Intel® Media Software Development Kit 2014 for Clients Release Notes
(Version 5.0.0000337.78585)

Overview

The **Intel® Media Software Development Kit for Clients (Intel® Media SDK for Clients)** is a software development library that exposes the media acceleration capabilities of Intel® platforms for decoding, encoding and video preprocessing. The API library covers a wide range of Intel platforms. The Intel Media SDK targets general application developers who want to integrate encoding and decoding into their applications.

New Features

Intel® Media SDK 2014 introduces a new package structure. Samples will be now distributed separately from the main package as a number of logically divided standalone packages. The new Intel Media SDK Audio Library (a software audio codec library) will be distributed as another standalone package.

Please go to Intel Media Solutions Portal for more details.

This document will further cover only the so called "core" package containing the Intel Media SDK video library, Intel Media SDK dispatcher, external headers and debug tools.

Intel® Media SDK 2014 introduces API version 1.8. This version is backwards compatible with the previous API version 1.7. API version 1.8 introduces the following major features:

- An extension of the USER class functions API, specialized for Decode, Encode and VPP, to provide ease of use interfaces for integration of user-defined Decode, Encode and VPP functions into Intel Media SDK pipelines.

- VPP composition feature to compose several raw video streams into one.

- Ability to choose VPP de-interlacing algorithm (BOB or advanced)

- Numerous enhancements to the AVC Encoder capabilities (new BRC modes, extended GOP control etc.)

Here is the detailed list of new APIs:

- `mfxVideoCodecPlugin` contains declaration of the new interfaces for Decode, Encode and VPP USER functions.

- `mfxExtVPPVideoSignalInfo` configures transfer matrix and nominal range of YUV frames.

- `mfxExtVPPComposite` configures VPP composition filter.

- `mfxExtVPPDeinterlacing` controls the choice of VPP de-interlacing algorithm

- `mfxExtAVCRefListCtrl::ApplyLongTermIdx` and `LongTermIdx` allow to manage long-term reference frames in AVC Encode.

- `mfxExtEncoderROI` allows the application to specify different Region Of Interests during encoding.

- `mfxExtAVCEncodedFrameInfo::MAD` provides mean absolute difference between original and motion compensated pixels of the frame.

- `mfxExtAVCEncodedFrameInfo::BRCPanicMode` notifies application that bitrate control was not able to allocate enough bits for this frame and frame quality may be unacceptably low.

- `mfxExtCodingOption2::RepeatPPS` controls PPS repetition before each frame for AVC encoder.

- `mfxExtCodingOption2::BRefType, AdaptiveI, AdaptiveB` provide additional controls over AVC encoder GOP structure.

- New bit-rate control modes: `MFX_RATECONTROL_ICQ` – the intelligent constant quality algorithm, `MFX_RATECONTROL_LA_ICQ` – the intelligent constant quality algorithm with look ahead, `MFX_RATECONTROL_VCM` – video conferencing mode algorithm.

- `mfxInfoMFX::ICQQuality` specifies the quality factor for `MFX_RATECONTROL_ICQ` and `MFX_RATECONTROL_LA_ICQ`.

- `mfxExtCodingOption2::LookAheadDS` controls down sampling in look ahead bitrate control mode.

- `mfxFrameData::Pitch` was replaced by `PitchHigh` and `PitchLow` fields to extend value range of surface pitch parameter.

- `mfxExtCodingOption2::NumMbPerSlice` specifies suggested slice size in number of macroblocks.

- `mfxEncodeCtrl::SkipFrame` tells encoder to encode a certain frame as "dummy" (frame where all macroblocks are encoded as skipped).

- `mfxExtAVCEncodedFrameInfo::QP` notifies the app about chosen luminance plane QP.

Please note that all the new APIs listed above, except for `mfxVideoCodecPlugin`, `mfxFrameData::PitchHigh, PitchLow` and `mfxExtVPPVideoSignalInfo`, are not supported by software implementation of Intel Media SDK Library. Make sure to call

`Query` functions to check actual support in hardware implementation of Intel Media SDK Library on particular platform.

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

For information on the USER class please see "`<install-folder>\doc\mediasdkusr-man.pdf`"

For information on Multi-view Video Coding support please see "`<install-folder>\doc\mediasdkmvc-man.pdf`"

For information on JPEG*/Motion JPEG Video Coding support please see "`<install-folder>\doc\mediasdkjpeg-man.pdf`"

System Requirements

Hardware

- IA-32 or Intel® 64 architecture processors with support for Intel® Streaming SIMD Extensions 2 instructions.

- For S3D display functionality using `igfx_s3dcontrol` library:
    1. 2nd Generation Intel® Core™ Processors with Intel® HD Graphics 3000/2000 or later
    2. HDMI* 1.4, eDP* 1.1 or similar based monitor/TV as primary display
    3. Active shutter glasses

Software

- Microsoft* Windows* 7 , Microsoft Windows 8 or Microsoft Windows 8.1

- For Microsoft DirectX* 11 functionality - Microsoft Windows 8 or Microsoft Windows 8.1.

- Microsoft Visual C++* 2005 with Service Pack 1, or later version of Microsoft Visual C++.

Package Contents

Note: The suffix `<arch>` indicates 32- or 64-bit Microsoft* Windows* (either "`win32`" or "`x64`"). Both are always installed to allow for cross-platform development.

`<install-folder>`	Intel® Media SDK Release Notes (this file), End User License Agreement (EULA) "`Intel Media SDK EULA.rtf`", a license file `license.txt`
`<install-folder>\` `bin\<arch>`	Intel® Media SDK Dynamic Library, software implementation: `libmfxsw32.dll` for IA-32 architecture

	`libmfxsw64.dll` for Intel® 64 architecture
`<install-folder>\doc`	Intel® Media SDK documentation: • Intel® Media SDK Reference Manual `mediasdk-man.pdf` • Intel® Media SDK Extensions for User-Defined Functions `mediasdkusr-man.pdf` • Intel® Media SDK Extensions for Multi-view Video Coding `mediasdkmvc-man.pdf` • Intel® Media SDK Extensions for JPEG*/Motion JPEG `mediasdkjpeg-man.pdf` • Intel® Media Developer's Guide `Intel_Media_Developers_Guide.pdf` • Intel® Media SDK Library Distribution and Dispatching Process Description `mediasdk-distrib.pdf`
`<install-folder>\ include`	External Intel® Media SDK headers: • Type definitions in `mfxdefs.h` • Structure definitions in `mfxstructures.h`, `mfxastructures.h`, `mfxvstructures.h` and `mfxcommon.h` • SDK session related definitions in `mfxsession.h` • Video function definitions in C in `mfxvideo.h` • C++ wrapper of the SDK video functions in `mfxvideo++.h` • Audio function definitions in C in `mfxaudio.h` • C++ wrapper of the SDK audio functions in `mfxaudio++.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` • Extensions for JPEG*/Motion JPEG Video coding options `mfxjpeg.h`

`<install-folder>\`
`lib\`
`<arch>`
	Static Dispatcher Library `libmfx.lib`

`<install-folder>\`	S3D API definitions `igfx_s3dcontrol.h`

`igfx_s3dcontrol\` `include`	

`<install-folder>\`
`igfx_s3dcontrol\`
`lib\<arch>`
	Static S3D Control Library `igfx_s3dcontrol.lib`

`<install-folder>\` `igfx_s3dcontrol\`	Displaying S3D with Intel® HD Graphics Developers Guide `Displaying S3D with Intel HD Graphics.pdf`
`<install-folder>\` `opensource\`	Source code of Intel® Media SDK dispatcher
`<install-folder>\` `tools\`	Contains the following tools in binary form: • Intel® Media SDK Tracer in folder `mediasdk_tracer`. This utility performs runtime recording of Intel Media SDK API calls and parameters to a log file. • Intel® Media SDK System Analyzer in folder `mediasdk_sys_analyzer`. This utility analyzes the system and reports back Intel Media SDK related capabilities, graphics driver and components status.

Installation

- Installation requires full administrative rights.
- Extract files from the `.ZIP` file to the target hard drive.
- Run the installer `Intel(R)_Media_SDK_x86_x64.exe`.

Known Limitations

The Intel® Media SDK library has the following known limitations:

- The Intel Media SDK dispatcher `libmfx.lib` is best used with a standard DLL entry point (as recommended by Microsoft*) when used in a DLL application such as a Microsoft DirectShow* filter. The DLL entry point setting can be found under the `Link > Advanced` compiler options. Non-standard entry points can be used, but are not recommended.
- Loading of library `libmfxsw32.dll`/`libmfxsw64.dll` not through the dispatcher is unsafe.
- Using the Intel Media SDK in parallel with Intel® Threading Building Blocks could impact performance.

- Frames for different views in single AU in MVC encoder must be provided to encoder in order specified by `mfxMVCViewDependency`.

- `MFX_EXTBUFF_AVC_REFLIST_CTRL` and `MFX_EXTBUFF_CODING_OPTION_SPSPPS` external buffers are not supported by MVC encoder.

- MVC encoder supports `MFX_PROFILE_AVC_STEREO_HIGH` only.

- H.264 encoder doesn't support processing of `mfxExtPictureTimingSEI` template. During initialization 0xFFFF values will be reset to default values. In runtime 0xFFFF values will be put to bitstream as is.

- Known limitations for H.264 Multiple-Segment Encoding:

  - Hardcoded HRD parameters: `bit_rate_scale = 0`, `cpb_size_scale = 3`
  - Encoded `bit_rate_value_minus1`, `bit_rate_scale` represent BitRate from original SPS within precision of kbps (maximum supported BitRate is $2^{16} - 1$ kbps).
  - Encoded `cpb_size_value_minus1`, `cpb_size_scale` represent CpbSize from original SPS within precision of Kb (maximum supported CpbSize is $2^{16} - 1$ Kb).
  - Encoded `time_scale`, `num_units_in_tick` could be both multiplied by 2 if the time_scale from original SPS is odd.
  - Conflicts between SPS/PPS and `mfxVideoParam` for parameters that are not covered by SPS/PPS could lead to change of parameters in SPS/PPS.

- `RefPicMarkRepSEI` syntax is not supported by MVC encoder.

- H.264 encoder (Intel Media SDK software library) is known to be slower on `x64` platform than on `win32` platform.

- If the MPEG-2 Video encoder `mfxVideoParam::mfxInfoMFX::CodecProfile` is initialized to 0, then the stream will be encoded as `MFX_PROFILE_MPEG2_MAIN`. Additionally if the MPEG-2 Video encoder `mfxVideoParam::mfxInfoMFX::CodecLevel` is initialized to `0`, then the stream will be encoded as `MFX_LEVEL_MPEG2_MAIN`.

- `MFX_FRCALGM_DISTRIBUTED_TIMESTAMP` is unsupported by InverseTelecine and Deinterlace (60i->60p) VPP filters.

- Target usages 4 and 5 of H.264/MVC encoders (Intel Media SDK software library) are known to be non-monotonic in terms of encoding FPS versus encoding quality.

- H.264 decoder may consume more than 1 frame from the input bitstream and then propagate same timestamp to all of the consumed frames. If accurate time stamp handling is required the application has to make sure that it doesn't store more than one-frame wise data in the input bitstream.

- Target usage 7 of H.264/MVC encoders (Intel Media SDK software library) is known to have a non-monotonic quality vs. bitrate dependency.

- MPEG2 Video, VC-1 and MVC decoders are not optimized for low delay of output frames.

- MVC encoder ignores any user SEI messages for the dependent view.

- MFX_CORRUPTION_ABSENT_TOP_FIELD, MFX_CORRUPTION_ABSENT_BOTTOM_FIELD, MFX_BITSTREAM_EOS are not supported by VC-1, MPEG2 Video and JPEG decoders.

- VPP always uses simple FRC algorithm based on repeat/drop frames and ignores MFX_FRCALGM_FRAME_INTERPOLATION flag.

- The feature set of JPEG decoder/encoder is limited to the following:
  - 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

- H.264 encoder and decoder (Intel Media SDK software library) are known to be a little bit slower compared with Intel® Media SDK 2012 R2.

- The output AVC and MVC streams contain SPS and PPS headers before IDR frames only.

- mfxExtVppAuxData::PicStruct isn't supported by encoders and VPP.

- VPP scaling for RGB32 interlaced content may produce slightly blurred frames.

- JPEG decoder does not set Corrupted flag of mfxFrameData structure, and does not accept MFX_BITSTREAM_EOS as DataFlag of mfxBitstream structure.

- The Look Ahead bitrate control mode is not HRD compliant.

- The Look Ahead bitrate control mode has stability issues for interlaced content encoding.

- VPP::Reset does not apply dynamic changes made to extended buffers such as mfxExtVPPProcAmp. The current workaround is to call VPP::Close directly followed by VPP::Init with the new configuration.

- The following APIs of API version 1.7 are not supported by software implementation of Intel Media SDK Library. Make sure to call Query functions to check actual support in hardware implementation of Intel Media SDK Library on particular platform.
  - MFX_RATECONTROL_LA

- o `mfxExtCodingOption2::MBBRC, ExtBRC, LookAheadDepth, Trellis`
- o `mfxExtEncoderCapability, mfxExtEncoderResetOption, mfxExtAVCEncodedFrameInfo`

- The following APIs of API version 1.8 are not supported by software implementation of Intel Media SDK Library. Make sure to call `Query` functions to check actual support in hardware implementation of Intel Media SDK Library on particular platform.
    - o `mfxExtVPPComposite, mfxExtVPPDeinterlacing,`
    - o `mfxExtAVCRefListCtrl::ApplyLongTermIdx, LongTermIdx`
    - o `mfxExtEncoderROI`
    - o `mfxExtAVCEncodedFrameInfo::MAD, BRCPanicMode, QP`
    - o `mfxExtCodingOption2::RepeatPPS, BRefType, AdaptiveI, AdaptiveB, LookAheadDS, mfxExtCodingOption2`
    - o `MFX_RATECONTROL_ICQ, MFX_RATECONTROL_LA_ICQ, MFX_RATECONTROL_VCM`
    - o `mfxInfoMFX::ICQQuality`
    - o `mfxEncodeCtrl::SkipFrame`

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