aws elemental

FEATURE GUIDE: WORKING WITH HDR

AWS ELEMENTAL SERVER VERSION 2.11-2.13

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Contents

Introduction

Version 2.9 of AWS Elemental Server introduced support for HDR10 with HEVC video streams in TS, DASH, and HLS. With version 2.9, you create HDR10 output by selecting “Rec 2020” color space in the input video selector and adding HDR10 metadata to the output stream (by entering values in the job fields).

Version 2.11 of AWS Elemental Server extends the HDR capabilities as follows:

AWS Elemental Server version 2.11	AWS Elemental Server version 2.9 or 2.10
Ingest and output of HLG with rec. 2020 color space.	The only HDR format supported for ingest and output is HDR10.
Automatic reading of HDR metadata from video source.	HDR metadata in output must be provided by the user. Any source metadata is ignored.
Passthrough or overwrite of source metadata.	
Conversion between supported HDR formats and from SDR to HDR. Conversion of metadata to match content conversion.	No conversion. SDR outputs generated from SDR sources; HDR10 outputs generated from HDR10 sources.

Supported HDR Formats

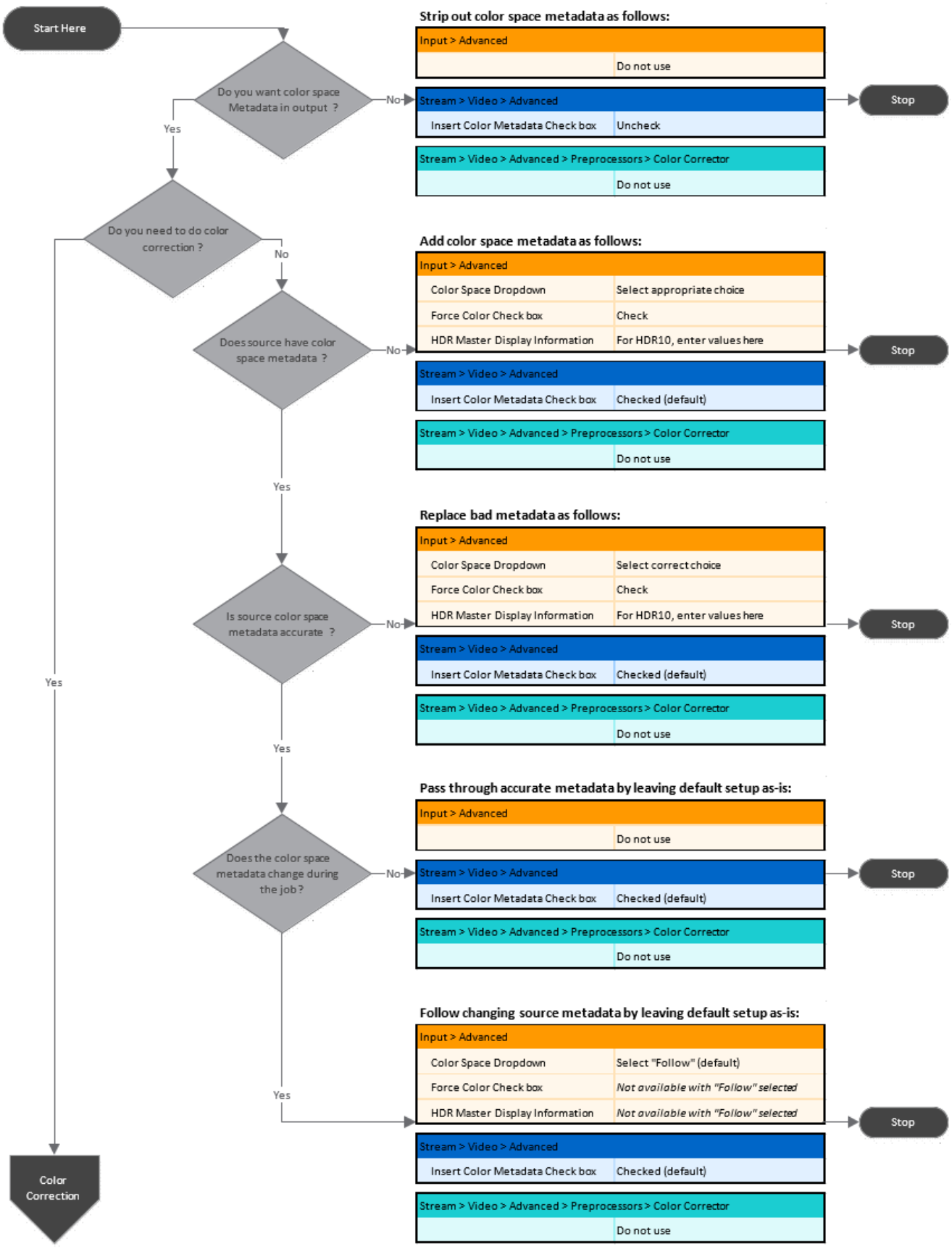
AWS Elemental Server 2.11 can ingest and output video in the following formats and color spaces:

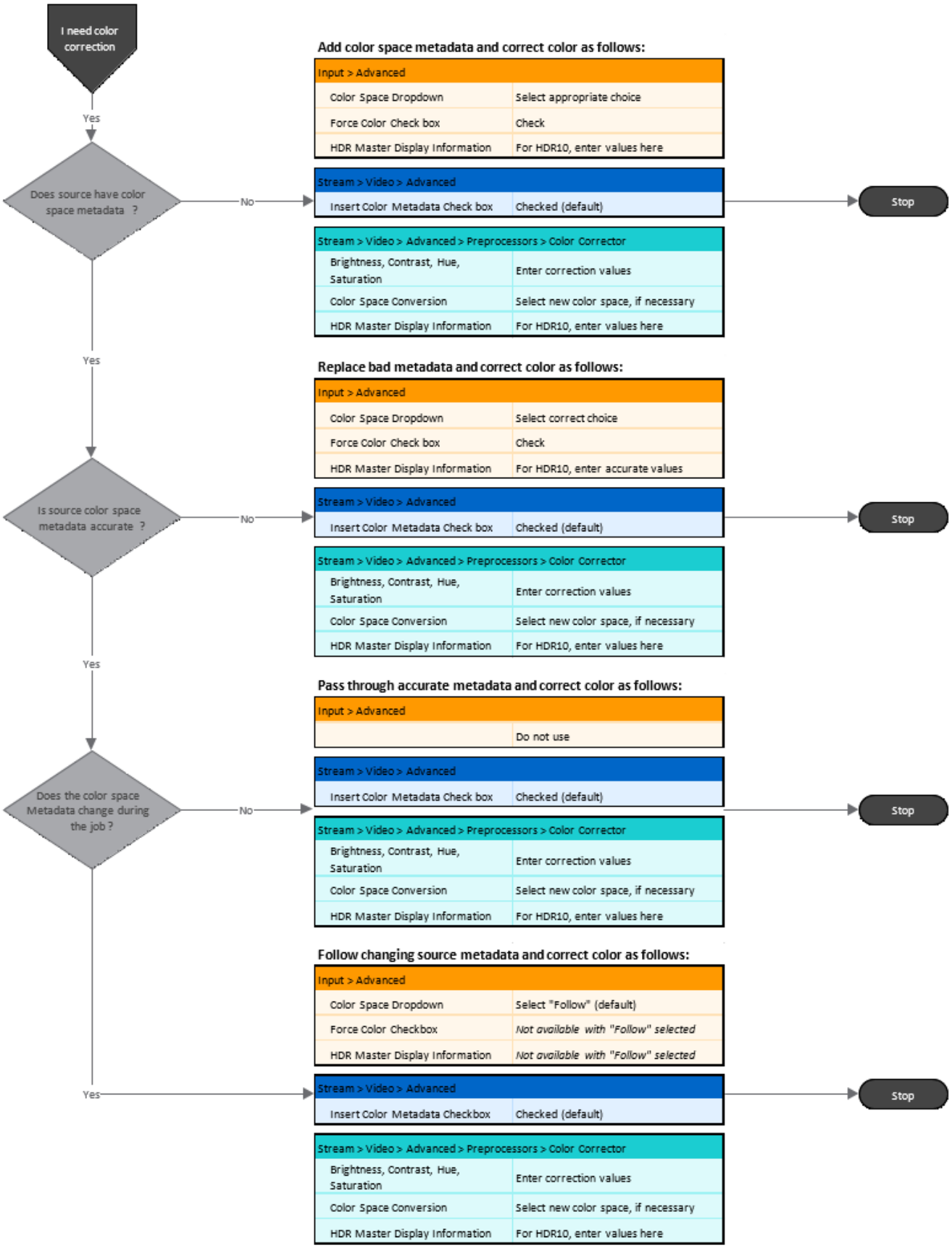
- HDR10
- HLG, rec. 2020
- SDR, rec. 709
- SDR, rec. 609

Setting Up HDR Jobs Using the Web Interface

Use the flowchart on the next pages to determine which fields in the job or profile you need to adjust to get the HDR functionality that you need. Then find detailed instructions and screenshots in the sections that follow, using the provided color code.

For example, if you need to use the Force Color checkbox on the input, you will see instructions for doing so in the flowchart in orange. Find instructions and screenshots for what you need to do by looking the orange-highlighted text section.





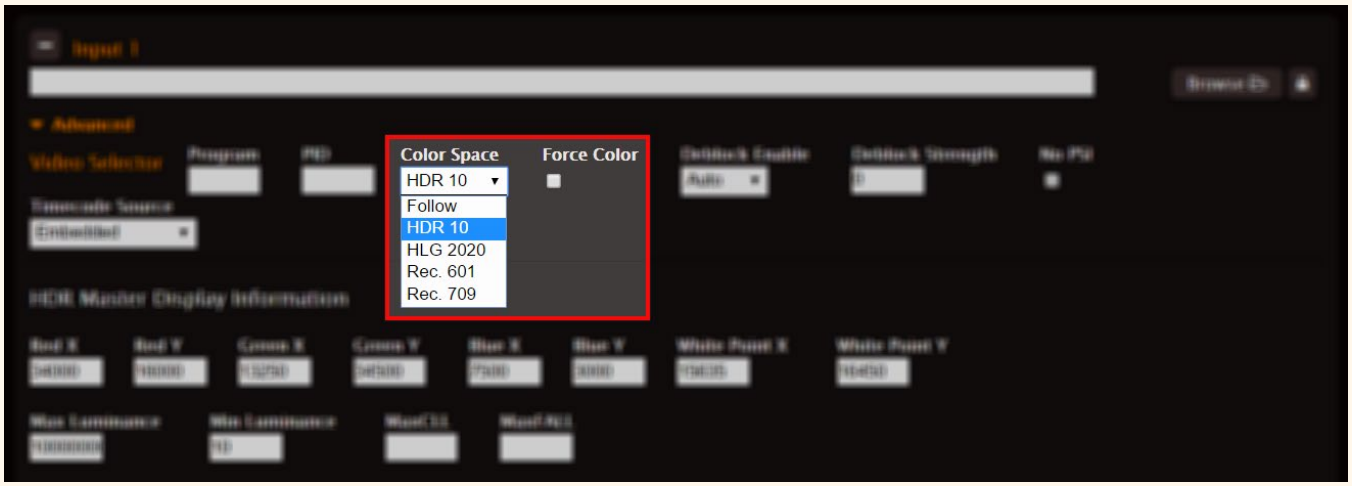
Input > Advanced: Managing Overwrite of Source Metadata

Use the controls under Input > Advanced to either provide missing metadata or to replace incorrect metadata. The new values will be passed into every output.

To do so:

Check the Force Color checkbox under Input > Advanced and select the correct color space in the Color Space dropdown box. (Do not select Follow from the Color Space dropdown box.)

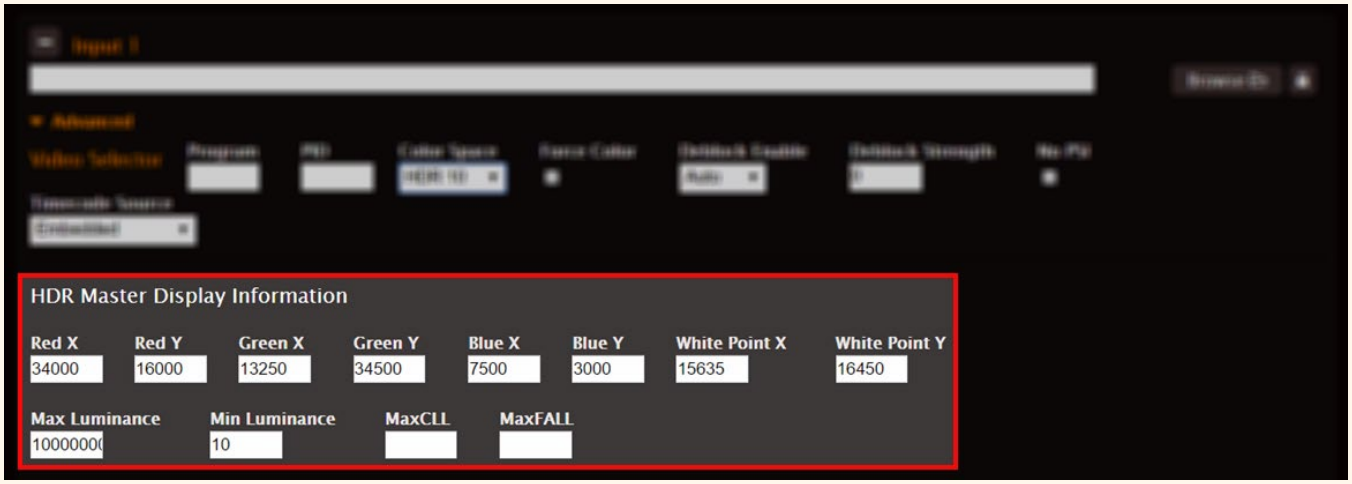
If you leave the Force Color checkbox unchecked, AWS Elemental Server will ignore the value in the Color Space dropdown box and any values provided in the HDR Master Display Information (described below).



For HDR10 Input Only

If you select HDR10 in the Color Space dropdown box, the HDR Master Display Information fields will appear below the dropdown. Enter correct values in these fields. Make sure to check the Force Color checkbox (described above) to have these values used in your metadata.

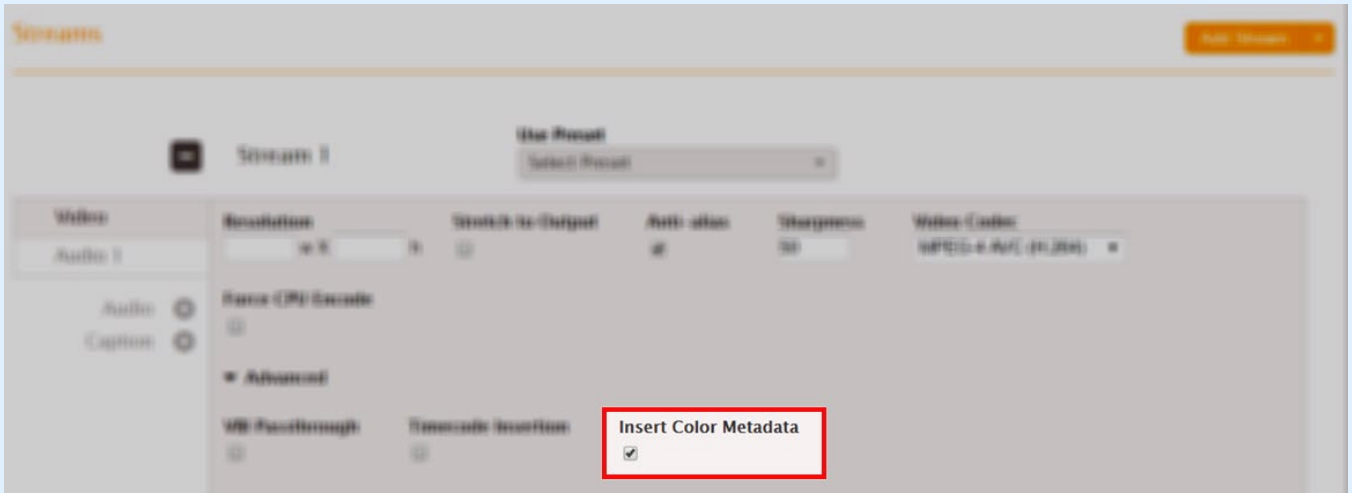
If you leave Force Color unchecked, these HDR Master Display Information fields will still show values, but these values will not be used. AWS Elemental Server will use metadata values from the incoming stream. You will be able to view these values in the media info display, once the job has started running.



Stream > Video > Advanced: Include/Exclude Metadata per Output

The Insert Color Metadata checkbox is located under Advanced on the Video tab of each Stream. Use this checkbox to indicate whether outputs should include metadata.

You can include metadata in some outputs and not in others because this checkbox is in the Streams section. To exclude metadata from an output, uncheck this checkbox in the Stream associated with the output.



Stream > Video > Advanced > Preprocessors > Color Corrector

Access the color correction control as follows:

1. Click Advanced on the Video tab of a Stream.
2. Scroll down and click Preprocessors to open a list of available preprocessors.
3. Click the slider switch labeled Color Corrector.

Use the Color Corrector preprocessor if you need to do color correction.

Color correction is calculated using the values in these fields and the color metadata from the input. The input metadata depends on your input settings. If you check the Force Color checkbox (described in the orange section, above), color correction is calculated from the metadata you supply. If you leave the Force Color checkbox unchecked, color correction is calculated from the source-supplied metadata.

You can use color correction for some outputs and not others because this checkbox is in the Streams section. Settings in the Color Corrector preprocessor apply to any output associated with the Stream.

Brightness, Contrast, Hue, Saturation

Enter correction values in these fields. AWS Elemental Server will use these values to do color correction regardless of whether you choose to do color space conversion as well. Color space conversion is discussed below.

Color Space Conversion

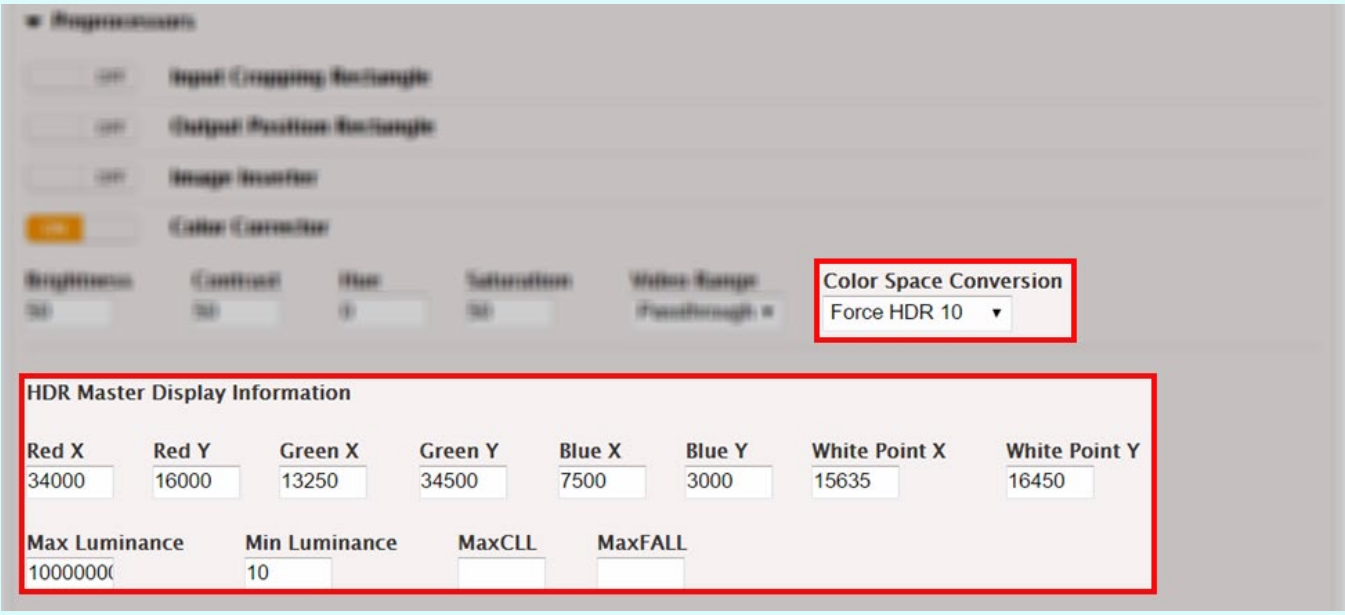
The Color Space Conversion dropdown box is located on the right side of the Color Corrector section. Use this dropdown to create output streams encoded with a different standard than the input stream. Select the option for the format you are converting to. (The format you are converting from is determined by the input.)

AWS Elemental Server supports the following conversions:

- Between the two HDR formats (HDR10 and HLG)
- Between the two SDR color spaces (rec. 601 and rec. 709)
- From either SDR color space to either HDR format

HDR Master Display Information

The HDR Master Display Information fields appear when you select “Force HDR 10” from the Color Space Conversion dropdown list. If you are converting to HDR10, use these fields to supply master display information metadata to be included in the output.



Setting Up HDR Jobs Using the REST API

This section provides information for setting up your AWS Elemental Server job and profile XML for HDR.

It assumes:

- That you understand the conceptual information provided in the main body of this document.
- That you understand how to create and modify jobs using xml.

XML Reference Tables for HDR

Managing Overwrite of Source Metadata

Element				Notes
job				Top-level element
	input			
		video_selector		Corresponds to the Video Selector section of the UI, under Input > Advanced. There is one <video_selector> element per job, which applies to all outputs.
			force_color	Corresponds to the Force Color checkbox in the UI. Set to true to overwrite the source metadata with the values in <color_space> and, for HDR10, the children of <hdr10_metadata>. Set to false to retain metadata from the source.
			color_space	Corresponds to the Color Space dropdown in the Video Selector section of the UI. Valid range: follow, rec_601, rec_709, hdr10, hlg_2020
			hdr10_metadata	Contains children for specifying master display information for HDR10. See table below.

Metadata Specific to HDR10

Child of <hdr10_metadata>	Valid Range
red_primary_x	0-50000
red_primary_y	0-50000
green_primary_x	0-50000
green_primary_y	0-50000
blue_primary_x	0-50000
blue_primary_y	0-50000
white_point_x	0-50000
white_point_y	0-50000
min_luminance	0-2147483647
max_luminance	0-2147483647
maxcll	0- 65535
maxfall	0- 65535

Including or Excluding Metadata from Outputs

Different outputs can have different values for <insert_color_metadata> because this setting is contained in the stream assembly.

Element	Notes
job	Top-level element
stream_assembly	Use one <stream_assembly> element for each set of encoding instructions you need.
name	Use the value of this element to map a stream assembly to an output.
video_description	Contains settings for how the video is encoded.
insert_color_metadata	Set to true to include color metadata in the output; set to false to exclude it.
output group	Use one output group element for each video package type produced. Different outputs within the group can have different sets of encoding instructions (different stream assemblies) applied to them.
output	Represents the actual set of elementary streams delivered to a single destination address.
stream_assembly_name	Set the value of this element to match the value of a <stream_assembly>/<name> element to associate this output with the stream assembly.

Color Correction

Different outputs can have different settings for color correction because this setting is contained in the stream assembly.

Element	Notes
job	Top-level element
stream_assembly	Use one <stream_assembly> element for each set of encoding instructions you need.
name	Use the value of this element to map a stream assembly to an output.
video_preprocessors	
color_corrector	Include this element if you want color correction on your output.
color_space_conversion	Use this element to specify the color space or format you want your video stream converted to. Supported conversions are between HDR10 and HLG, from either rec. 601 or rec. 709 to either HDR10 or HLG, and between rec. 601 and rec. 709. Valid range: none, force_601, force_709, force_hdr10, force_hlg_2020
brightness	Provide brightness correction value here. Valid range: 1 through 100
contrast	Provide contrast correction value here. Valid range: 1 through 100
hue	Provide hue correction value here. Valid range: -180 through 180
saturation	Provide saturation correction value here. Valid range: 1 through 100
hdr10_metadata	Contains children for specifying master display information for HDR10. See table below.
output group	Use one output group element for each video package type produced. Different outputs within the group can have different sets of encoding instructions (different stream assemblies) applied to them.
output	Represents the actual set of elementary streams delivered to a single destination address.
stream_assembly_name	Set the value of this element to match the value of a <stream_assembly>/<name> element to associate this output with the stream assembly.

Metadata Specific to HDR10

Values for these elements must be supplied by your color grader or another upstream source with information about how your specific video was.

Child of <hdr10_metadata>	Valid Range
red_primary_x	0-50000
red_primary_y	0-50000
green_primary_x	0-50000
green_primary_y	0-50000
blue_primary_x	0-50000
blue_primary_y	0-50000
white_point_x	0-50000
white_point_y	0-50000
min_luminance	0-2147483647
max_luminance	0-2147483647
maxcll	0- 65535
maxfall	0- 65535