

Media Samples Guide

Overview

Samples work with **Intel® Media Server Studio 2015 for Linux Server** “**Production**” and “**Preview**” versions.

They demonstrate how to incorporate **Intel Media Server Studio – SDK** (hereinafter referred to as “**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**”).

Full Transcoding Sample can work with **Intel Media Server Studio – Audio Decoder & Encoder** (hereinafter referred to as “**Audio library**”).

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

Samples included in **Preview** version of **Intel® Media Server Studio 2015 for Linux** Server contains the following new features:

- New **Video Encoding with FEI (Flexible Encoder Infrastructure) Sample** which performs streaming of extended encoder information during encoding process. The sample needs **SDK** headers that are available only in **Professional** edition of **Intel® Media Server Studio 2015 for Linux Server**.
- Hardware implementation (“-hw” key) of **SDK** video library is selected by default for all of **Samples**.
- Premium Telecine Interlace Reverser (PTIR) feature support is added to **Video Processing Sample**. The feature needs **SDK** headers that are available only in **Professional** edition of **Intel® Media Server Studio 2015 for Linux Server**.
- **VP8 Decoder Plugin** via FFmpeg is excluded.

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
- **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
 - video rotation via User Plug-in Sample using Intel OpenCL™
 - encoding HEVC video via **HEVC Encoder**
- **Video Encoding with FEI Sample (New!)**
 Console application that performs encoding of raw video frames into elementary compressed stream and in parallel streams extended information about encoding process into specified output. Included only in **Preview** version of **Intel® Media Server Studio 2015 for Linux Server**.
- **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 Intel OpenCL
- **Video Conferencing Sample**
 Console application which performs encoding of raw video frames into elementary compressed stream. Shows various encoding features specific to video conferencing use case.
- **Full Transcoding Sample**
 Console application which performs full scale transcoding of media files: allows changing container format and video/audio compression formats. Includes the following features:
 - shows usage of the new **Splitters and Muxers Sample** using FFmpeg
 - shows usage of the **Audio Library**

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 Requirements

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 **Ubuntu* 12.04**:

```
$ sudo apt-get install gcc g++ make cmake perl xserver-xorg-dev
```

For **SLES* 11 SP3**:

```
$ sudo zypper install gcc46 gcc46-c++ make cmake perl xorg-x11-devel
$ ln -s gcc-4.6 gcc
$ ln -s g++-4.6 g++
```

Samples can be built with GCC/G++ compiler version 4.6 and CMake* version 2.6.2 or higher.

For **Video Encoding with FEI Sample** and PTIR feature in **Video Processing Sample** it is required to have **Professional** version of **Intel® Media Server Studio 2015 for Linux Server Preview** installed.

For **Splitters and Muxers Sample** and **Full Transcoding Sample** you will also need several additional dynamic libraries which are the part of FFmpeg* codec libraries, particularly:

libavutil, version 52.38.100

libavcodec, version 55.18.102

libavformat, version 55.12.100

You can install them from the package manager or build from sources. Please, check the official compilation guide at <https://trac.ffmpeg.org/wiki/CompilationGuide> for build instructions.

For samples with OpenCL (**Video Encoding, Video Transcoding, Video Motion Estimation, Interoperability**) it is required to have Intel® SDK for OpenCL™ Applications installed. Please refer <http://software.intel.com/en-us/vsource/tools/opencl-sdk> for details.

Sample Locations

Material for each sample application is located in the following folder:

Sample	Location
Console Decoding	<install-folder>/sample_decode
Console Decoding with VPP	<install-folder>/sample_decvpp
Console Encoding	<install-folder>/sample_encode
Console Encoding with FEI	<install-folder>/sample_fei
Console Video Processing	<install-folder>/sample_vpp
Console Transcoding	<install-folder>/sample_multi_transcode
Full Transcoding	<install-folder>/sample_full_transcode
Splitters and Muxers	<install-folder>/sample_spl_mux
Video Conferencing	<install-folder>/sample_videoconf

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_drm
sample_decode_x11
sample_encode_drm
sample_encode_x11
sample_multi_transcode_drm
sample_multi_transcode_x11
sample_videoconf_drm
sample_videoconf_x11
sample_vpp_drm
sample_vpp_x11
```

Samples with Hardware Acceleration support are buildable in a few variants depending on the availability of LibVA backends. For example:

- sample_decode_drm – sample variant with HW acceleration support to be run on the system without Graphic Server installation (i.e. LibVA DRM backend is used).
- sample_decode_x11 – sample variant with HW acceleration support to be run under X Server (i.e. LibVA X11 backend is used).

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_drm h264 -i input.264 -o output.yuv -d3d -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_drm h264 -i input.264 -o output.yuv -d3d -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_drm h264 -i input.264 -o output.yuv -d3d -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_x11 h264 -i input.264 -o output.yuv -d3d -hw
```

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