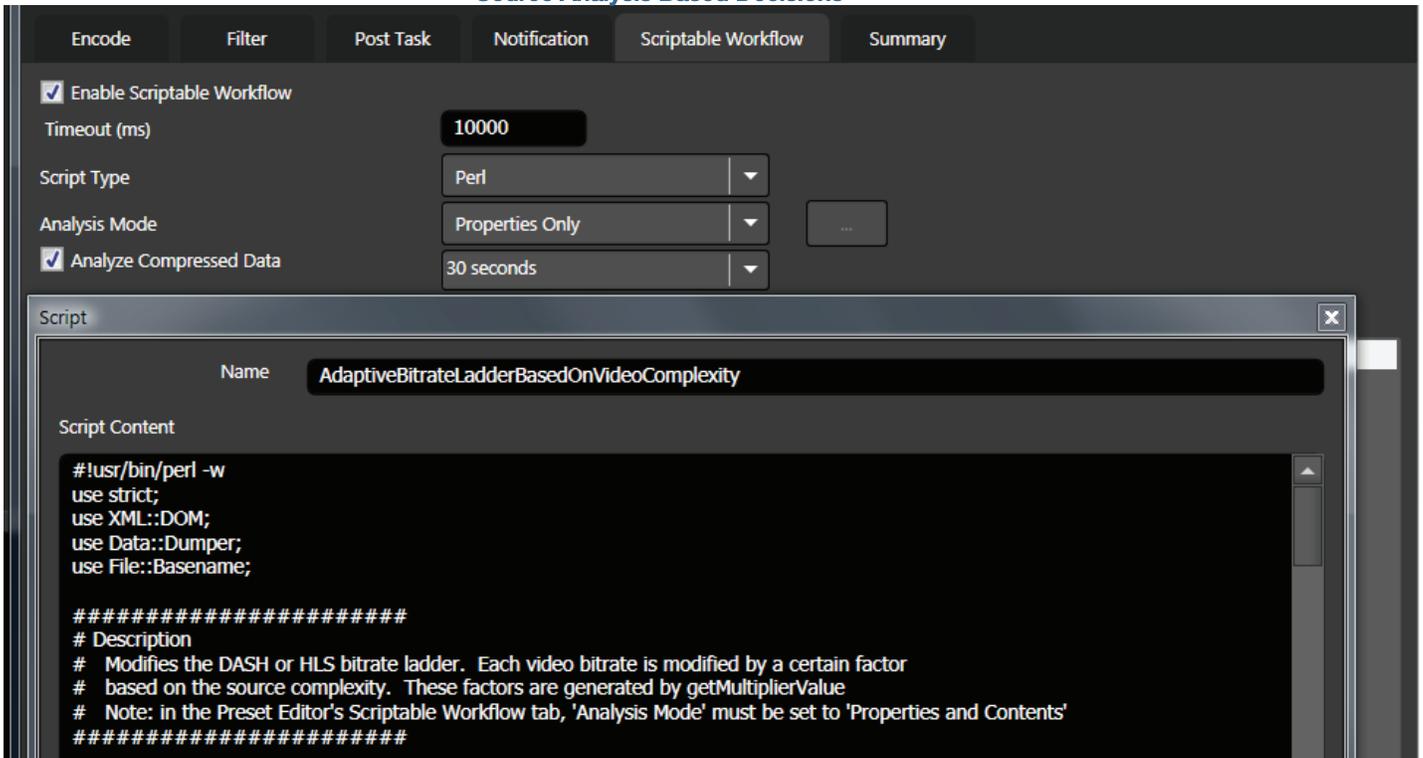# Extend Cambria Functionality using Simple Perl Scripts

Product: *Cambria FTC Encoder*
Feature: *Scriptable Workflows*
Description: *Users can extend and customize Cambria operation for their specific requirements*
Works with: *UI, API, Watch folders.*

In Brief: Scriptable Workflows is a feature of Cambria FTC and Cambria Cluster that enables users to extend and customize Cambria to suit their own needs when encoding via the user interface, watch folders, or APIs. During operation, Perl scripts parse input file data like resolution and frame rate to make decisions about how to fail or customize the encoding job, which is accomplished by the script modifying the Job XML prior to transcoding.

Capella includes multiple scripts with Cambria, which can:

- Customize a DASH/HLS encoding ladder based upon the complexity of the source video.

- Adjust frame rate, resolution, data rate and other output parameters based upon the source.

- Pass through audio if source contains AC-3 data. Otherwise, encode source to AC-3.

- Burn in subtitles to matching source files by same base file names, or add pre- and post-rolls to a video.

This document will introduce you to Scriptable Workflows, describe how to identify and use the scripts included with Cambria, and give a brief description of some resources you can use to learn how to create and modify your own scripts.

What are Scripts?

Scripts are written in Perl, or modified from scripts included with Cambria.

How Do Scripts Work?

Cambria executes scripts at the start of each job, before source decoding starts. Cambria an-alyzes the source file and augments the 'Source' section in the original Job XML with source elements and attributes. When running script analysis in 'Properties and Contents' mode
(configurable in the Preset Editor's 'Script' tab), Cambria can measure video complexity (how difficult a video is to encode) and audio loudness to augment the XML. Scripts can also analyze compressed video/audio and muxer properties. Scripts can access all this data and make configuration and output decisions based upon this data.

Operationally, Cambria uses the original Job XML with source information to input the script. The script will output a new Job XML that is used for transcoding. The process of inputting the original Job XML and outputting the new Job XML is called Script Transform.

How do I Deploy Scripts?

You add scripts in the Preset Editor for manual operation or watch folder encoding (see top of front page).

What Scripts are Included?

At the time of this writing, Cambria includes twelve scripts, roughly broken out into the following categories.

Source Analysis Go/No Go

These scripts inspect the source file and fail the job if certain conditions are met.

FailIfPAL.pl - Script fails the job if the frame rate is PAL (ie.) 25 or 50).

FailIfNotHD.pl - Script fails the job if the width is less than 1280 or if the height is less than 720.

You can adopt these scripts for other inspections like checking for audio, black frames, or aspect ratio, to ensure the wrong preset is not used to encode a particular file.

Source Analysis Job Customization

These scripts inspect the source file and change the Job output if certain conditions are met.

AdaptiveBitrateLadderBasedOnVideoComplexity.pl - This script deploys Cambria's Source Adaptive Bitrate Ladder (SABL), which is generically called per-title encoding. In operation, the script measures the source video complexity (a measure of how difficult it is to encode) and modifies the bitrate for each DASH or HLS layer. Less com-plex sources will be encoded at lower bitrates than more difficult sources. You can adopt the script to adjust the resolutions of the files in the encoding ladder, and to drop layers below a certain data rate or resolution.

UseHalfSourceFrameRateIfMoreThan30fps.pl - This script prevents encoding at frame rates higher than 30 fps. Operationally, this script inspects the source frame rate. If it is 30 or less, the output frame rate is set to source frame rate. If it is over 30, output frame rate is set to half of source frame rate.

SkipAdaptiveStreamingLayersBasedOn-SourceResolution.pl - This script prevents encoding any files at larger then their source res-olution. Operationally, the script checks the res-olution of the source file and removes any adap-tive streaming (DASH, HLS, Smooth Streaming) layer if that layer's resolution is higher than the source resolution.

PassthroughAudioIfAC3.pl - This script pre-vents re-encoding audio when not necessary. In operation, the script checks if the source's audio is encoded in AC-3 format, and if so, uses Audio pass through. Otherwise, the
script re-encodes the audio to the format specified in the original job
encoding settings.

ModifyBitrateBasedOnSourceResolution.pl - This script applies different output data rates to SD and HD files. Specifically, the script looks at the width/height of the source. If it is SD, it sets the H.264 bitrate to 2000bps. If it is HD, it sets the bitrate to 5000mbps.

Automated Packaging and Assembly

These scripts automatically assemble files for final output.

MapAdditionalAudio.pl - Used with Watch Folder 'Group of Files', this script combines ex-ternal audio files to audio of the main source file. This can, for example, combine audio of different languages into a multi-track source.

AddPreroll_Postroll.pl - Stitches the source file with a pre-roll file and/or a post-roll file.

Automated File Customization

These scripts set certain parameters within a file.

SetInTimecodeTo_01_00_00_00.pl - Script sets the In Timecode to 01:00:00:00, and sets no Out point, so Cambria encodes until the file end.

Create5MinuteSegment.pl - Script sets the In point at 0 and Out point at 5 minutes.
Segmenter.pl - Th e script adds segments (in/out points) throughout the source.
You can use/modify these scripts to encode the first x minutes of video as a preview, or to extract x minutes from videos for archival or other purposes.

Script-Related Resources

Capella has created the Scriptable Workflows Guide which is available at:
https://bitbucket.org/CapellaSystems/capellasystems
As discussed in the Guide, users should be familiar with Cambria FTC, and in particular the Job XML format it uses. The Job XML contains the settings for the sources, encoders, multi-plexers, filters as well as notification settings, upload settings, audio mapping, etc. This Job XML is what the scripts will be modifying or generating.
The Guide details how to read source audio and video properties, compressed source video properties, and how to modify all job settings. As discussed, scripts can add, re-move or modify any settings stored in the Job XML. To get a list of which settings can be modified, use FTC or the Manager to extract a Job XML which contains the desired video and audio encoders, video or audio filters,
notification, upload, audio mapping, etc.

For help with scripting, please contact your customer service representative.

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