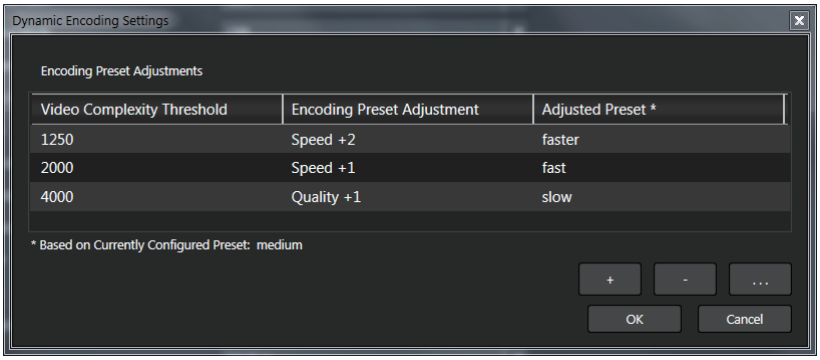
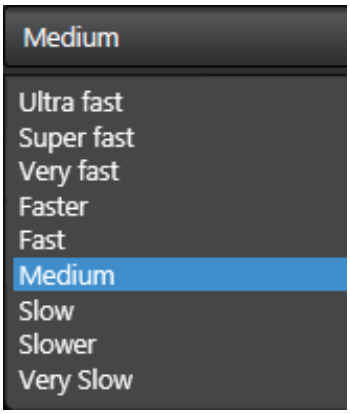


Optimize the Quality and Speed of Your x265 Encodes

In Brief:
Product: Cambria FTC Encoder
Feature: Dynamic Encoding
Description: Adjusts the x265 preset to match encoding complexity
Works with: the x265 HEVC codec



What is it?

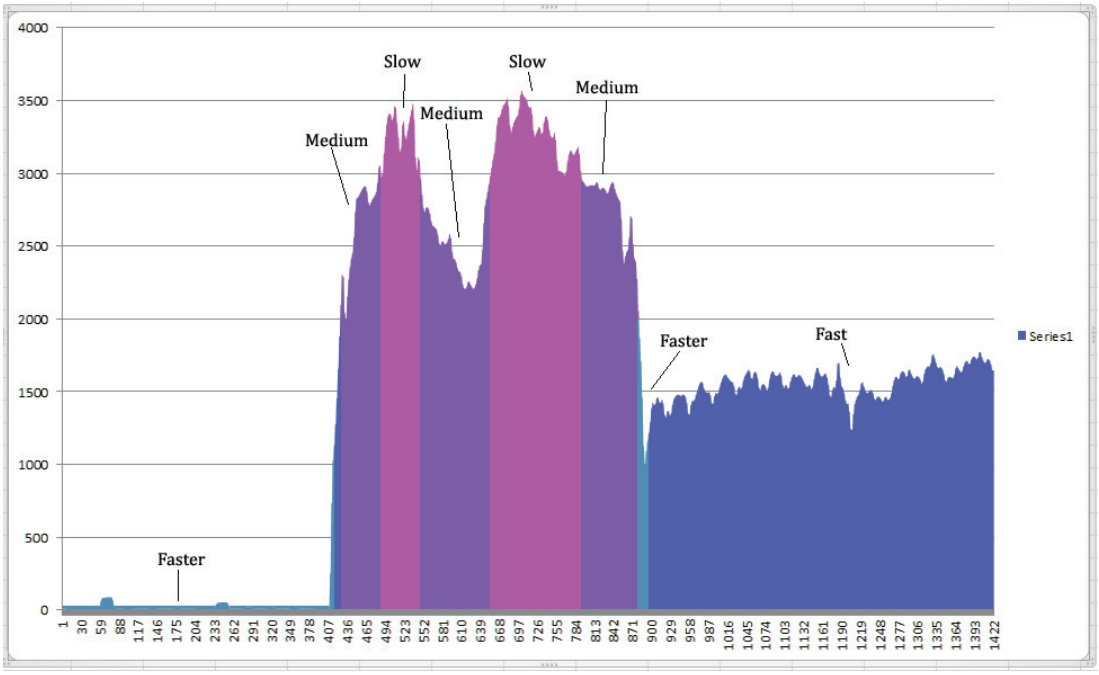
Dynamic Encoding adjusts the x265 preset used by Cambria FTC based upon the encoding complexity of the footage.

How Does It Work?

x265 is a high quality HEVC codec with potentially lengthy encoding times. To allow users to trade off quality and encoding time, the x265 developers created nine encoding presets that you can select in the Cambria FTC interface as shown on the left , with Medium as the default. As you would expect, Ultra fast produces the lowest quality in the shortest encoding time, while Very Slow produces the highest quality and the longest encoding times.

By default, once you assign a preset, it's applied to the entire video, which can be suboptimal. That is, if you apply a faster preset, you'll shorten encoding time, but some hard-to-encode regions in the video may look degraded. If you use a higher-quality preset, you'll improve quality in the harder-to-encode regions, but significantly lenghten encoding times in simpler regions, where a faster preset would look just as good.

What you really want is to apply a higher-quality preset to complex regions for optimal quality, and a faster preset everywhere else for faster encoding. That's what Dynamic Encoding does.



Technical Details

When Dynamic Encoding is enabled, the encoder runs a Constant Rate Factor (CRF) encode to gauge the encoding complexity of the footage, which produces an analysis like the graph above. Lower regions are easy to encode, while the peaks are harder to encode. Note the numerical scale on the left.

Now take a look at the Dynamic Encoding Settings on the top of page one. This shows the default settings for Dynamic Encoding, though as you'll see, you can customize all settings. As shown in the dialog, the default Medium preset is applied.

According to the settings shown, when the Video Complexity Threshhold is below 1250, Dynamic Encoding adjusts the preset two steps upward to Faster to accelerate encoding. When the threshold is between 1250 and 2000, Dynamic Encoding adjusts the preset one step upward to Fast.

Between 2000 and 3000, Cambria FTC uses the Medium preset with no adjustment. When levels exceed 3000, Cambria applies the Slow preset to optimize quality. You can see how Cambria would apply these adjustments in the graph above.

Using this schema, Dynamic Encoding applies higher quality presets to complex regions, and faster presets to simple regions, optimizing quality and encoding time.

Dynamic Encoding and Encoding Time

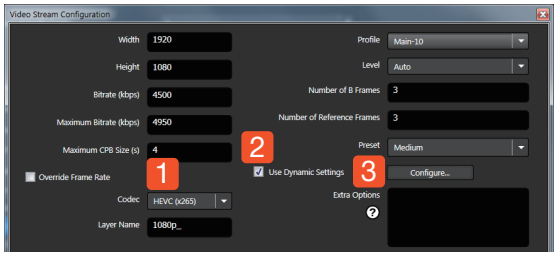
The CRF encode lengthens encoding time slightly. The most significant changes, upwards or downwards, will relate to the application of the different presets. Using the default settings, Dynamic Encoding will significantly accelerate the encoding of simple footage, like talking heads. However, it will lengthen the encoding time for more complex clips, though most producers will find the quality improvement worthwhile.

Dynamic Encoding and SABL

Source Adaptive Bitrate Ladder (SABL) is another Cambria FTC feature that adjusts the bitrate of the encoding ladder used for HLS or DASH encodes according to overall video complexity. SABL is a universal adjustment made to the entire video.

After applying SABL, producers can deploy Dynamic Encoding to optimize the quality of hard-to-encode regions and accelerate the encoding of simpler regions. The features are complementary, not mutually exclusive.

Using Dynamic Encoding



1. Dynamic Encoding is available in any preset where you can choose the x265 codec, whether single file or adaptive. To enable these controls, select the x265 codec.

2. To enable Dynamic Encoding, click the Use Dynamic Settings checkbox.

3. To configure Dynamic Encoding, click the Configure button, which opens the dialog shown below. Using the annotated buttons, you can easily add, delete, or edit a Video Complexity Threshold setting.

In the dialog, we're adding another setting to boost quality by 2 presets once complexity exceeds 5000.

Common Dynamic Encoding Options

Many users deploy Dynamic Encoding using the default settings, which are shown atop page one.

Many users also delete the third Video Complexity Threshold setting to accelerate encoding of simple footage. To accomplish this, click and select the third setting, click the Delete button, then click OK to save the updated settings.