Intel® Media Software Development Kit 2014 R2 for Linux* Servers Release Notes

(Version 5.0.1603344.93446)

Overview

Intel® Media Software Development Kit for Linux* Servers (Intel Media SDK) is an SDK for optimizing datacenter and embedded media applications for Linux server operating systems to utilize Intel Iris™ Pro and Intel HD Graphics hardware acceleration capabilities.

This document covers product features, system requirements and known limitations. For installation procedures description please see the `mediasdk_getting_started_guide.pdf`.

New in This Release

- Intel® Media SDK DRM Authentication Server tool provides a solution for running multiple Intel Media SDK sessions under regular/unprivileged user accounts. Please see `<unpack_folder[1]>/MSDK/<version>/l_MSDK/tools/drmserver/drmserver_release_notes.pdf` and https://software.intel.com/en-us/articles/using-drmserver-with-media-sdk-for-linux-servers-applications for more details.

- Intel Media SDK API version 1.10. Compared to the previous release (with API version 1.8), the following new features are supported:

  (API 1.10)

  - Standalone Look Ahead (LA) algorithm (`mfxExtLAControl`, `mfxExtLAFrameStatistics`, `MFX_RATECONTROL_LA_EXT`) implemented as a plugin using `mfxVideoENC` class of functions.

    Usage of the standalone LA is recommended in 1->N transcoding applications to optimize performance and memory consumption.

    1->N pipeline with standalone LA, LA runs once:

Decode->ENCplugin(standalone_LA)->N*Encode(MFX_RATECONTROL_LA_EXT)

1->N pipeline with traditional/integrated LA, LA runs N times:

Decode->N*Encode(MFX_RATECONTROL_LA)

- `mfxExBufferingPeriodSEI` allows to control buffering period SEI frequency in the encoded stream.

(API 1.9)

- Alpha Blending extension for VPP Composition (`mfxVPPCompInputStream:: LumaKeyEnable, LumaKeyMin, LumaKeyMax, GlobalAlphaEnable, GlobalAlpha, PixelAlphaEnable`)
- `mfxExtAVCRefLists` buffer which gives full control over reference lists for H.264 encode.
- `mfxExtAVCEncodedFrameInfo::secondFieldOffset` which allows to split frame-wise encoded bitstream into fields and is a light weight alternative to `FieldOutput` mode which has certain limitations (e.g. is not supported with mixed picture structure encoding).

- JPEG*/Motion JPEG decode and encode, pure software implementation.
- VPP Composition alpha blending now production quality.
- Issues in mixed picture structure encoding for H.264 encode were fixed.
- Corruption reporting and recovery was enabled in VC-1/MPEG2/H.264 decoders.
- MPEG2 encode user data insertion was enabled.
- New packaging and installation options: in addition to the legacy/full tar.gz package, separate runtime and development sub-packages are provided in .rpm and .deb format. Please see `mediasdk_getting_started_guide.pdf` for more details.

Detailed description of the new API features can be found in Intel® Media SDK Reference Manual "`<unpack_folder>/MSDK/<version>/l_MSDK/doc/mediasdk-man.pdf`"

For information on the USER class please see "`<unpack_folder>/MSDK/<version>/l_MSDK/doc/mediasdkusr-man.pdf`"

For information on JPEG*/Motion JPEG Video Coding support please see "`<unpack_folder>/MSDK/<version>/l_MSDK/doc/mediasdkjpeg-man.pdf`"

[1] As multiple installation layouts are possible, we provide file paths relative to the folder where `intel-linux-media_<os>_<version>_64bit.tar.gz` package is unpacked.

Features

Hardware accelerated Intel® Media SDK Library included in this package implements Intel Media SDK API 1.10 and contains the following components:

Component	Supported features	Limitations
H.264 decoder	Supported Profiles: • Baseline • Main • High	Maximum supported resolution: 4096x2304
H.264 encoder	Supported Profiles: • Baseline • Main • High Supported BRC methods: • Constant QP (CQP) • Constant Bit Rate (CBR) • Variable Bit Rate (VBR) • Look Ahead (LA)	Maximum supported resolution: 4096x2304
MPEG-2 decoder	Supported Profiles: • Simple • Main • High	Maximum supported resolution: 1920x1088
MPEG-2 encoder	Supported Profiles: • Simple • Main • High Supported BRC methods: • Constant QP (CQP) • Constant Bit Rate (CBR) • Variable Bit Rate (VBR)	Maximum supported resolution: 1920x1088
VC1 decoder	Supported Profiles: • Simple • Main • Advanced	Maximum supported resolution: 1920x1088

MJPEG encoder (SW only)	Supported Profiles: • Baseline mode, 8bit	Maximum supported resolution: 8192x8192
MJPEG decoder (SW only)	Supported Profiles: • Baseline mode, 8bit	Maximum supported resolution: 8192x8192
Video Pre Processing (VPP)	Supported Algorithms: • Color Conversion • Scaling • De-Interlacing • De-noising • Frame Rate Conversion • Composition	Maximum supported resolution: 4096x2304

Common for all components: minimum supported resolution is 32x32, frame width must be a multiple of 16, frame height must be a multiple of 16 for progressive frames and a multiple of 32 otherwise.

Please see the Intel Media SDK Reference Manual for details
"`<install-folder>/doc/mediasdk-man.pdf`"

System Requirements

Hardware

The following processor models are supported:

- Intel® Xeon® Processor E3-1285 v3/E3-1285L v3 and E3-1286 v3/E3-1286L v3 with Intel C226 Chipset.
- 4th Generation Intel Core™ Processors with Intel Iris™ Pro Graphics, Intel Iris Graphics or Intel HD Graphics 4200+ Series
- 3rd Generation Intel Core Processors with Intel HD Graphics 4000/2500

Please note: Only the Intel Xeon processor + chipset combinations listed above are supported. Other Intel Xeon configurations are not supported. Intel Core processors earlier than 3rd Generation are not supported. Intel Celeron®, Intel Pentium® and Intel Atom™ processors are also not supported.

Software

- Ubuntu* 12.04 LTS for 64-bit architecture (currently 12.04.3) or SUSE* Linux* Enterprise Server 11 for 64-bit architecture
- Xf86-video-intel driver (needed only for local rendering with LibVA X11 backend support). Recommended version: 2.20.10,

http://cgit.freedesktop.org/xorg/driver/xf86-video-intel/snapshot/xf86-video-intel-2.20.10.tar.gz

- FFmpeg* (needed for the Splitters and Muxers Sample and for the Full Transcoding Sample). Recommended version: 2.1.4, http://www.ffmpeg.org/releases/ffmpeg-2.1.4.tar.bz2
- Additional platform-specific software requirements (X indicates a supported combination – **only these hardware/kernel combinations are supported**):

OS	Ubuntu* 12.04 LTS		SUSE* Linux* Enterprise Server 11
Kernel version	3.2.0-41	3.8.0-23	SP3 3.0.76-11
Intel® Xeon® E3-1285 v3 / 4th Generation Intel Core™		X	X
3rd Generation Intel Core™	X		X

Package Contents

As multiple installation layouts are possible, we provide files description according to the tar.gz packages layout.

File paths below are relative to the folder "`<unpack_folder>/MSDK/<version>/l_MSDK`", where `<unpack_folder>` is the folder where `intel-linux-media_<os>_<version>_64bit.tar.gz` package is unpacked.

Component	Description
`./bin/x64/libmfxhw64-p.so.1.10`	Intel Media SDK Dynamic Library
`./bin/x64/libmfxhw64.so`	Symbolic link to Intel Media SDK Dynamic Library
`./doc`	Intel Media SDK documentation: • Intel Media SDK Reference Manual `mediasdk-man.pdf` • Intel Media SDK Extensions for User-Defined Functions Manual `mediasdkusr-man.pdf` • Intel Media SDK Reference Manual for Motion JPEG `mediasdkjpeg-man.pdf` • Samples Overview `MediaSDK Sample Guide.pdf`

./include	External Intel Media SDK headers: • Structure definitions in mfxstructures.h, mfxastructures.h, mfxvstructures.h and mfxcommon.h • Audio function definitions in C in mfxaudio.h • C++ wrapper for Media SDK audio functions in mfxaudio++.h • Type definitions in mfxdefs.h • mfxVideoENC functions definitions mfxenc.h • Extensions for Motion JPEG Video coding options mfxjpeg.h • Extensions for standalone Look Ahead algorithm mfxla.h • Extensions for Multi-view Video Coding options mfxmvc.h • Extensions for User-Defined Functions mfxplugin.h • C++ wrapper for User-Defined Functions mfxplugin++.h • Session management function definitions in mfxsession.h • Function definitions in C in mfxvideo.h • C++ wrapper of the SDK functions in mfxvideo++.h
./lib/lin_x64	• Static Dispatcher Library libmfx.a

`./samples`	• Samples build script `build.pl`
	• CMake* configuration file CmakeLists.txt
	• Contains the following source code samples:
	  ○ Intel Media SDK Decoding Sample in folder `sample_decode`.
	  ○ Intel Media SDK Decoding Sample with VPP in folder `sample_decvpp`.
	  ○ Intel Media SDK Encoding Sample in folder `sample_encode`
	  ○ Intel Media SDK Full Transcoding Sample in folder `sample_full_transcode`
	  ○ Intel Media SDK Transcoding Sample in folder `sample_multi_transcode`
	  ○ Intel Media SDK Splitters and Muxers Sample in folder `sample_spl_mux`
	  ○ Intel Media SDK User VPP Plug-in for rotation in folder `sample_user_modules`
	  ○ Intel Media SDK Video-conferencing Sample in folder `sample_videoconf`
	  ○ Intel Media SDK Video Processing Sample in folder `sample_vpp`

./samples/_bin/x64	Pre-built binaries of installed sample applications
	• Console sample application binaries (DRM): (this is the expected interface for most production applications)
	`sample_encode_drm`
	`sample_decode_drm`
	`sample_decvpp_drm`
	`sample_vpp_drm`
	`sample_multi_transcode_drm`
	`sample_videoconf_drm`
	`sample_full_transcode_drm`
	• Console sample application binaries (X11): (X11 mode provided for rendering convenience. It is not expected to be used in production and is not well optimized.)
	`sample_encode_x11`
	`sample_decode_x11`
	`sample_decvpp_x11`
	`sample_vpp_x11`
	`sample_videoconf_x11`
	`sample_multi_transcode_x11`
	`sample_full_transcode_x11`

./builder	CMake helper scripts.
./opensource	Source code for the Intel Media SDK Dispatcher
./tools/drmserver	Intel® Media SDK DRM Authentication Server

Version Information

To obtain Intel® Media SDK Library version run the following command (output should be as provided below):

```
$ strings libmfxhw64.so | grep mediasdk
mediasdk_product_version: 5.0.1603344.93446
mediasdk_file_version: 5.14.5.27
mediasdk_copyright: Copyright(c) 2007-2014 Intel Corporation
mediasdk_product_name: Intel(r) Media SDK 2014 R2 for Linux* Servers
```

Version numbers are the first line of output from the prebuilt samples when run without any command-line options. For example:

```
$ ./sample_decode_drm
Intel(R) Media SDK Decoding Sample Version 5.0.1603344.93446
$ ./sample_encode_drm
Intel(R) Media SDK Encoding Sample Version 5.0.1603344.93446
$ ./sample_vpp_drm
Intel(R) Media SDK VPP Sample Version 5.0.1603344.93446
$ ./sample_multi_transcode_drm
Intel(R) Media SDK Multi Transcoding Sample Version 5.0.1603344.93446
```

Known Limitations

This release is subject to the following known limitations:

- **API:**

  Intel® Media SDK API is designed for a range of products. A particular product release may support only a subset of the features of the declared API version. This release has the following API limitations:

  - Only the following features among those introduced in API 1.7 are supported:
    - `RateControlMethod::MFX_RATECONTROL_LA`
    - `mfxExtCodingOption2::LookAheadDepth`
    - `mfxExtCodingOption2::MBBRC`
    - `mfxExtCodingOption2::Trellis`
  - Only the following features among those introduced in API 1.8 are supported:
    - `mfxVideoCodecPlugin`
    - `mfxExtVPPComposite`
    - `mfxExtVPPDeinterlacing`
    - `mfxExtCodingOption2::LookAheadDS`
    - `mfxHandleType::MFX_HANDLE_VA_DISPLAY`
    - `mfxImpl::MFX_IMPL_VIA_VAAPI`
  - Only the following features among those introduced in API 1.9 are supported:
    - `mfxVPPCompInputStream:: LumaKeyEnable, LumaKeyMin, LumaKeyMax, GlobalAlphaEnable, GlobalAlpha, PixelAlphaEnable`
    - `mfxExtAVCRefLists`
    - `mfxExtAVCEncodedFrameInfo::secondFieldOffset`
  - Only the following features among those introduced in API 1.10 are supported:
    - `MFXVideoENC` class of functions

- `mfxENCInput`
- `mfxENCOutput`
- `mfxExtLAControl`
- `mfxExtLAFrameStatistics`
- `RateControlMethod::MFX_RATECONTROL_LA_EXT`

Additionally, all the APIs listed above, except for `mfxVideoCodecPlugin`, `mfxHandleType::MFX_HANDLE_VA_DISPLAY` and `mfxImpl::MFX_IMPL_VIA_VAAPI`, are supported only on Intel Xeon® E3-1200 v3 / 4th Generation Intel Core™ platforms. Make sure to call `Query` functions to check the actual support on particular platform at runtime.

- **Performance:**
  - Advanced De-Interlacing provides better quality but might be slower than BOB DI in some cases. API control `mfxExtVPPDeinterlacing` provides application control of de-interlacing method.
  - Transcoding to H.264 on lower target usages might show worse performance as compared to Intel Media SDK for Linux Servers 2013 R2 on Intel Xeon E3-1200 v3 / 4th Generation Intel Core platforms. This effect is due to several encoding features improving subjective and objective visual quality being enabled by default (multiple reference frames, MBBRC, Trellis).
- **H.264 encode:**
  - Look Ahead BRC may generate non HRD-compliant streams.
  - Careful memory/resource planning is needed when using Look Ahead BRC due to storage of pre-analyzed frames. 1:N and N:N transcoding use cases are especially demanding for memory.
  - Trellis option can be enabled only on lower target usages, on some of those it is enabled by default but can be switched off. Exact implementation details are hidden and may change with time and between platforms. Use of `Query` function to retrieve actual support is strongly recommended.
  - MBBRC option is enabled by default on lower target usages but can be switched off. Exact implementation details are hidden and may change with time and between platforms, so using `Query` function to retrieve actual support is strongly recommended.
- **MPEG-2 encode:**
  - The MPEG-2 encoder is hardware accelerated only on Intel Xeon E3-1285 v3 / 4th Generation Intel Core platforms. On 3rd Generation Intel Core software fallback will be used.
  - The MPEG-2 encoder may produce output that under-runs the MPEG-2 video buffer verifier hypothetical reference decoder model (VBV HRD) on some streams.
- **JPEG/MJPEG decode and encode** support only the below feature set:
  - Baseline mode only

        - DCT based
        - 8-bit samples
        - sequential
        - loadable 2 AC and 2 DC Huffman tables
        - 3 loadable quantization matrixes
        - interleaved and non-interleaved scans
        - single and multiple scans
    - No extended, lossless and hierarchical modes
        - no 12-bit samples
        - no progressive
        - no arithmetic coding
        - no 4 AC and 4 DC Huffman tables
    - Resolution is not limited to 8192x8192 but wasn't well tested beyond this limit.
- New Decoding with Video Processing Sample under `<unpack_folder>/MSDK/<version>/l_MSDK/samples/sample_decvpp` is not yet functional.
- Limitations related to source code samples are discussed in their corresponding readme files. See "`<install-folder>/doc/MediaSDK Sample Guide.pdf`" for an overview of the samples and additional documentation.

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