

PRESTO 4 U

**Digital AV Archiving Workflows;
Digitisation, Ingest, Preservation, Conversion & Delivery**
September 22- 23rd 2014

Joan Leese

VET Post Production and Training

VET Post Production and Training



- London based Post Production House
- Services for TV, independent film, artists and digital agencies
- Training for the industry:
national institutions, arts organisations, facility houses,
broadcasters, freelancers, production companies

Summary

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- An overview of the DPP file delivery specification
- The future of the DPP collaboration
- The library / archive challenges for TV and video production

The DPP specification
for file delivery of programmes to
UK broadcasters

Who are the DPP?



- Digital Production Partnership
- Formed in 2011
- UK's public service broadcasters
- Funded by ITV, BBC and Channel 4
- Channel Five, Sky, S4/C, UKTV, BT Sport are on working groups
- Also Independent production sector

Why the DPP?

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- To create common ground for digital delivery
- DPP promotes best practice through:
 - Forum meetings
 - Industry reports
 - Technical Standards
 - Guidance
 - Compliance programme

What channels will require DPP delivery?



UKTV Channels - TBA



Not just files!



- DPP also covers tape and live broadcasts in the transition period



Timescales



- 1st October 2014 - Target date. FD Day
- ITV and BT Sport all file delivery. Internal and external suppliers
- C4 and Channel 5 will be fully transitioned by 1st October
- BBC transitioning
- BSkyB – starting from 1st October and completing by October 2015
- Loudness requirements R128 already apply. Since 2013

What's in the DPP v4 Specification?

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- QC
- Access for people with disabilities
- File Delivery Format Requirements
- Video Technical Requirements
- Audio Technical Requirements
- Tape Delivery
- Live Delivery

Where to find the latest DPP spec?

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- www.digitalproductionpartnership.co.uk
 - Generic version
 - Version control sheets for generic and broadcaster specific

also

- Templates
- Guidance
- Forms and Standards
- Metadata Application

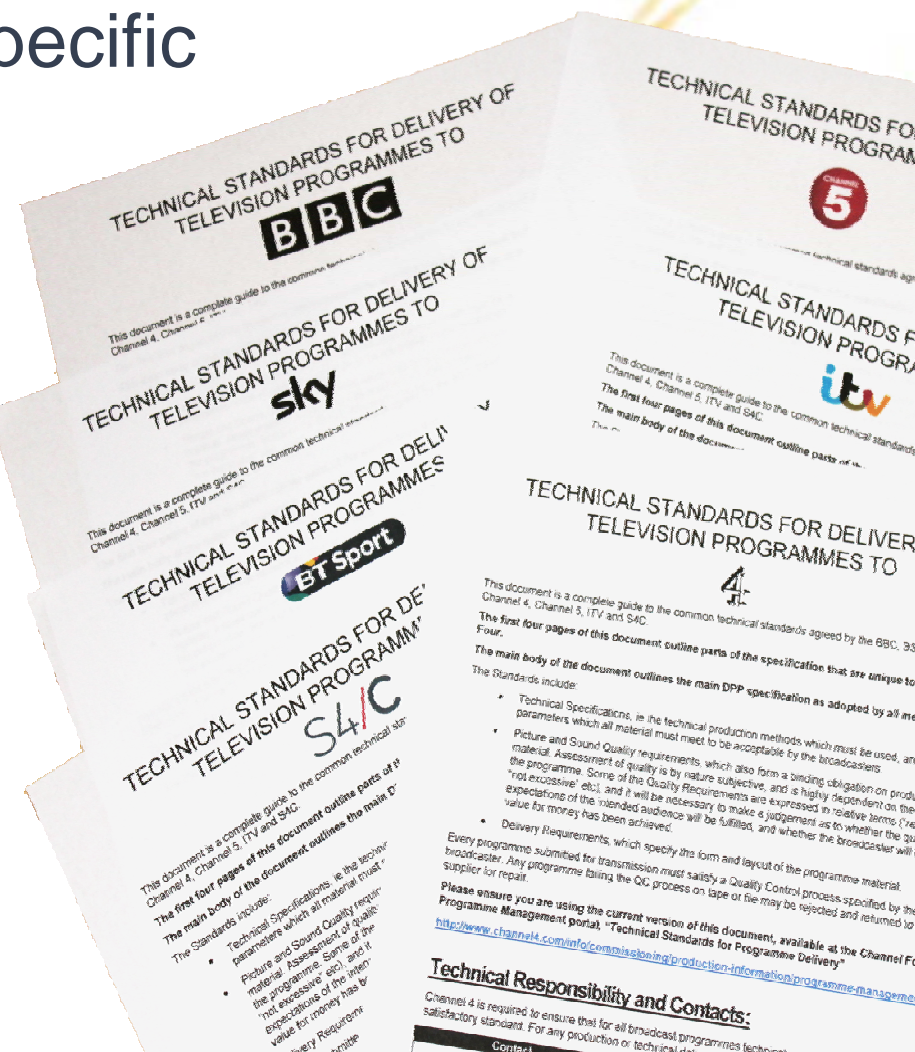
Small variations for each broadcaster



- The first few pages are broadcaster specific

- Delivery contacts
- Delivery of live programmes
- File naming convention
- Legacy issues – until technology refurbish
- Surround sound mixing requirements

- Mainly generic



File naming conventions

- Broadcasters have different naming conventions
 - Derived from programme numbers or contract numbers
 - BBC
 - CTL02152_82.mxf
 - C4
 - 54321_004_V02.mxf
 - C5
 - H5_1234_0001A.mxf
-
- File names don't give any clue as to what is contained within them
 - Re-enforces the need for metadata to Producers

Why files?

Advantages of Files

- Less physical storage of tapes
- Lower ingest costs – fewer expensive VTRs
- Simultaneous use of assets – without clones. Editorial / legal / compliance
- Tracking assets – search production metadata
- Enrichment and integration of metadata into asset management systems – merge with scheduling, rights, contract and status info
- Automated workflows – QC, move to playout server, transcode for VOD etc, archive
- Generic IT hardware – costs reducing - maybe cloud?
- Human intervention – fewer people, cost savings for broadcaster

Inevitable but imperfect

The logo consists of the letters 'VET' in a bold, white, sans-serif font, centered within a black rounded rectangular background. The logo is positioned in the top right corner of the slide.

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- Helped by standardisation
- Thanks to public sector broadcasters for investing in common ground
- Still need to plan for future IT / OS migrations
- And the costs of ongoing storage and migration

DPP Specifications

What's in the DPP v4 Specification?

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Reminder:

- QC
- Access for people with disabilities
- File Delivery Format Requirements
- Video Technical Requirements
- Audio Technical Requirements
- Tape Delivery
- Live Delivery

DPP Spec for File Delivery

The logo for VET (Video Exchange Technology) is located in the top right corner. It consists of the letters 'VET' in a bold, white, sans-serif font, set against a black rounded rectangular background. The background of the slide also features abstract, golden-yellow brushstroke-like lines in the upper right quadrant.

VET

- File format
- Codec
- Programme layout and format
- 3D delivery
- Closed Captions (see Subtitle Exchange Format)
- Timecode
- Audio only files
- SD legacy files
- Metadata

DPP – Video Spec

- Video HD format
- Line Up
- Levels and Gamut
- Blanking
- Aspect Ratio
- Archive, non HD material, and Standards Conversion
- Film
- PSE
- Safe Area

DPP – Audio Spec

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- Audio format
- Metadata
- Loudness
- Metering, Line Up and Test signals
- Track allocation
- Stereo requirements
- Surround 5.1 requirements
- Sync and Sync markers

DPP file format

DPP file structure

- MXF - Media eXchange Format
- An open standard file **wrapper** - with very broad scope
- Too much scope allows compatibility /inter-operability issues
- Further defined into AS-11
- DPP Shim further constrains AS-11 for UK use
 - e.g. AS-11 allows all frame rates but DPP Shim constrains this to 25fps
- DPP has two shims – one for HD and one for SD



DPP file structure (continued)

- Wrapper: MXF – files have .mxf extension
 - Application spec: AS-11 with DPP HD shim or DPP SD shim
 - MXF Operational Pattern Op1a - Video and audio interleaved in the same file
- Video essence
 - HD Codec: **AVC-Intra100** - 100 Mb/s (SMPTE 2027)
 - SD Codec: D10 (IMX50) – 50 Mb/s
- Audio essence
 - 4 or 16 tracks
 - 24bit PCM uncompressed sampled at 48kHz
- Metadata

Metadata



- Production, technical and file structure parameters
- Equivalent to the paperwork in the tape box, and PasC forms
- Essential for broadcasters' asset management databases
- Mandatory metadata fields in DPP file delivery
- Can't wrap the file unless metadata is entered and validated

Metadata

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- Production Metadata

- Series Title, Programme Title, Episode Title, Production Number, Originator
- Contact Details
- Synopsis, Genre
- ISAN (International Standard Audio-visual Number) - optional

Metadata



- Technical Video and Audio Metadata
 - Structural Metadata derived from the essence – codec, fps, frame size..
 - Manually entered - PSE tested, Audio track layout, Loudness standard
- Segmentation Metadata
 - Timecodes for start of part, part duration, number of parts
- Additional Info
 - Textless elements present, Caption language
- Access Services (optional)
 - Audio description, signing, open or closed subtitles

Subtitle Exchange Format

- DPP spec derivative and compatible with EBU-TT
 - Defines a format for the delivery and exchange of subtitles
 - Defines a format for audio description
 - Smooth transfer between Access Service Providers and Broadcasters
 - Adds DPP required data

Audio track layouts for files



EBU Code	Prog Type	Audio Tracks															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
R48 2a	Stereo	St. Final Mix L	St. Final Mix R	Silence	Silence												
R123 4b	Stereo with M&E	St. Final Mix L	St. Final Mix R	St. M&E L	St. M&E R												
R123 4c	Stereo with Audio Desc	St. Final Mix L	St. Final Mix R	St. Aud Desc L	St. Aud Desc R												
R123 16c option 1	Stereo, 5.1 with M&E	St. Final Mix L	St. Final Mix R	St. M&E L	St. M&E R	5.1 Final Mix L	5.1 Final Mix R	5.1 Final Mix C	5.1 Final Mix LFE	5.1 Final Mix Ls	5.1 Final Mix Rs	5.1 M&E L	5.1 M&E R	5.1 M&E C	5.1 M&E LFE	5.1 M&E Ls	5.1 M&E Rs
R123 16c option 2	Stereo, 5.1 with Audio Desc	St. Final Mix L	St. Final Mix R	St. Aud Desc L	St. Aud Desc R	5.1 Final Mix L	5.1 Final Mix R	5.1 Final Mix C	5.1 Final Mix LFE	5.1 Final Mix Ls	5.1 Final Mix Rs	5.1 M&E L	5.1 M&E R	5.1 M&E C	5.1 M&E LFE	5.1 M&E Ls	5.1 M&E Rs
R123 16d	5.1 Dual language	5.1 Lang 1 L	5.1 Lang 1 R	5.1 Lang 1 C	5.1 Lang 1 LFE	5.1 Lang 1 Ls	5.1 Lang 1 Rs	Other	Other	5.1 Lang 2 L	5.1 Lang 2 R	5.1 Lang 2 C	5.1 Lang 2 LFE	5.1 Lang 2 Ls	5.1 Lang 2 Rs	Other	Other
R123 16f	Triple language	St. Lang 1 L	St. Lang 1 R	Not Used	Not Used	St. Lang 2 L	St. Lang 2 R	Not Used	Not Used	St. Lang 3 L	St. Lang 3 R	Not Used	Not Used	Other	Other	Other	Other



QC of a DPP AS-11 file

- Automated QC boxes now available with a DPP template
 - Some devices are considerably slower than real-time
 - Some AQC devices also correct RGB gamut, loudness and PSE
 - Log and report
- Checks required at multiple levels within a file
 - Wrapper
 - Metadata
 - Video and audio codecs
 - Decoded video and audio
 - Consistency cross checks

QC of a DPP file

- EBU QC model
 - Regulatory
 - PSE and Loudness
 - Absolute
 - Definite levels that can be measure against specified parameters
 - Objective
 - May or may not have a spec but difficult to measure absolutely
 - e.g. Caption safe, lip-sync, blurriness, grain, noise, film dirt
 - Subjective
 - Artistic interpretation – e.g. archive, non-broadcast footage, deliberate degradation, intelligibility
- DPP QC test requirements are a subset of EBU tests

AQC of a DPP file

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- AQC devices are good for regulatory and absolute tests
- Eyes and ears essential for objective and subjective assessment

QC checks and responsibility



- Broadcasters require an electronic technical compliance (QC) report with delivery
- Producers are responsible for editorial compliance
.... and for technical compliance
- Broadcasters will do basic automated checks on file receipt
- Then only spot check the file
- Producers will be liable for any delivery failings

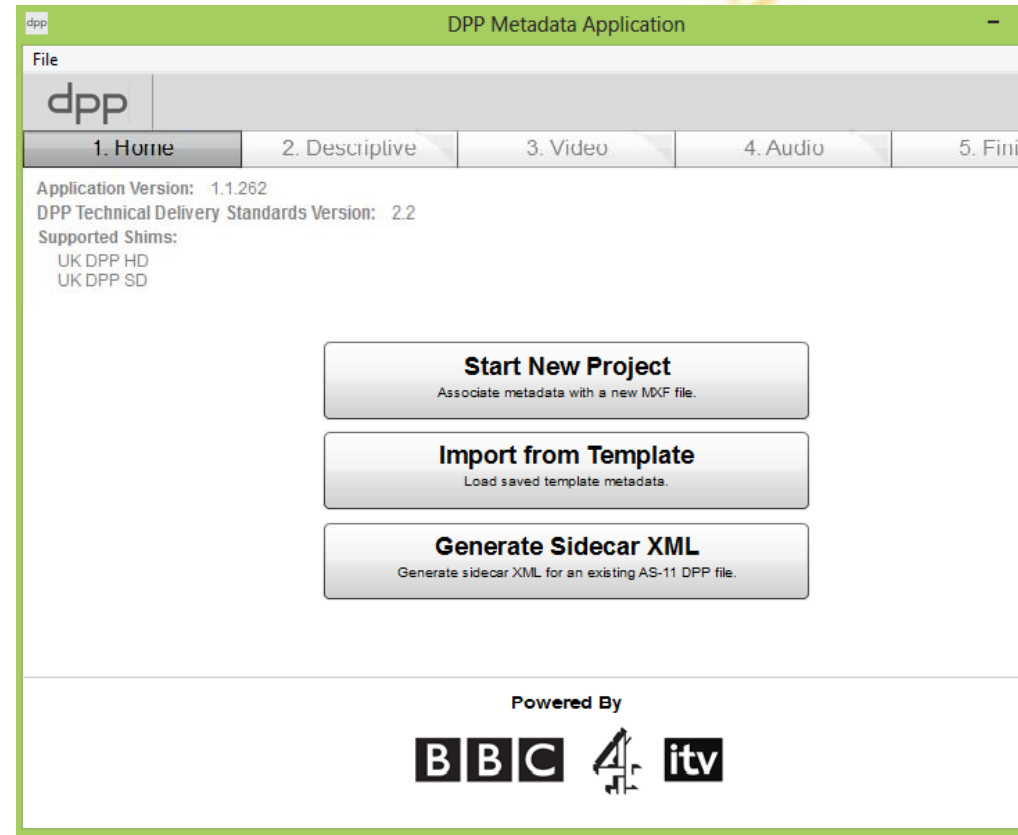
Creating a DPP AS-11 file



To create a DPP file



- DPP metadata application – will be supported for at least a couple of years
- Adds metadata to existing MXF file
- Strict verification rules
- Can also produce Sidecar XML file for asset management systems
- Some manufacturers incorporate a DPP encoding template e.g. Avid Media Composer Version 7+, Content Agent
- Some dedicated boxes and software



To view a DPP AS-11 file



- Need a viewing application that supports MXF:
 - Quicktime Player needs an MXF plug-in e.g. Calibrated {Q}, Hamburg Pro Media MXF4MAC, EVS XFReader, MOG mxfSPEEDRAIL, Blue Lucy, Amberfin, Cinegy
- AMA link back into Avid
- Fast enough kit and network to playback 100Mb/s file
- View interlaced file on a TV monitor
- Ability to select audio from different tracks – may need 5.1 speakers
- Ability to review metadata from the file

Amending a DDP AS-11 file

- Why would you need to amend a file?
 - Technical fixes (PSE, loudness, flash frames, dropouts, etc.)
 - Late editorial changes (credits, new VO, legal, compliance etc.)
- No easy way of making an insert edit into a wrapped AS-11 file
 - Applies to audio and video – although there is a way of laying back entire audio
 - Best to get it right before starting the transcode and export process
- Make changes on original sequence
 - Re-export & transcode
 - Add metadata again
 - QC new file
- Time consuming compared to tape!

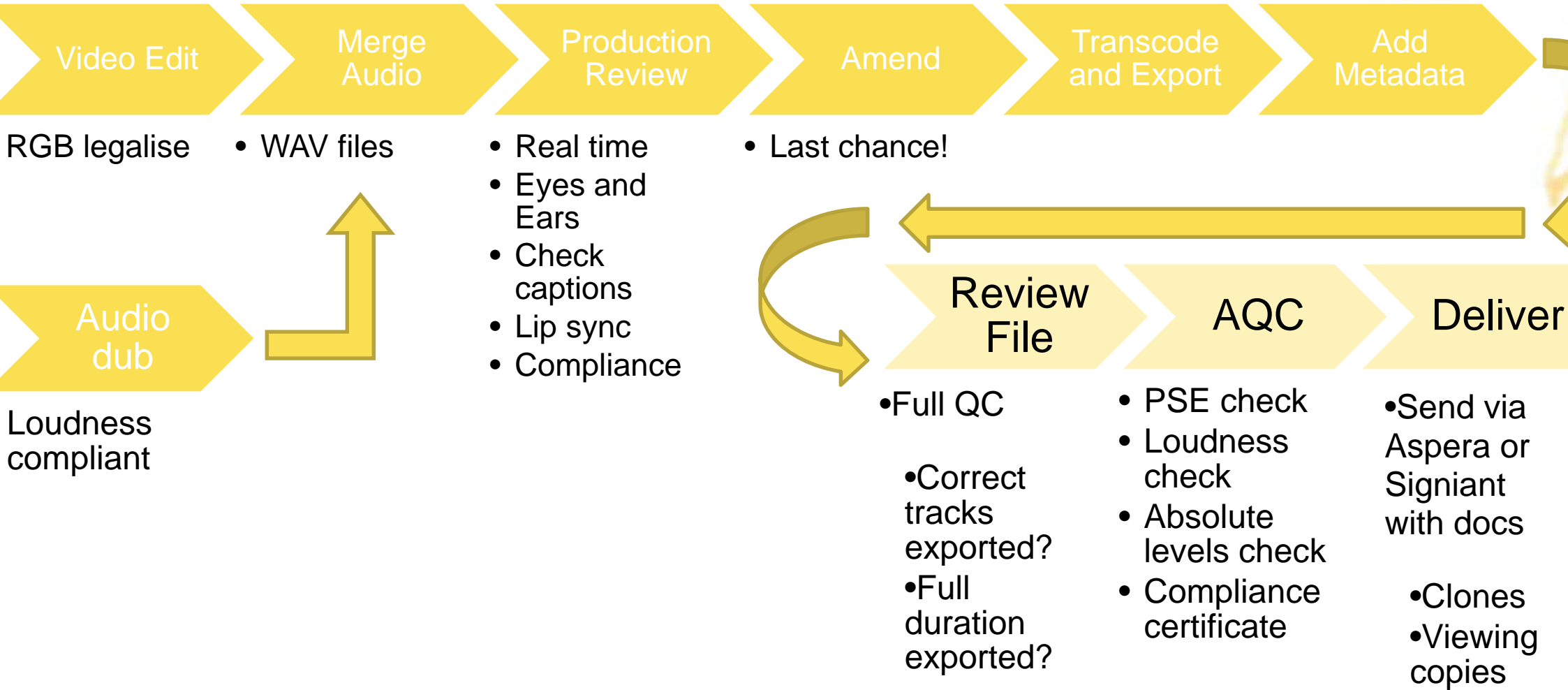
Amending a DPP AS-11 file ...



- Version control !

Workflow

Mastering and delivery workflow



What else is in the DPP spec?

Testing for PSE for file delivery

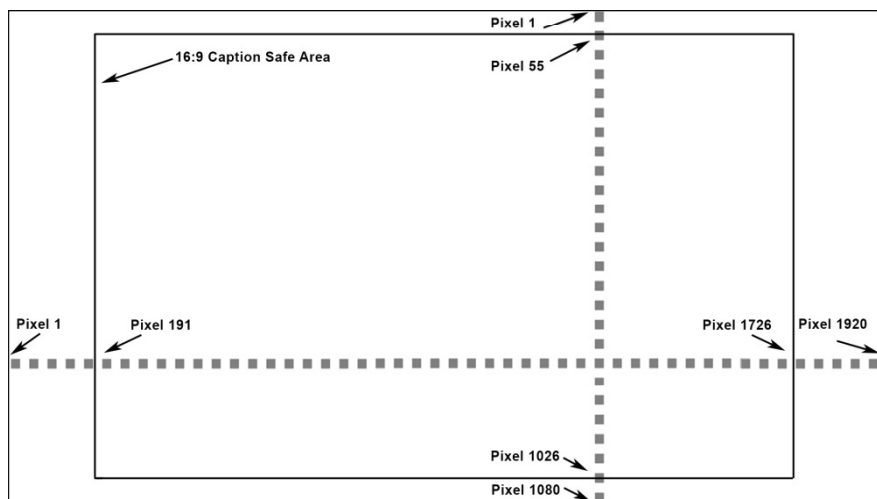
VET

- HardingFPA version 2.5 still required for tape – no change
- For files – can use any device that meets OFCOM spec
- DPP have a compliance programme to approve specific hardware as this is a regulatory requirement
- Broadcasters will be receiving pre-QCd content with certificate of compliance

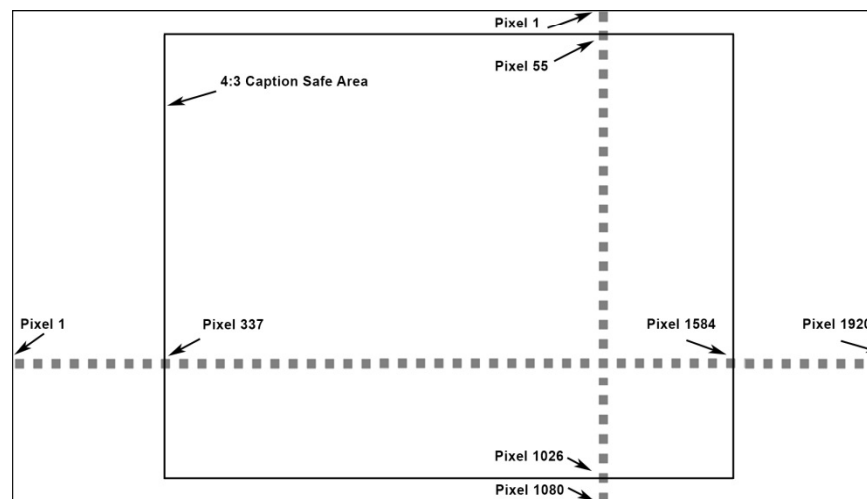
Changes to caption safe area requirements



- Since analogue switch off – 14:9 is no longer required
- Safe areas are now either 16:9 or protected for 4:3
- Credits in 4:3 safe may be advisable for easy international versioning
- Channels or programme strands may have a specific end credit layout for squeezing



16:9 caption safe
80% of Width 90% of Height



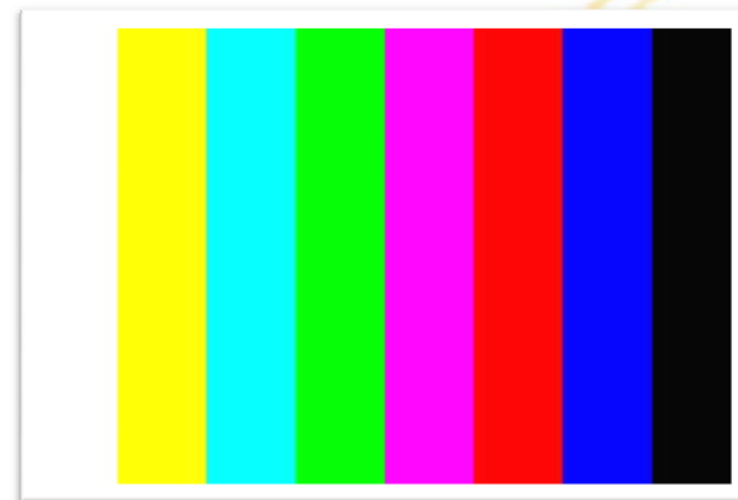
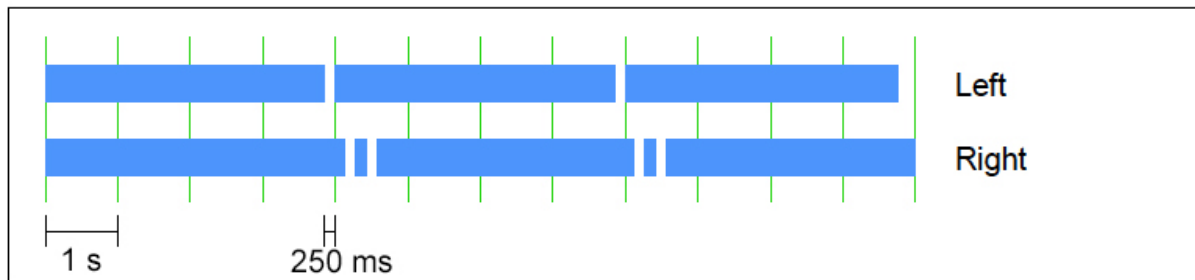
Protect for 4:3 caption safe
65% of Width 90% of Height

Shortened line up requirements for files

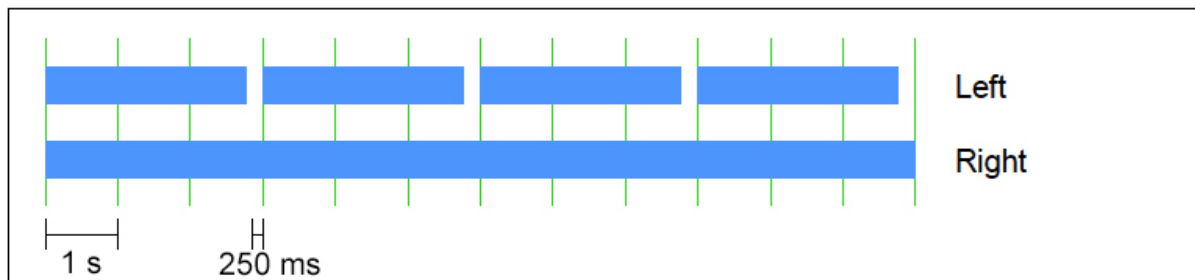
- To avoid clogging storage with terabytes of bars and tone
- 20 seconds bars and tone 09:59:30:00
- 7 seconds clock 09:59:50:00
- 3 seconds black 09:59:57:00
- Programme (or part 1) start 10:00:00:00
- End of part freeze 5 seconds on each part – including final part
- 1 second minimum of black between end freeze and next part's clock
- Subsequent parts do not have to start on whole minute
- 1 minute of black between final part and any textless or supplementary material
- Older line up layout also acceptable for legacy tape transfers to DPP file
 - (i.e. 90 secs of bars and tone, 27 secs of clock)

Specific audio and video line up requirements

- 100% Bars (no EBU, SMPTE or 75% bars)
- GLITS tone (for stereo)



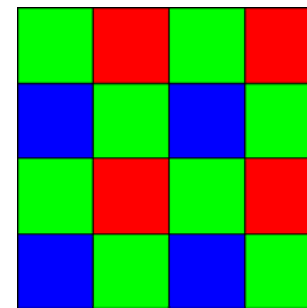
- EBU tone (for stereo)



- Rejected for continuous tone on both tracks of stereo signal
- Files of line up tone available for download from DPP website

Advice for the use of DSLRs and Ultra HD (4k) cameras.

- References EBU R118 – HD Camera Tiering
- UHD1 Tier 1 - 3840x2160 (3 sensor cameras) or 5760x3240 (single sensor Bayer filtered cameras)
- UHD2 Tier 2 - 2880x2160 (3 sensor cameras) or 3840x2160 (single sensor Bayer filtered cameras)
- HD Tier 1 - Minimum pixel count for single sensor Bayer pattern cameras 2880 x1620
- Check with broadcaster before use
- DSLRs are not suitable for HD broadcast
- Except for time-lapse or stop-frame animation
- Broadcaster may give exemption for covert shooting



What to archive?

What do Broadcasters archive?



- AS-11 will be archived by broadcaster
- Some broadcasters also require and archive international versions
- ITV long term archive requires a videotape currently, despite full file delivery from post production to network.
- Different solutions during transition

What to archive for the Production Company?

Production archive?

- AS-11 is a distribution master, not an archive master
- Some companies also master to tape - HDCAM SR. Probably temporary
- Propose: rushes, timeline edit media, project, AS-11, LTO
- Different views, different solutions during transition

What next for the DPP?

- Maintain a compliance programme for manufacturers of AQC software and hardware
- Progress common standards for International deliverables
- Progress alignment of standards with EBU
- Delivery, storage and distribution
- Develop recommendations for storage and use of Cloud
(10 Things you need to know about digital storage)

The specific preservation challenges for TV and video production

Multiple programme elements

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- Original sourced footage: multiple formats, multiple takes
- Commissioned animations
- Motion graphics
- Graphics
- Archive material
- Visual Effects
- Music: Composed music and library music
- Sound: SFX, Commentary, stems
- Stills – commissioned and library

Other related assets

- Scripts, storyboards
- Budgets and schedules
- Stills, research shots, production stills
- Sketches, set design, costume, staging
- Signed release forms
- Copyright, permissions, licenses
- Correspondence, diaries
- Related social media

Identifying the assets for preservation



- Whose responsibility is it to select and assemble the final assets for preservation?
- Final programme elements only?
- Who knows what and where they all are, and what permissions were cleared?
- Is the person employed beyond the production?
- How long will they remain with the company?
- Time allocation for logging?
- It's so hard to say 'delete'

Any questions?