Display Colour Volume Metadata	n/a		SMPTE ST-2086 including MaxFALL and MaxCLL	

2.4.3. Audio

Audio tracks must be conformed to the primary video asset delivered.

Audio tracks must be delivered in the original production language. If the original production language was not English, an alternative audio file in English should also be provided.

Audio tracks must be included in the same container as the primary image track.

Channel layout information must be included for each track & channel.

Language information must be included for each track & channel.

Audio Tracks (8 Channels / 5.1 Surround + Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround 7. Downmix Left 8. Downmix Right

Audio Tracks (6 Channels / 5.1 Surround Only)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround

Audio Tracks (2 Channels / Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Stereo Left 2. Stereo Right

2.5. HEVC (H.265)

2.5.1. Container

Container	
Container	MOV or MP4 or MXF

2.5.2. Video

Image Track				
Codec	HEVC			
Profile	4:4:4 source files: • Main 444 10 4:2:2 source: • Main 422 10			
Level	5.1 or 5.2			
Bit Rate (Minimum)	4:4:4 source files with frame rate up to 30 fps: • 30 Mbit/s 4:4:4 source files with frame rate above 30 fps: • 60 Mbit/s 4:2:2 source files with frame rate up to 30 fps: • 50 Mbit/s 4:2:2 source files with frame rate above 30 fps: • 100 Mbit/s			
Bit Rate (Peak)	4:4:4 source files with frame rate up to 30 fps: • 70 Mbit/s 4:4:4 source files with frame rate above 30 fps: • 140 Mbit/s 4:2:2 source files with frame rate up to 30 fps: • 90 Mbit/s 4:2:2 source files with frame rate above 30 fps: • 180 Mbit/s			
Dynamic Range	**Standard (SDR)**		**High (HDR10)**	
Component Sampling	4:2:2	4:4:4	4:2:2	4:4:4
Component Format	YUV	RGB	YUV	RGB
Bit Depth	10 bit		10 bit or 12 bit	
Colourimetry	BT.709		P3 D65 or BT.2020	
Transfer Function	ITU-R BT.1886		SMPTE ST-2084 (PQ)	
Metadata	n/a		SMPTE ST-2086 including	

		MaxFALL and MaxCLL

2.5.3. Audio

Audio tracks must be conformed to the primary video asset delivered.

Audio tracks must be delivered in the original production language. If the original production language was not English, an alternative audio file in English should also be provided.

Audio tracks must be included in the same container as the primary image track.

Channel layout information must be included for each track & channel.

Language information must be included for each track & channel.

Audio Tracks (8 Channels / 5.1 Surround + Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround 7. Downmix Left 8. Downmix Right

Audio Tracks (6 Channels / 5.1 Surround Only)	
Codec	PCM
Bitrate	Highest Possible
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right

	3. Centre 4. LFE 5. Left Surround 6. Right Surround

Audio Tracks (2 Channels / Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Stereo Left 2. Stereo Right

2.6. AVC (H.264)

2.6.1. Container

Container	
Container	MOV or MP4 or MXF

2.6.2. Video

Image Track	
Video Codec	MPEG-4 Part 10
Profile	High
Level	Source files up to 1280x720 and up to 30 fps: • 4.1 Source files above 1280x720: • 5 Source files with frame rates above 30 fps: • 5
Bit Rate (Minimum)	4:2:2 source files with frame rates up to 30 fps: • 40 Mbit/s 4:2:2 source files with frame rates above 30 fps: • 80 Mbit/s 4:2:0 source files with frame rates up to 30 fps: • 30 Mbit/s 4:2:0 source files with frame rates above 30 fps: • 60 Mbit/s
Bit Rate (Peak)	4:2:2 source files with frame rates up to 30 fps: • 100 Mbit/s 4:2:2 source files with frame rates above 30 fps: • 200 Mbit/s 4:2:0 source files with frame rates up to 30 fps: • 80 Mbit/s 4:2:0 source files with frame rates above 30 fps: • 160 Mbit/s
GOP Structure	Intra (I-Frame Only), Closed GOP with per-frame sequence header
Dynamic Range	**Standard (SDR)**
Component Sampling	4:2:0 or 4:2:2
Component Format	YUV

Bit Depth	8 bit
Colourimetry	BT.709
Transfer Function	ITU-R BT.1886

2.6.3. Audio

Audio tracks must be conformed to the primary video asset delivered.

Audio tracks must be delivered in the original production language. If the original production language was not English, an alternative audio file in English should also be provided.

Audio tracks must be included in the same container as the primary image track.

Channel layout information must be included for each track & channel.

Language information must be included for each track & channel.

Audio Tracks (8 Channels / 5.1 Surround + Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround 7. Downmix Left 8. Downmix Right

Audio Tracks (6 Channels / 5.1 Surround Only)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak

Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround

Audio Tracks (2 Channels / Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Stereo Left 2. Stereo Right

2.7. MPEG-2

2.7.1. Container

Container	
Container	MXF or MPG

2.7.2. Video

Image Track	
Video Codec	MPEG-2
Profile	High
Level	Main or High
Bit Rate (Minimum)	35 Mbit/s
Bit Rate (Peak)	50 Mbit/s
GOP Structure	Intra (I-Frame Only), Closed GOP with per-frame sequence header
Dynamic Range	**Standard (SDR)**
Component Sampling	4:2:0 or 4:2:2
Component Format	YUV
Bit Depth	8 bit
Colourimetry	BT.709
Transfer Function	ITU-R BT.1886

2.7.3. Audio

Audio tracks must be conformed to the primary video asset delivered.

Audio tracks must be delivered in the original production language. If the original production language was not English, an alternative audio file in English should also be provided.

Audio tracks must be included in the same container as the primary image track.

Channel layout information must be included for each track & channel.

Language information must be included for each track & channel.

Audio Tracks (8 Channels / 5.1 Surround + Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz

Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left (Total) 2. Right (Total) 3. Left 4. Right 5. Centre 6. LFE 7. Left Surround 8. Right Surround

Audio Tracks (6 Channels / 5.1 Surround Only)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround

Audio Tracks (2 Channels / Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left (Total) 2. Right (Total)

3. Standard Definition

All titles must be delivered in their highest available resolution. If the title is not available in Ultra-High Definition or High Definition, written approval for Standard Definition delivery must be obtained from your account manager prior to delivery commencing.

Resolution	704x576 or 704x480
Aspect Ratio	16:9 or 4:3
Pixel Aspect Ratio (PAR)	16:9 Sources with a resolution of 704x576: • 16:11 4:3 Sources with a resolution of 704x576: • 12:11 16:9 Sources with a resolution of 704x480: • 40:33 4:3 Sources with a resolution of 704x480: • 10:11
Timecode Start	00:00:00:00
Frame Rate	Progressive: • 23.976 or 24 or 25 or 29.97 or 30 Interlaced: • 50 or 59.94 or 60
Scan Type	Progressive or Interlaced If interlaced material is delivered it must have the picture structure correctly set to interlaced and the field order must be correctly aligned (Top or Bottom Field First) matching the encoded content.

3.1. Apple ProRes

3.1.1. Container

Container	
Container	MOV

3.1.2. Video

Image Track	
Codec	ProRes 422 (HQ)
Bit Rate	Sources with frame rates of 23.976 or 24 fps: • 59 Mbit/s Sources with frame rates of 25 fps: • 61 Mbit/s

	Sources with frame rates above 25 fps: • 73 Mbit/s
Dynamic Range	**Standard (SDR)**
Component Sampling	4:2:2
Component Format	YUV
Bit Depth	10 bit
Colourimetry	BT.709
Transfer Function	ITU-R BT.1886

3.1.3. Audio

Audio tracks must be conformed to the primary video asset delivered.

Audio tracks must be delivered in the original production language. If the original production language was not English, an alternative audio file in English should also be provided.

Audio tracks must be included in the same container as the primary image track.

Channel layout information must be included for each track & channel.

Language information must be included for each track & channel.

Audio Tracks (8 Channels / 5.1 Surround + Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround 7. Downmix Left 8. Downmix Right

Audio Tracks (6 Channels / 5.1 Surround Only)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)

Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround

Audio Tracks (2 Channels / Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Stereo Left 2. Stereo Right

3.2. AVC (H.264)

3.2.1. Container

Container	
Container	MOV or MP4 or MXF

3.2.2. Video

Image Track	
Video Codec	MPEG-4 Part 10
Profile	High
Level	3.2 or above
Bit Rate (Minimum)	15 Mbit/s
Bit Rate (Peak)	35 Mbit/s
GOP Structure	Intra (I-Frame Only), Closed GOP with per-frame sequence header
Component Sampling	4:2:0 or 4:2:2
Component Format	YUV
Bit Depth	8 bit
Colourimetry	BT.709
Transfer Function	ITU-R BT.1886

3.2.3. Audio

Audio tracks must be conformed to the primary video asset delivered.

Audio tracks must be delivered in the original production language. If the original production language was not English, an alternative audio file in English should also be provided.

Audio tracks must be included in the same container as the primary image track.

Channel layout information must be included for each track & channel.

Language information must be included for each track & channel.

Audio Tracks (8 Channels / 5.1 Surround + Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit

Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround 7. Downmix Left 8. Downmix Right

Audio Tracks (6 Channels / 5.1 Surround Only)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround

Audio Tracks (2 Channels / Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Stereo Left 2. Stereo Right

3.3. MPEG-2

3.3.1. Container

Container	
Container	MXF or MPG

3.3.2. Video

Image Track	
Video Codec	MPEG-2
Profile	Main
Level	Main or High
Bit Rate (Minimum)	25 Mbit/s
Bit Rate (Peak)	35 Mbit/s
GOP Structure	Intra (I-Frame Only), Closed GOP with per-frame sequence header
Dynamic Range	**Standard (SDR)**
Component Sampling	4:2:0 or 4:2:2
Component Format	YUV
Bit Depth	8 bit
Colourimetry	BT.709
Transfer Function	ITU-R BT.1886

3.3.3. Audio

Audio tracks must be conformed to the primary video asset delivered.

Audio tracks must be delivered in the original production language. If the original production language was not English, an alternative audio file in English should also be provided.

Audio tracks must be included in the same container as the primary image track.

Channel layout information must be included for each track & channel.

Language information must be included for each track & channel.

Audio Tracks (8 Channels / 5.1 Surround + Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit

Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left (Total) 2. Right (Total) 3. Left 4. Right 5. Centre 6. LFE 7. Left Surround 8. Right Surround

Audio Tracks (6 Channels / 5.1 Surround Only)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround

Audio Tracks (2 Channels / Stereo)	
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left (Total) 2. Right (Total)

Associated Content

4. Closed Captions

If closed captions are not available, written approval for delivery must be obtained from your account manager prior to delivery commencing.

Closed Captions must be provided in English.

Closed Caption files must be conformed to the primary video asset delivered.

Closed Captions should be provided in all available languages.

Closed Caption files must not contain any advertisements, placards, branding or website link callouts.

Closed Captions must not be censored.

Closed Caption files must include positional data with the default placement being lower third.

Closed Caption Files	
File Format	SCC or DFXP or TTML or SAMI or WebVTT or SMPTE-TT or CAP
Timecode Start	00:00:00:00
Text Event Minimum Duration	0.5 seconds
Minimum Interval Between Text Events	200 milliseconds
Maximum Reading Speed	400 words per minute

5. Audio Description

Audio description tracks must be provided for all titles.

If audio description tracks are not available, written approval for delivery must be obtained from your account manager prior to delivery commencing.

Audio description tracks must be conformed to the primary video asset delivered.

Audio description tracks must be delivered in English.

Channel layout information must be included for each track & channel.

Language information must be included for each track & channel.

Audio Description File (8 Channels / 5.1 Surround + Stereo)	
Container	WAV or MOV
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Descriptive Audio Track	The descriptive dialogue mixed in to the centre channel. The full stereo mix including the descriptive dialogue mixed in to both the Downmix Left and Downmix Right channels
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround 7. Downmix Left 8. Downmix Right

Audio Description File (6 Channels / 5.1 Surround Only)	
Container	WAV or MOV
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl

Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Descriptive Audio Track	The descriptive dialogue mixed in to the centre channel
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround

Audio Description File (2 Channels / Stereo)	
Container	WAV or MOV
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Descriptive Audio Track	The full stereo mix including the descriptive dialogue mixed in to both the Left and Right channels
Channel Mapping	1. Stereo Left 2. Stereo Right

6. Alternate Audio as a Separate File

Alternative audio tracks include, but are not limited to, alternative language (i.e. other than the original production language) and commentary tracks.

If alternate audio tracks are available, they must be conformed to the primary video asset delivered.

Channel layout information must be included for each track & channel.

Language information must be included for each track & channel.

Alternative Audio File (8 Channels / 5.1 Surround + Stereo)	
Container	WAV or MOV
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE 5. Left Surround 6. Right Surround 7. Downmix Left 8. Downmix Right

Alternative Audio File (6 Channels / 5.1 Surround Only)	
Container	WAV or MOV
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Left 2. Right 3. Centre 4. LFE

	5. Left Surround 6. Right Surround

Alternative Audio File (2 Channels / Stereo)	
Container	WAV or MOV
Codec	Uncompressed Linear PCM
Bitrate	Highest Possible (CBR)
Sampling Rate	48 kHz
Bit Depth	24 bit or 16 bit
Reference Level	79db spl or 82db spl
Loudness	-24db LKFS +/- 2 LU using ITU-R BS.1770-3
True Peak Level	Must not exceed -2dbfs True Peak
Channel Mapping	1. Stereo Left 2. Stereo Right

Media Delivery

This section specifies the requirements for the delivery of audio and video files to Stan.

Stan automates the delivery of all files and has developed software and practices that support this.

7. File Restrictions

No individual file is to exceed one (1) Terabyte

8. Aspera

8.1. Connect

Is the recommended method of delivery.

Stan supports the use of Aspera PUSH and PULL.

8.2. Faspex

As an alternative to Aspera Connect, Aspera Faspex is also supported.

Stan supports the use of Aspera PULL only. PUSH is not supported.

It is highly recommended that Aspera Faspex 3.7+ is used. Stan must be notified if an older version of Faspex is in use.

9. SFTP

Stan supports the delivery of titles from partner hosted SFTP servers.

Due to the slower delivery speeds achieved by this transfer method files being transferred via SFTP should be delivered in AVC (H.264) or HEVC (H.265) format.

10. Hard Disk Drive

Hard Disk Drive (HDD) delivery is supported when Aspera or SFTP is unavailable.

10.1. Storage Device Requirements

The specification defined below is to be used as a guide only and may change without notice. Contact Stan prior to delivery to ensure that the device meets the latest specification.

Item	Requirement
Interface Type	- eSATA - USB 2.0 and 3.0 (including USB flash drives) 2.5 inch and 3.5 inch internal SATA hard drives
Device Capacity	Up to 16TB
Device Compatibility	Device must be compatible with Red Hat Linux

Change Log

MEZZANINE 2.7 (2020-08-25)
- Added statement prohibiting up-resing of content
- Expanded the allowed frame rates for Ultra-High Definition titles

MEZZANINE 2.6 (2020-01-23)
- Added maximum file size constraint

MEZZANINE 2.5 (2019-11-27)
- Added Component Format specification
- Added Dolby Vision Metadata delivery format
- Removed support for P3 colourimetry on Ultra High Definition titles
- Removed support for Apple ProRes when title is Dolby Vision

MEZZANINE 2.4 (2019-04-17)
- Included Change Log in published version
- Updated formatting of Media Encoding Preparation
- Added requirement for burnt-in subtitles on non-English language titles

MEZZANINE 2.3 (2019-04-03)
- Added Dolby Vision
- Added Dolby Atmos
- Added Reference, Loudness and True Peak Levels

MEZZANINE 2.2 (2019-02-22)
- Added requirement for audio tracks to be included in the same container as the primary image track

MEZZANINE 2.1 (2018-05-18)
- Added requirement for HDR10 metadata to be provided as a sidecar file

MEZZANINE 2.0 (2018-05-10)
- Updated document format

MEZZANINE 1.2 (2018-03-16)
- Minor formatting and grammar changes

MEZZANINE 1.1 (2017-12-20)
- Added the requirement to deliver SMPTE ST 2086, MaxFALL and MaxCLL metadata for HDR10 titles

MEZZANINE 1.0 (2017-03-13)
- Updated document format
- Updated introduction to make the intend of the requirements clearer
- Added Ultra High Definition requirements
- Added support for HDR10
- Added requirement for all titles to be delivered in their original frame rate
- Added requirement for all titles to be uncensored
- Added JPEG2000 support
- Updated supported frame rates
- Added containers
- Expanded Closed Caption requirements to include readability requirements
- Added tokenised delivery support for Faspex

MEZZANINE 0.7 (2015-02-26)
- Updated supported audio codecs
- Replaced StreamCo references with Stan

MEZZANINE 0.6 (2014-07-19)
- Removed DRAFT tag
- Added requirement for all titles to be delivered in their original aspect ratio
- Removed content metadata requirements

MEZZANINE 0.5 (2014-06-13)
- Added media delivery requirements

MEZZANINE 0.4 (2014-05-28)
- Updated supported aspect ratios

MEZZANINE 0.3 (2014-04-15)
- Added ProRes 422 (HQ) support

MEZZANINE 0.2 (2014-03-14)
- Added Associated Content requirements for Program Metadata and Closed Captions

MEZZANINE 0.1 (2014-03-10)
- Initial version