



Dolby Vision Content Delivery for Home Distribution Specification

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1 Introduction

Dolby Laboratories has established these guidelines for facilities entrusted with creating and delivering Dolby Vision content for distribution.

Note: This document outlines the recommended deliverables for Dolby Vision. It is always advisable to check with the studio or client for detailed delivery specifications that may vary from the options described in this document.

2 Delivery Option 1: TIFF Image Sequence and Metadata (XML)

Dolby Vision deliverables must include:

- Dolby Vision Master
- Dolby Vision Metadata

2.1 Dolby Vision Master

The Dolby Vision Master must:

- Be graded on a display with a minimum peak brightness of 1,000 nits and a minimum contrast ratio of 200,000:1 set for P3 color gamut and PQ (SMPTE-2084) EOTF. A Rec.2020 display may also be used if required.
- Be delivered as an RGB, 16-bit, P3, D65, PQ, or Tiff image sequence in the original resolution and aspect ratio of the Digital Intermediate (or the original source material used for color grading). Rendered Rec.2020 files may also be requested and are accepted.

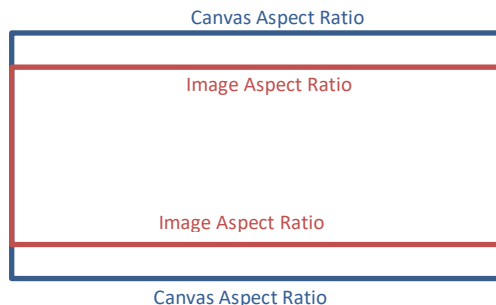
2.2 Dolby Vision Metadata

Dolby Vision Metadata must be delivered as a separate XML file that is exported from the color correction system that creates the Dolby Vision Master. The Dolby Vision Metadata (.xml) must contain:

- **Level 0** – Mastering Monitor information
- **Level 1**– Master Image analysis using the **Analyze** tool on the color correction system
- **Level 2** – Target Trim Metadata -A shot by shot Trim Pass is highly recommended* on the Color Correction system using a Rec.709/100 nit target and viewing the remapped image through a CMU to a Target reference grade display set up for this purpose (Rec.709, Gamma 2.4, peak brightness of 100 nits)

*The colorist may choose not to apply any trims if the analysis (Level 1) metadata produces an acceptable Rec.709 result. We recommend reviewing the Rec.709 output of the entire timeline and performing any necessary Dolby Vision Metadata trim adjustments (Level 2) before exporting the XML. The purpose of this trim pass is to best maintain the artistic intent across mapped HDR and the SDR versions.

- **Level 5** – Active Video Area used The L5 metadata is specified as two values in the XML:
 - Canvas Aspect Ratio
 - Image Aspect Ratio



2.3 Quality Checks (QC)

Check the Dolby Vision Master and XML Metadata for quality and integrity using Dolby's recommended practices for QC.

- **QC#1 – Check Metadata [XML]** The XML must be checked for errors and inconsistencies using the Dolby Metafier that is included in the Dolby Vision Professional Tools. Metafier validates the XML (only) and report any errors that may be present.
- **QC#2 – Preliminary Checks** – Perform these preliminary checks to eliminate potential errors before a more comprehensive QC is performed.
 - Check Durations, frame numbering
The duration of the content as specified in the metadata (XML) must match the number of frames that were rendered out of the color corrector. If there is a mismatch, it must be corrected.
 - Image specifications and information
The specifications of the rendered image sequence must conform to that requested by the client or entity that commissions the project. This must be confirmed before sending the content for QC or any further processing.
 - Color encoding fields
The Color Encoding Fields in the metadata (XML) must match the specifications and format of the rendered image sequence. These include the color primaries, white point, signal range (video/legal/full/data).
 - Mastering display
The Mastering Display as specified in the metadata (XML) is a parameter that is critical to all the downstream processing for which the metadata (XML) is used. It is therefore important to ensure that the right Mastering Display is specified in the metadata (XML).
 - Aspect ratio
Check the aspect ratio specified in the metadata (XML) and confirm that it is in accordance with that of the rendered files. The aspect ratio is specified by two variables namely, CanvasAspectRatio and ImageAspectRatio in the metadata (XML).

- **QC#3 – Comprehensive check (16-bit TIFF and XML)** – Check the 16-bit TIFF and XML deliverable by creating a target deliverable (such as Rec.709/100 nits) using Dolby Vision CM_Offline that is included in the Dolby Vision Professional Tools) and visually checking the result. Any visual errors can be traced back to either the 16-bit TIFF or XML.

Alternatively, check the integrity of the 16-bit TIFF and XML using partner solutions such as Clipster (R&S), Cortex (MTI), DVP (GIC), or Transkoder Colorfront). Content that fails the QC are rejected before encoding.

2.4 Naming Conventions for master rendered files and deliverables

Use the following folder structure and naming convention when creating content that is delivered as TIFF image sequences:

```
title/reel/resolution/title_reel_resolution_framerate_colorspace_whitepoint_
encoding_nits_master.tiff
```

Example: **Battleship**, 4,000 nit Master

Folder

```
battleship/r1/2048x1152/battleship_r1_2048x1152_24fps_p3d65_pq_4000nit_master.tiff
```

Rec.709 Render

```
battleship/r1/2048x1152/battleship_r1_2048x1152_24fps_rec709_g2.4_100nit_master.tiff
```

1,000 nit Render

```
battleship/r1/2048x1152/battleship_r1_2048x1152_24fps_rec2020d65_pq_1000nit_m
aster.tiff
```

Example: Textless material

```
battleship/r1_txtls/2048x1152/battleship_r1_txtls_2048x1152_24fps_p3d65_pq_40
00nit_master.tiff
```

Textless material should accompany the master render files and should be numbered to drop into the corresponding texted material abbreviated as `_txtls_` in the filename put into a folder that has been named accordingly.

XML files

The corresponding Dolby Vision Metadata must accompany the image file sequence as XML files. The naming conventions for the XML files follow the same naming convention and are placed in a separate folder along with the image sequence.

Example: XML file

```
battleship/xml/r1/battleship_r1_2048x1152_24fps_p3d65_pq_4000nit_master.xml
```

3 Delivery Option 2: Dolby Vision Mezzanine

We recommend creating and delivering a Dolby Vision Mezzanine (Lossless or Lossy MXF) file because it is easier to manage and transport than a Tiff Image sequence. You can also create the mezzanine using the Dolby Mezzinator that is included in the Dolby Vision Professional Tools.

Alternatively, create the Dolby Vision Mezzanine using partner solutions such as Clipster (R&S), Cortex (MTI), DVP (GIC) or Transkoder (Colorfront).

The default encoding profile for the Dolby Vision Mezzanine is **bcp5** for 8- and 12-bits, or **imf_ml6** for 16-bits. The Mezzanine may be created with higher quality (or lossless) profiles if required.

3.1 Quality Check (QC)

Check the Dolby Vision Mezzanine for possible errors before it is sent for distribution or encoding, by creating a target deliverable (such as Rec.709/100 nits) using Dolby Vision CM_Offline that is included in the Dolby Vision Professional Tools) and visually checking the result. Any visual errors can be traced back to either the 16-bit TIFF or XML.

Alternatively, check the integrity of the 16-bit TIFF and XML using partner solutions such as Clipster (R&S), Cortex (MTI), DVP (GIC), or Transkoder Colorfront). Content that fails the QC are rejected before encoding.

We recommend creating a target deliverable such as Rec.709/100 nits using CM_Offline that is included in the kit.

4 Delivery Option3: ProRes and XML

For certain distribution platforms, you may be required to deliver a mezzanine as a ProRes file. The HDR grade can be rendered out as a ProRes file from the Color Corrector for this purpose and the XML exported as previously described.

Alternatively, the ProRes file can also be created from the 16-bit TIFF image sequence using partner solutions such as Clipster (R&S), Cortex (MTI), DVP (GIC), or Transkoder (Colorfront).

This ProRes file can then be delivered with the XML.

4.1 Quality Check (QC)

Check the ProRes and XML for errors by creating a target deliverable (such as Rec.709/100 nits) and visually checking the result. You can do so using a partner solutions such as Clipster (R&S), Cortex (MTI), DVP (GIC), or Transkoder (Colorfront).

Any visual errors can then be corrected by making the necessary modifications to the ProRes or XML.

5 Recommendations

- The first frame of action should start on the hour that corresponds to the following frame numbers:

Reel#1 – r1 = 0086400.tiff* (01:00:00:00)

Reel#2 – r2= 0172800.tiff*

Reel#3 – r3= 0259200.tiff*

Reel#4 – r4= 0345600.tiff*

Reel#5 – r5= 0432000.tiff*

Reel#6 – r6= 0518400.tiff*

Reel#7 – r7= 0604800.tiff*

*padded with 7 digits

- We recommend recording the last frame of picture on a note or label accompanying the material as it helps when combining individual reels into long play clips for encoding.
- The following color spaces are currently supported by Dolby Vision.
 - Rec.709
 - Rec.2020
 - P3
 - XYZ
 - WCG (wide color gamut – (created for Dolby Cinema)

Note: If you do not follow this convention, specify what you used in a note or on a label accompanying the material.