

Media Samples Guide

Overview

Samples work with **Intel® Media Server Studio 2017 for Linux** (hereinafter referred to as "**SDK**").

They demonstrate how to incorporate the **SDK** API into various applications.

Some samples can work with **Intel® Media Server Studio – HEVC Decoder & Encoder** (hereinafter referred to as "**HEVC Encoder**", "**HEVC Decoder**", "**HEVC**").

Not all of the samples listed below might be applicable and supported for a particular product. Make sure to check the respective release notes document for potential limitations.

What's New

- sample_encode is extended with new options:
 - P010 raw input file format and encoding into 10-bit HEVC (using HEVC SW encoding plugin).
 - -ec::p010 option for color format conversion from 8-bit to 10-bit (for 10-bit HEVC encoding using HEVC SW encoding plugin)
 - -timeout option for continuous encoding in a loop
 - -membuf option for encoding from memory buffer (sample reads several frames into memory buffer and then encodes those buffered frames)
- Rendering improvements - frame buffering is added to sample_decode for smoother rendering
- VBR bitrate control mode is added to sample_multi_transcode
- install command is added to make for samples. make install installs samples to the default location

Package contents

Full list of available samples:

- **Video Decoding Sample**

Console application which performs decoding of elementary compressed video stream to raw frames. Includes the following features:

- stereoscopic 3D (S3D) rendering of elementary MVC (Multi-View Video Coding) streams
- decoding of HEVC (High Efficiency Video Coding) video via **HEVC Decoder**
- decoding with video post processing (color conversion) of raw video sequences
- screen capturing via screen capture plugin

- **Video Encoding Sample**

Console application which performs encoding of raw video frames into elementary compressed stream. Includes the following features:

- video resizing
- video rotation via User Plug-in Sample

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- video rotation via User Plug-in Sample using OpenCL™
- encoding HEVC video via **HEVC Encoder**
- **Video Processing Sample**
Console application which performs various video processing algorithms on raw frames.
- **Video Transcoding Sample**
Console application which performs transcoding of elementary video stream from one compressed format to another. Includes the following features:
 - multiple video streams transcoding
 - video resizing, de-interlacing
 - video rotation via User Plug-in Sample
 - video rotation via User Plug-in Sample using OpenCL
 - video processing using VPP algorithms
- **OpenCL Video Motion Estimation Sample and OpenCL Advanced Video Motion Estimation Samples**
Console application which provides step-by-step guidelines on the using Intel's motion estimation extension for OpenCL standard. The motion estimation extension includes a set of host-callable functions for frame-based Video Motion Estimation.

Each sample includes:

- a readme file for each sub-sample
- source and header files for each sub-sample

Samples package has one installer for all sub-samples.

Software & Hardware Requirements

Hardware:

- Hardware requirements are the same as described in **SDK Release Notes**
- (Optional) HDMI* 1.4, eDP* 1.1 or similar based monitor/TV as primary display
- (Optional) Active shutter glasses

Software:

- See <msdk_install-folder>/media_server_studio_sdk_release_notes.pdf for **SDK** general requirements. To build **Samples** you additionally need the following components to be installed and properly configured on the system:
- **For CentOS*:**

```
$ sudo yum install gcc g++ make cmake perl libX11-devel mesa-libGL-devel
```
- Samples can be built with GCC/G++ compiler version 4.6 and CMake* version 2.8.0 or higher.
- For samples with OpenCL (**Video Encoding, Video Transcoding, Video Motion Estimation, Interoperability**) it is required to install **Intel® Media Server Studio – Code Builder** and **Intel® Media Server Studio – Graphics Drivers**.

Build Instructions

To build samples the following environment variable should be setup:

```
$ export MFX_HOME=/mediasdk/installation/folder
```

Go to the samples directory and execute `build.pl` script without arguments to see the help:

```
$ ./build.pl
Copyright (c) 2014 Intel® Corporation. All rights reserved.
This script performs Samples projects creation and build.
Usage: perl build.pl --cmake=ARCH,GENERATOR,CONFIG [--clean] [--build]
Possible variants:
  ARCH = intel64
  GENERATOR = make
  CONFIG = debug | release
Environment variables:
  MFX_HOME=/path/to/mediasdk/package # required
  MFX_VERSION="0.0.000.0000" # optional
Optional flags:
  --clean - clean build directory before projects generation / build
  --build - try to build projects before generation (requires
cmake>=2.8.0)
Examples:
  perl build.pl --cmake=intel64,make,debug [ only
generate projects ]
  perl build.pl --cmake=intel64,make,debug --build [ generate
and then build ]
  perl build.pl --cmake=intel64,make,debug --build --clean [ generate,
clean and build ]
```

Script invokes specified CMake* projects generator and optionally builds them (option available for `cmake>=2.8.0`). At the moment only make files generator for UNIX-like systems is supported. Project files will be placed in the folder named by the requested configuration; for example:

```
/__cmake
intel64.make.release
intel64.make.debug
```

To build generated project files use generator-specific approaches. For example, to build samples from make files invoke:

```
$ make -C <install-folder>/__cmake/intel64.make.release
```

With CMake older than 2.8.0 all samples can be built at once with the following command:

```
$ ./build.pl --cmake=intel64,make,release --clean --build
```

Binaries will appear in the following folder:

```
$ ls -l __cmake/intel64.make.release/__bin/release/
sample_decode
sample_encode
sample_multi_transcode
sample_vpp
```

Running the Software

DRM backend specific notes:

- For application to work thru DRM application should be authorized to access graphics card. VA-API DRM backend supports 2 authentication models:

- The first model can be applied on the system with no installation of Graphic Server. In this case you need root privileges to run:

```
$ sudo LD_LIBRARY_PATH=$MEDIASDK_INSTALL_FOLDER/bin/x64 \
$ sample_decode h264 -i input.264 -o output.yuv -vaapi -hw
```

- The second model assumes that X server is installed and running. In this case DRM authentication will actually go thru LibVA X11 backend and, thus, thru X server which already has access to the graphic card. The only thing user should be sure in is that he is logged on to the X server (or has access) and DISPLAY environment variable is set properly. For example:

```
$ export DISPLAY=:0.0
$ sudo LD_LIBRARY_PATH=$MEDIASDK_INSTALL_FOLDER/bin/x64 \
$ sample_decode h264 -i input.264 -o output.yuv -vaapi -hw
```

- It can be noted that DRM-itself authentication can still be tried out even with running X server, but you need to remove DISPLAY environment variable and use root privileges:

```
$ export -n DISPLAY
$ sudo LD_LIBRARY_PATH=$MEDIASDK_INSTALL_FOLDER/bin/x64 \
$ sample_decode h264 -i input.264 -o output.yuv -vaapi -hw
```

X11 backend specific notes:

- To use this backend user should be sure that he is logged into X server or is allowed to make connections to the X server
- If user is allowed to use X and logged into machine remotely (thru SSH) he needs DISPLAY environment variable properly set. For example:

```
$ export DISPLAY=:0.0
$ sample_decode h264 -i input.264 -o output.yuv -vaapi -hw
```

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