

Encoding Sample

Overview

Encoding Sample works with **Intel® Media Server Studio 2015 for Linux Server**.

It demonstrates two usage models of **Media Server Studio – SDK** (hereinafter referred to as "**SDK**"):

- Creation of a simple console application that performs preprocessing and encoding of an uncompressed video stream according to a specific video compression standard;
- Integration of user-defined functions for video processing (picture rotation plug-in) into the **SDK** encoding pipeline.
- The sample could work together with **Intel® Media Server Studio – HEVC Decoder & Encoder** (hereinafter referred to as "**HEVC**").

Features

Encoding Sample supports the following video formats:

input (uncompressed)	YUV420, NV12
output (compressed)	H.264 (AVC), MPEG2-Video, JPEG*/Motion JPEG, HEVC (High Efficiency Video Coding)

Note: For format YUV420, **Encoding Sample** assumes the order Y, U, V in the input file.

Software and Hardware Requirements

- For general **SDK** requirements, please, see <msdk_install-folder>/media_server_studio_sdk_release_notes.pdf
- For the samples specific requirements, please, see <install-folder>/Samples Guide.pdf

Package Contents

Encoding Sample package contains the following:

<install-folder>/sample_encode

readme-encode.pdf	This file
CMakeLists.txt	CMake* configuration file
include	Header files for the sample
src	Source files for the sample

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<install-folder>/sample_encode/include

pipeline_encode.h	Header file for the encoding pipeline class
pipeline_user.h	Header file for the encoding pipeline with user functions class

<install-folder>/sample_encode/src

pipeline_encode.cpp	Source file for the encoding pipeline class
pipeline_user.cpp	Source file for the encoding pipeline with user functions class
sample_encode.cpp	Source file for the sample application

<install-folder>/sample_common

CMakeLists.txt	CMake configuration file
include	Header files for the common sample resources
src	Source files for the common sample resources

How to Build the Application

Use the *build.pl* script located at <install-folder>. For the details on how to build samples see <install-folder>/Media Samples Guide.pdf. Shortly, you may invoke the following commands to build the sample:

```
$ export MFX_HOME=/mediasdk/installation/folder
$ cd <install-folder>
$ ./build.pl --cmake=intel64,make,release --clean
$ cd <install-folder>/__cmake/intel64.make.release && make
```

Output will be placed in the following folder: <install-folder>/__cmake/intel64.make.release/__bin/release

Running the Software

Sample is buildable in a few variants depending on LibVA backends availability and support:

- sample_encode_drm – sample variant to run on the system without Graphic Server installed (for example, X)
- sample_encode_x11 – sample variant to run under X

The executable file *sample_encode_** (* - one of the supported backends) requires the following command-line switches to function properly:

h265 h264 mpeg2 jpeg	Output video type. The use of option h265 is possible only if HEVC is installed.
-i <InputFile>	Input (uncompressed) video file, name and path

<code>-o <OutputFile></code>	Output (compressed) video file, name and path
<code>-w <width></code>	Width of input video frame
<code>-h <height></code>	Height of input video frame
<code>-hw</code>	Use platform-specific implementation of SDK (default).
<code>-sw</code>	Use software implementation of SDK . Should not be set since there is no software library for Linux platforms.

The following command-line switches are optional:

<code>-nv12</code>	Signals that the input stream is in NV12 color format
<code>-tff bff</code>	Signals that the input stream is interlaced (top bottom field first). If this option is not specified, progressive stream is expected.
<code>-b <bitrate></code>	Bitrate of the encoded stream in Kbits/second
<code>-f <framerate></code>	Frame rate of the encoded stream (30 by default)
<code>-u <quality, speed, balanced></code>	Target usage (balanced by default). This parameter specifies a trade-off between quality and speed.
<code>-q</code>	The mandatory quality parameter for JPEG/Motion JPEG encoder (not valid for other encoders). In range [1,100], 100 is the best quality.
<code>-la</code>	Use the look ahead bitrate control algorithm (LA BRC) for H.264 encoder. Supported only with <code>-hw</code> library on processors with Intel® Iris™ Pro Graphics, Intel® Iris™ Graphics or Intel® HD Graphics 4200+ Series.
<code>-lad</code>	Depth parameter for the LA BRC, the number of frames to be analyzed before encoding. In range [10,100].
<code>-cqp</code>	Use constant quantization parameter (CQP BRC) bitrate control method (by default constant bitrate control method is used), should be used along with <code>-qpi</code> , <code>-qpp</code> , <code>-qpb</code> .
<code>-qpi</code>	Constant quantizer for I frames (if bitrate control method is CQP). In range [1,51]. 0 by default, i.e.no limitations on QP.
<code>-qpp</code>	Constant quantizer for P frames (if bitrate control method is CQP). In range [1,51]. 0 by default, i.e.no limitations on QP.
<code>-qpb</code>	Constant quantizer for B frames (if bitrate control method is CQP). In range [1,51]. 0 by default, i.e.no limitations on QP.
<code>-num_slice</code>	Number of slices in each video frame. 0 by default. If <code>num_slice</code> equals zero, the encoder may choose any slice partitioning allowed by the codec standard.
<code>-mss</code>	Maximum slice size in bytes. Supported only with hardware library (<code>-hw</code>) and H.264 encoder. This option is not

	compatible with -num_slice.
-dstw <width>	Width of encoded video frame. If specified and the value here is different from the value specified with -w, the encoder invokes video preprocessing (VPP) for scaling (resizing).
-dsth <height>	Height of encoded video frame. If specified and the value here is different from the value specified with -h, the encoder invokes video preprocessing (VPP) for scaling (resizing).
-vaapi	Use VA-API surfaces
-p guid path_to_plugin	32-character hexadecimal guid string or path to encoder plugin. Optional for SDK in-box plugins, required for user-encoder ones (HEVC, f.e.).
-async	Depth of asynchronous pipeline. default value is 4. must be between 1 and 20.
-opencl	Invokes Intel® OpenCL™ implementation of 180 degrees picture rotation. File <code>libsampl plugin_openc l.so</code> must be available.
-?	Print help

Below are examples of a command-line to execute **Encoding Sample**:

```
$ sample_encode_drm h264 -i input.yuv -o output.h264 -w 720 -h 480 -b 10000
-f 30 -u quality -d3d -hw

$ sample_encode_drm mpeg2 -i input.yuv -o output.mpeg2 -w 1920 -h 1080
-b 15000 -u speed -nv12 -tff -hw

$ sample_encode_drm h264 -i input.yuv -o output.h264 -w 1920 -h 1080
-dstw 360 -dsth 240 -b 1000 -u balanced -hw
```

Please, also pay attention on "Running the Software" section of `<install-folder>/Media Samples Guide.pdf` document where you will find important notes on backend specific usage (drm and x11).

Tip:

To achieve better performance, use input streams in NV12 color format. If the input stream is in YUV420 format, each frame is converted to NV12 which reduces overall performance.

Known Limitations

- Plugins loading by path feature is implemented using deprecated plugin loading mechanisms. Next versions of **Encoding Sample** will use different methods for path-based plugins loading.

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