Intel® Media Server Studio 2017–
Driver, SDK for Windows Server*
Release Notes

Overview

The **Intel® Media Server Studio – Driver, SDK for Windows Server*** provide software development tools and libraries needed to develop enterprise grade media solutions on Intel® Server Products. The studio is designed for optimizing datacenter and embedded media applications for Windows server operating systems to utilize Intel® Iris™ and Intel® HD Graphics hardware acceleration capabilities.

The package includes the following components:

- Intel® Media Server Studio 2017– Graphics driver, version 15.40.4483

- Intel® Media Server Studio 2017– Software Development Kit, version 7.0.0000.358

- Intel® Media Server Studio 2017– Screen Capture plug-in, version 1.19.3.66

- Intel® Media Server Studio 2017– Advanced AVC Encode plug-in, version 1.19.6.66

- Intel® Media Server Studio 2017– Samples are not a part of this package, but they can be accessed through [Intel(R) Media Server Studio 2015 Support](#).

This document covers product features, system requirements and known limitations.

What's New

The **Intel® Media Server Studio – SDK for Windows Server*** (further referred to as the SDK) introduces API version 1.19.

Following fixes, improvements and features were added:

- API updates comparing to 1.17:

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- o mfxvideo.h: MFXVideoCORE_QueryPlatform function, mfxPlatform structure and PlatformCodeName enumeration added to get current platform codename in application.

- o mfxstructures.h: mfxExtCodingOption3::LowDelayHrd, to control VUI flags from Aplication

- o mfxstructures.h: mfxExtCodingOption3::EnableQPOffset, mfxExtCodingOption3::QPOffset added to control HEVC encode B frame QP for different layer hierarchical B frames GOP structure.

- o mfxstructures.h: mfxFrameData::MemType added for better integration with 3rd party plugins into pipeline with Media SDK pipeline.

- o mfxstructures.h: mfxPayload::CtrlFlags with MFX_PAYLOAD_CTRL_SUFFIX supported for HEVC encode to include suffix SEI payload into bitream.

- o mfxstructures.h: mfxExtVPPScaling structure added to control Scaling mode differentiation between new 6th generation Core mode MFX_SCALING_MODE_LOWPOWER and MFX_SCALING_MODE_QUALITY - usual.

- o mfxstructures.h: mfxExtVPPMirroring structure added to support new filter for frame mirroring.

- o mfxstructures.h: mfxExtVPPColorFill structure added to enable/disable color fill stage for area outside cropping for performance improvement on denoise filter.

- o mfxstructures.h: mfxExtEncodedSlicesInfo structure added to support reporting of slice sizes in MaxSliceSize mode.

- o mfxstructures.h: MFX_CODEC_VP9 and MFX_PROFILE_VP9_0, MFX_PROFILE_VP9_1, MFX_PROFILE_VP9_2, MFX_PROFILE_VP9_3 added for VP9 HW decode support.

- o mfxstructures.h: MFX_MEMTYPE_SHARED_RESOURCE added to support surface allocation for sharing with Open CL or 3D shaders.

- o mfxstructures.h: mfxExtVPPVideoSignalInfo reenabled and extended with runtime support to specify transfer matrix and color range management for color conversion.

- o mfxplugin.h: MFXVideoUSER_GetPlugin function added to get current loaded plug-in parameters from mfxSession.

- o mfxplugin.h: mfxCoreInterface::GetFrameHandle and mfxCoreInterface::QueryPlatform functions added for better 3rd party plug-ins programmability.

For detailed API description please refer to mediasdk-man.pdf and mediasdkusr-man.pdf for plugin API.

- Common:

  - Opaque memory usage extended to support external allocator in transcoding pipelines with mixed memory types.

- HW AVC Encode:

  - QSV-FF technology (LowPower mode) support added for 6th generation Intel® Core™ and Xeon E3 v5.

- HW HEVC Encode:

  - Supported for 6th generation Intel® Core™ and Xeon E3 v5.

- HW HEVC Decode:

  - Supported for 6th generation Intel® Core™ and Xeon E3 v5.

- HW AVC Decode:

  - Added multiple fixes and improvements for decoder robustness and resilience to corrupted content.

  - Fixed issue with wrongly reported corrupted flag on non-corrupted content.

- HW MPEG2 Decode:

  - Added multiple fixes and improvements for decoder robustness to corrupted content.

- HW VPP:

  - Added mirroring filter support for horizontal flip.

  - Added Scaling mode support.

  - Added video signal info support for bt.601, bt.709 color conversion matrices, nominal range and full range video support.

  - VPP pipeline optimized to eliminate excessive allocations in Query/QueryIOSurf functions.

  - GetVideoParam function full implementation added.

  - Reset function implementation for all supported configurations added.

- RAW Accelerator Plug-in:

  - Added to be distributed with driver and included into this release.

- Fixed issues with for user plugin and compatibility with Media Server Studio Professional edition plugins.

All the new features listed above are not supported by software implementation of the SDK Library.

In a particular platform specific hardware implementation of the SDK Library some of the features may also be unsupported. Make sure to call `Query` functions to check the actual support.

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

Please see the RAW Media Accelerator plug-in Reference Manual for details "`<install-folder>\doc\mediasdk-raw-accelerator-man.pdf`"

Please see the Screen Capture plug-in Reference Manual for details

"`<install-folder>\doc\mediasdkscreencap-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

The following Intel platforms with processor graphics are supported:

- Intel® Xeon® Processor E3-1200 v5, Intel® Xeon® Processor E3-1500 v5 series.
- 6th Generation Intel Core™ Processors with Intel Iris™ Pro Graphics, Intel Iris™ Graphics or Intel HD Graphics (580, 540, 530).
- Intel® Xeon® Processor E3-1200 v4 series
- 5th Generation Intel Core™ Processors with Intel Iris™ Pro Graphics, Intel Iris™ Graphics or Intel HD Graphics (5500, 6000, 6100, 6200).
- Note: chipset must have processor graphics enabled; make sure to check the datasheet.
    - Only C226 Server Chipset is supported for Xeon E3 v4 platforms.
    - Only C236 Server Chipset is supported for Xeon E3 v5 platforms.
    - Having a C226/C236 chipset is necessary but **not** sufficient. Make sure to consult with specific platform or board vendor regarding processor graphics being supported. Check Media Server Studio website for the

list of "Known OEM/ODM Functional Platforms": https://software.intel.com/en-us/intel-media-server-studio/details

The following Intel platforms are supported for SW (CPU) only processing:

- Intel 64 architecture processor supporting the Intel® Streaming SIMD Extensions 3 (SSE3).

Software

- Microsoft Windows Server* 2012 R2, 64-bit Microsoft Windows* 8.1 for server/embedded usage, Microsoft Windows* 10 and updates (OS builds 10240 – codename Threshold 1; 10586 – codename Threshold 2). 64-bit Microsoft Windows* 7 for development purpose only.

- Microsoft Windows Server* 2016/Windows 10(codename Redstone) have limited support as preview only (driver implements WDDM2.0 only).

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

Note: Other combinations of Microsoft Windows Server 2012/2016 and Intel Core™ /Xeon based platforms may function. But please be aware that such combinations are neither validated nor supported server platforms by Intel Media Server Studio - SDK for Windows Server. These software drivers are generic versions and can be used for general purposes. However, computer original equipment manufacturers (OEMs) may have altered the features, incorporated customizations, or made other changes to the software or software packaging they provide. To avoid any potential installation incompatibilities on your OEM system, Intel recommends that you check with your OEM and use the software provided by your system manufacturer. Intel and the computer original equipment manufacturer (OEM) may not provide technical support for some or all issues that could arise from the usage of this generic version of software drivers.

Installation Folders

Intel® Media Server Studio 2017– SDK installs under C:\Program Files\Intel\Intel® Media Server Studio 2017\– this is referenced as <sdk-install-dir> in the remainder of this document.

`<sdk-install-dir>\media_studio_2015_sdk_release_notes.pdf`	Intel® Media Server Studio 2017– Driver, SDK Release Notes (this file)
`<sdk-install-dir>\Software Development Kit\bin\x64`	Intel® Media Server Studio 2017– SDK Dynamic Library, software implementation: `libmfxsw64.dll` for Intel® 64 architecture **Note:** Hardware implementation of

	Intel® Media Server Studio 2017– SDK Dynamic Library `libmfxhw64.dll` is packed and installed with Intel® Media Server Studio 2017– Graphics Driver (default location is C:\Program Files\Intel\Media SDK)

`<sdk-install-dir>\Software Development Kit\bin\22d62c07e672408fbb4cc20ed7a053e4`	Intel® Media Server Studio 2017– Screen Capture plug-in:
	
	• Screen Capture plug-in
	`mfxplugin64_screen_capture.dll`
	
	• Configuration file
	`plugin.cfg`

`<sdk-install-dir>\Software Development Kit\bin\588f1185d47b42968dea377bb5d0dcb4`	Intel® Media Server Studio 2017– Advanced AVC Encode plug-in:
	
	• Advanced AVC Encode plug-in (implements 1:N Look Ahead optimization)
	`mfxplugin64_h264la_hw.dll`
	
	• Configuration file
	`plugin.cfg`

`<sdk-install-dir>\ Software Development Kit\doc`	Intel® Media Server Studio 2017– SDK documentation
`<sdk-install-dir>\ Software Development Kit\include`	External Intel® Media Server Studio 2017 – SDK headers: • Type definitions in `mfxdefs.h` • Structure definitions in `mfxstructures.h` • Function definitions in C in `mfxvideo.h` • C++ wrapper of the SDK functions in `mfxvideo++.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`

`<sdk-install-dir>\Software Development Kit\lib\x64`	Intel® Media Server Studio 2017– SDK Static Dispatcher Library `libmfx.lib`
`<sdk-install-dir>\Software Development Kit\igfx_s3dcontrol`	Intel® Media Server Studio 2017– SDK Stereoscopic 3D API for Intel Iris and HD Graphics hardware, includes: • S3D API definitions `igfx_s3dcontrol.h` • Static S3D Control Library `igfx_s3dcontrol.lib` • Displaying S3D with Intel® HD Graphics Developers Guide
`<sdk-install-dir>\Software Development Kit\tools`	Contains the following tools in binary form: • SDK Tracer in folder `mediasdk_tracer`. This utility performs runtime recording of Intel SDK API calls and parameters to a log file. • SDK System Analyzer in folder `mediasdk_sys_analyzer`. This utility analyzes the system and reports back the SDK related capabilities, graphics driver and components status.
`<sdk-install-dir>\Software Development Kit\opensource`	Source code of Intel® Media Server Studio 2017– SDK Dispatcher

Documentation

You can find more information on how to use Intel® Media Server Studio 2017 - SDK in the following documentation:

• `<sdk-install-dir>\Software Development Kit\doc\mediasdk-man.pdf`

  "Intel® Media Server Studio - SDK Reference Manual" describes the SDK API.

• `<sdk-install-dir>\Software Development Kit\doc\mediasdkusr-man.pdf`

  "Intel® Media Server Studio - SDK Extensions for User-Defined Functions" describes an API extension (aka plug-ins API) that allows seamless integration of user-defined functions in SDK pipelines.

• `<sdk-install-dir>\Software Development Kit\doc\mediasdkjpeg-man.pdf`

  "Intel® Media Server Studio - SDK Reference Manual for JPEG*/Motion JPEG" describes SDK API for JPEG* processing.

• `<sdk-install-dir>\Software Development Kit\doc\mediasdkmvc-man.pdf`

  "Intel® Media Server Studio - SDK Extensions for Multi-view Video Coding" describes the SDK extension to support Multi-view Video Coding (MVC).

- `<sdk-install-dir>\Software Development Kit\doc\mediasdk-distrib.pdf`

  "Intel® Media Server Studio - SDK Library Distribution and Dispatching Process".

- `<sdk-install-dir>\Software Development Kit\doc\mediasdkscreencap-man.pdf`

  "Intel® Media Server Studio - SDK Screen Capture Decoder Reference Manual"

Known Limitations

The Intel® Media Server Studio - SDK libraries and driver have the following known limitations. Unless explicitly specified each limitation is relevant for both software and hardware implementations of SDK dynamic library.

API

- The following APIs are not supported by the software implementation of the SDK library:
    - `mfxExtEncoderCapability`, `mfxExtEncoderResetOption`, `mfxExtAVCEncodedFrameInfo`
    - `MFX_RATECONTROL_LA`, `MFX_RATECONTROL_ICQ`, `MFX_RATECONTROL_LA_ICQ`, `MFX_RATECONTROL_VCM`, `MFX_RATECONTROL_QVBR`, `MFX_RATECONTROL_LA_HRD` and any options related to these BRC modes
    - `mfxExtVPPComposite`, `mfxExtVPPDeinterlacing`,
    - `mfxExtAVCRefListCtrl::ApplyLongTermIdx`, `LongTermIdx`
    - `mfxExtEncoderROI`
    - `mfxExtCodingOption2::Trellis`, `MBBRC`, `ExtBRC`, `RepeatPPS`, `BRefType`, `AdaptiveI`, `AdaptiveB`, `LookAheadDS`
    - `mfxInfoMFX::ICQQuality`
    - `mfxEncodeCtrl::SkipFrame`
    - `MFX_PLUGINID_HEVCE_HW`, `MFX_EXTBUFF_HEVC_PARAM`, `mfxExtHEVCParam`
    - `CreateAccelerationDevice`
    - `MFXInitEx`, `MFXDoWork`, `mfxInitParam`, `mfxExtThreadsParam`
    - `mfxInfoMFX::LowPower`
    - `MFX_EXTBUFF_DECODED_FRAME`, `mfxExtDecodedFrameInfo`, `MFX_EXTBUFF_TIME_CODE`, `mfxExtTimeCode`
    - `mfxExtCodingOption3`
    - `mfxExtPredWeightTable`
    - `mfxExtDirtyRect`
    - `mfxExtMovingRect`
    - `mfxInitParam::GPUCopy`

- o mfxInfoMFX::MaxDecFrameBuffering
- o mfxVideoParam:: AllocId
- o MFX_MEMTYPE_EXPORT_FRAME
- o mfxExtCodingOptionVPS
- o mfxExtVPPRotation
- o mfxExtVPPSignalInfo
- o mfxExtVPPMirroring
- o MFXVideoCORE_QueryPlatform
- o mfxPayload::CtrlFlags
- o mfxFrameData::MemType
- o mfxExtVPPScaling
- o mfxExtVPPColorFill
- o mfxExtEncodedSlicesInfo
- o MFX_MEMTYPE_SHARED_RESOURCE
- o mfxCoreInterface::QueryPlatform
- o mfxExtSceneChange
- o mfxExtVPPColorFill
- o mfxExtHEVCRegion
- o mfxExtVPPFieldProcessing
- o MFX_DEINTERLACING_ADVANCED_SCD
- o MFX_DEINTERLACING_FIELD_WEAVING

- The below APIs are not supported by the hardware implementation of SDK Library in this release. For other APIs not mentioned in this list make sure to call Query functions to check the actual support on a particular platform as it may vary.
  - o mfxExtCodingOption2::AdaptiveI, AdaptiveB, UseRawRef
  - o mfxExtAVCEncodedFrameInfo::MAD, BRCPanicMode, QP
  - o MFX_PLUGINID_VP8D_HW
  - o mfxExtCodingOption2:: EnableMBQP, DirectBiasAdjustment, GlobalMotionBiasAdjustment
  - o mfxExtChromaLocInfo
  - o mfxExtMBQP
  - o MFXInitEx, MFXDoWork, mfxInitParam, mfxExtThreadsParam
  - o mfxInitParam::GPUCopy
  - o mfxExtDirtyRect
  - o mfxExtMovingRect
  - o mfxExtCodingOption3::ScenarioInfo
  - o mfxExtCodingOption3::ContentInfo

- o `mfxExtCodingOptionVPS`

- o `mfxExtEncodedSlicesInfo`

- o `mfxExtSceneChange`

- o `mfxExtHEVCRegion`

- o `mfxExtVPPFieldProcessing`

Functional

Common/general limitations

- The 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 SDK dynamic libraries `libmfxsw64.dll` and `libmfxhw64.dll` not through the dispatcher is unsafe.

- Using the software implementation of SDK in parallel with Intel® Threading Building Blocks could impact performance.

- The number of internal tasks in hardware implementation is limited to 1024. This imposes a related limitation on the number of SDK sessions which depends on the number of components in a session and the asynchronous depth of each component: each component (DECODE, ENCODE or VPP) requires one task for synchronous operation and N tasks for asynchronous operation with depth N.

- This release supports only 64-bit Microsoft* Windows* applications.

- Microsoft DirectX* 11.1 is the only supported acceleration infrastructure (due to headless mode requirement).

- On Windows 10 bitstreams produced by any encoder can be not bit exact from time to time, but no visible difference.

- Recommended to use system memory allocated with pointer alignment to 64, otherwise result can contain corruptions and sometimes pipeline can be broken.

Jpeg Encode, Decode

- The feature set of JPEG decoder/encoder is limited to the following:
  - o 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
  - o No extended, lossless and hierarchical modes

- no 12-bit samples

- no progressive

- no arithmetic coding

- no 4 AC and 4 DC Huffman tables

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

- Software library implementation can break pipeline in stress multisession encoding and complex threading graphs scenarios when two or more encoders sharing the same mfxFrameSurface1 object and memory handling implemented through MemId.

HEVC Decode

- HEVC HW plugin MAIN10 profile limited to Luma and Chroma BitDepth 10, all other BitDepth are unsupported in current implementation.

- HW HEVC decode plugin is limited to 4096x2304 resolution and doesn't implement SW fallback for higher resolutions 5th generation Intel® Core and Intel® Xeon E3 v4. You may use software implementation of HEVC decode from Intel® Media Server Studio 2015 - Professional Edition to support higher resolutions. On 6th Generation Intel Core and Xeon E3 v5 it is limited to 8192x8192 resolution.

- Interlaced decoding is supported only through separate field output(half frame size), and no specific reporting of such behavior implemented in current version, if App need interlace decode support, it can detect interlaced sequence through: get SEI through GetPayload, parse SEI message to get pic_struct value for SEI semantics(See **D.2.3 seection of High efficiency video coding**)

H264 decode

- 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.

Mpeg2 encode limitations:

- 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`.

- Mpeg2 encode may produce not bit to bit result from run to run on 5th generation Intel® Core and Intel® Xeon E3 v4. Run to run variation doesn't affect visual quality.

HEVC Encode limitations:
- Supports maximum resolution 4096x2172.
- Supports only CQP, CBR, VBR and ICQ rate control methods, as well as MFX_RATECONTROL_LA_EXT with lookahead plugin.
- Query max macroblock per second report not supported.
- Next limitation for encoded bitstream:

- o No tiles support
- o No SAO
- o No P slice
- o Progressive only

- QP Offset for HEVC is 1 by default.

- HW Accelerated HEVC encode supports next extended buffer ids, with listed limitations:
    - o MFX_EXTBUFF_CODING_OPTION
    - o MFX_EXTBUFF_OPAQUE_SURFACE_ALLOCATION
    - o MFX_EXTBUFF_HEVC_REFLISTS
    - o MFX_EXTBUFF_HEVC_REFLIST_CTRL
    - o MFX_EXTBUFF_CODING_OPTION_VPS
    - o MFX_EXTBUFF_ENCODED_FRAME_INFO
    - o MFX_EXTBUFF_VIDEO_SIGNAL_INFO
    - o MFX_EXTBUFF_CODING_OPTION2
        Supported:
        - MBBRC
        - BRefType
        - NumMbPerSlice
        - DisableDeblockingIdc
        - RepeatPPS
        - NumMbPerSlice
    - o MFX_EXTBUFF_CODING_OPTION3
        Supported:
        - PRefType
        - EnableQPOffset
        - QPOffset
    - o MFX_EXTBUFF_CODING_OPTION_SPSPPS
    - o MFX_EXTBUFF_HEVC_TEMPORAL_LAYERS
    - o MFX_EXTBUFF_ENCODER_RESET_OPTION
    - o MFX_EXTBUFF_HEVC_PARAMS
        - GeneralConstraintFlags: not supported

H264 AVC/MVC encode limitations

- Specific QSV-FF encode limitations:
    - o Only I and P frame types supported, so no API related to B frames encoding supported.
    - o CQP, CBR, VBR and QVBR rate control methods only.
    - o Supported QP values range: 10-51
    - o Only progressive encoding supported.
    - o Maximum number of reference frames equal to 3.
    - o Encoding quality can be worse than legacy encode with similar parameters.
    - o Encoding bitrates higher than 43Mbps not supported in current implementation.
    - o MaxSliceSize feature can produce slices non-compliant to specified value, it is content dependent how often slice size overflow can occur, so need to be tested according to usage and requirement if such violations acceptable or not.
    - o QSV-FF encode not utilizing render engine, except next 2 cases:

- ▪ Target Usage equal to 1 and NumRefFrame equal to 3
  ▪ ARGB used as input.

- MaxQP with MaxFrameSize – not working, MaxQP will have more priority and MaxFrameSize will be violated

- 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 in software implementation 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.

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

- 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.

- Target usage 7 of H.264/MVC encoders in software implementation is known to have a non-monotonic quality vs. bitrate dependency.

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

- The look ahead bitrate control mode may produce non HRD compliant encoded streams.

- `mfxExtCodingOption2::LookAheadDS` currently supports only `MFX_LOOKAHEAD_DS_OFF` and `MFX_LOOKAHEAD_DS_2x`, `MFX_LOOKAHEAD_DS_4x` will give the same result as `MFX_LOOKAHEAD_DS_2x`. `MFX_LOOKAHEAD_DS_OFF` is the default value for target usage 1 and 2. `MFX_LOOKAHEAD_DS_2x` is the default value for target usages 3-7.

- H.264 and MVC encoders may not obey the minimum compression ratio required by the Blu-Ray*/AVCHD* specifications when the requirement is stronger than in H.264 standard.

- The value reported via `mfxExtEncoderCapability::MBPerSec` may be bigger than the actual maximum processing rate of the encoder.

- To change encoding parameters on the fly with Reset() function w/o IDR insertion application should drain all the buffered surfaces from encoder. Otherwise encoder may demonstrate undefined behavior after Reset.

- Call of Reset which starts new sequence (inserts IDR) will drop HRD conformance over the inserted IDR (CPB removal counter will be set to 0 in the IDR Picture Timing SEI).

- HRD violations are possible in specific scenarios (e.g. massive frame skipping).

- Encoder prohibits increase of DPB size (NumRefFrame) via Reset function even if new size is lower than initialization value. Reset function will return MFX_ERR_INCOMPATIBLE_VIDEO_PARAM on any attempt to increase NumRefFrame.

- Target usage MFX_TARGETUSAGE_BEST_SPEED may produce better objective quality than MFX_TARGETUSAGE_BALANCED.

- Encoder may not insert PCM macroblocks when required. Encoding of specific (complex) content with huge bitrate (which makes encoder insert many PCM MBs) may cause a GPU hang on Haswell.

- Reset function isn't supported for LookAhead BRC modes. Reset function doesn't return an error when called together with LA BRC. Result of such Reset call is undefined.

- B-pyramid isn't supported together with HRD compliant Look Ahead BRC (MFX_RATECONTROL_LA_HRD) and Look Ahead BRC with sliding window control (MFX_RATECONTROL_LA and WinBRCMaxAvgKbps and WinBRCSize).

- 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.

- When external Look Ahead BRC is used in transcoding pipeline which includes Frame Rate conversion (FRC), FRC in the pipeline should take place before external Look Ahead. Otherwise encoder may return error MFX_ERR_UNDEFINED_BEHAVIOR from EncodeFrameAsync calls.

- 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.

- SkipFrame feature has the following limitations:

  o If GOP has only P frames, arbitrary P can be skipped. When skipped, it is made non-reference.

  o If GOP has B frames, only non-reference B can be skipped.

Mpeg2 decode limitations

- MPEG-2 Video decoder returns `MFX_ERR_UNDEFINED_BEHAVIOR` instead of `MFX_ERR_MORE_DATA` when part of sequence header is absent and `MFX_BITSTREAM_COMPLETE_FRAME` flag is set.

- MPEG2 Decode: Decoder does not support bitstreams with resolution bigger than 2096x2096. MFXVideoDECODE_Init returns MFX_ERR_UNSUPPORTED on such bitstreams.

- MPEG2 Decode: Decoder does not support MPEG-1 bitstreams. It is interpreted as corrupted MPEG-2 bitstream. MFXVideoDECODE_Init returns MFX_ERR_NONE and MFXVideoDECODE_DecodeFrameAsync returns MFX_ERR_MORE_DATA until valid MPEG-2 bitstream is found.
- MPEG2 Decode: Sequence headers are skipped if resolution exceeds maximum supported values (2096x2096) or level/chroma are invalid. It affects MFXVideoDECODE_DecodeFrameAsync.
- MPEG2 Decode: mfxDecodeStat.NumFrame that is returned from GetDecodeStat function is less by 1 than actual count of decoded frames if GetDecodeStat is called after buffered frames are returned.

VPP component has next limitations

- Composition has issues after reset with input system memory usage, input system memory not recommended for use with composition if resetting composition pipeline required.
- `MFX_FRCALGM_DISTRIBUTED_TIMESTAMP` is unsupported by InverseTelecine and Deinterlace (60i->60p) VPP filters.
- `mfxExtVppAuxData` deprecated.
- `VPP::Query` in software implementation mistakenly indicates support for `MFX_FRCALGM_FRAME_INTERPOLATION` while it is actually not available.
- VPP scaling in software implementation may produce slightly blurred frames for RGB32 interlaced content.
- VPP Image Stabilization and FRC Interpolated filters will be deprecated and not recommended for use due to result image quality and product quality associated with these filters.
- When De-interlace and FRC filters used in pipeline MFX_DEINTERLACING_BOB will be used by default, if not specified explicitly to use MFX_DEINTERLACING_ADVANCED.
- MFX_FOURCC_YV12 supported only via software fallback with DirectX* 11.1 interface.
- VPP in software implementation always uses simple FRC algorithm based on repeat/drop frames and ignores `MFX_FRCALGM_FRAME_INTERPOLATION` flag.
- ADI may produce color artefacts on frame preceding a scene change.
- ADI may produce color artefacts in case of harmonic motion (repeated pattern and motion magnitude is the same as the periodic of repeated pattern).
- Multiple VPP filters being combined in one session may produce output that is not bit-exact with the output from the same VPP filters that are split by separate sessions, but the difference does not affect visual quality.
- Frames with interlaced content must have CropH multiple of 4. Otherwise, VPP may produce color artefacts on the bottom lines.
- De-interlacing is supported for NV12, YUY2 formats only.
- Once enabled at the Init stage VPP de-interlacing for BOB mode is not disabled automatically if application provides input frames with picstruct set to MFX_PICSTRUCT_PROGRESSIVE.

- 1st frame is doubled during 30i->60p de-interlacing for MFX_DEINTERLACING_BOB and MFX_DEINTERLACING_ADVANCED_NOREF modes

- MFXVideoVPP_GetVideoParam does not update values in attached extended buffers, except VPP_DO_USE

- MFXVideoVPP_Reset could return error if additional memory allocation is required based on provided video parameters (changed type of color or frame rate conversion for example). The application should close VPP component and then re-initialize it in this case. See MFXVideoVPP_Reset in SDK API Reference Manual for more details about possible return statuses.

- Multiple RGB4 surfaces with PixelAlphaEnable enabled could give poor visual quality after composition on the same area with overlapping.

- deprecated `MFX_EXTBUFF_VPP_PICTSTRUCT_DETECTION` enumerator

- VPP Mirroring in pipeline with video to video memory in/output patterns can be supported only without any other filters, in/out memory patterns containing system memory is supported with any other legal filters combination.

- ADI with doubled framerate – there is an issue when first 3 frames copied instead of 2.

- On 6th generation Intel Core and Xeon E3 v5 Temporal Denoise enabled – this can affect some result of denoise on scene change and after reset with changed denoise factor.

- mfxExtVPPSignalInfo has to be attached to surface with NV12 format only when color conversion done.

- Rotate + Detail/ProcAmp – in combination affect each other, thus result can different comparing running filters separately and in one call.

The Screen Capture have the following known limitations:

- Screen Capture plugin will use fallback to standard Microsoft* DirectX* Video Acceleration (DXVA) path in case when monitor is connected and application uses exclusive render mode or OPM mode.

- Screen capture with scaling (i.e. when initialization resolution is not equal current display resolution) is supported only with NV12 fourcc format

- Screen Capture plugin loading recommended only with SDK HW library implementation API 1.15 or later.
- In case of DirectX 11 implementation, video memory type, and RGB4 surface format usage, the application frame allocator needs to allocate the surfaces using DXGI_FORMAT_AYUV format because OS runtime will block RGB surface allocation with BIND_DECODER flag and decoder output view. In any other configuration cases, e.g. DirectX 9 implementation, system or opaque memory type, or NV12 output format, special frame allocation is not needed.
- DXVA fallback functionality doesn't work for resolution change.
- DirtyRect detection feature will detect dirty areas in captured frame and coalesce areas to bigger ones until get 256 areas to feet into DirtyRect API buffer.
- Display Selection API supported only for Virtual Displays.

- Windows 10 acceleration currently unsupported, plugin will fall back to standard Microsoft functions, and performance drop can be observed.

The Media RAW Accelerator Plug-in has the following known limitations:

- Current version supports sessions only initialized as MFX_IMPL_HARDWARE, MFX_IMPL_HARDWARE_ANY, MFX_IMPL_VIA_D3D11, MFX_IMPL_VIA_D3D9.
- Software fallback implementation is not optimized thus performance is very poor.
- Software fallback can be not bitexact with GPU optimized version.
- Current version supports only system memory as input memory type.
- Current version supports only system memory as output memory type for MFX_FOURCC_ARGB16 and MFX_FOURCC_ABGR16 color types.
- Current version of plugin doesn't support opaque memory type.
- Additional Intel Media SDK session must be created to use traditional VPP features of Intel Media SDK HW Library.
- MFX_GAMMA_MODE_VALUE currently not supported.
- Current version supports only system memory output type for MFX_FOURCC_ARGB4 color type not supported with output Video memory type in case when total surface size is bigger than 6000x4000 on processors older than 6th generation Intel Core.
- For resolutions more than 6000x4000 result will be slightly different for padded content and non-padded content due to internal implementation.
- Application need to do MFXInit with API 1.10 version to have RAW Accelerator working on all available driver versions.
- MFX_EXTBUF_CAM_FORWARD_GAMMA_CORRECTION API is slower than MFX_EXTBUF_CAM_GAMMA_CORRECTION on platforms older than 6th generation Intel Core processors.
- Vignette correction filter support is limited to photo with 8192x8192 resolution of picture on 6th Generation Intel® Core™ platforms.
- For resolutions width bigger than 8192 and MFX_FOURCC_ARGB16 or MFX_FOURCC_ABGR16 color types plug-in will fall back to GPU acceleration instead of fixed function on 6th generation Core platforms.
- 3D look up table filter supported only on 6th generation Core platforms and will utilize render engine for acceleration.

Other Limitations

- For Intel® Server Systems R1304RPMSHOR/ R1208RPMSHOR:

  o Headless mode is supported only with BIOS version 01.03.0004 or later. Download the Intel® Server Board S1200V3RPM Firmware Update Package for EFI at downloadcenter.intel.com (link).

- When Intel HD Graphics is not primary display and not connected to an actual display device make sure to manually enable Internal Graphics in BIOS, see the screenshot below for reference:

```
PCI Configuration

Maximize Memory below 4GB          [Disabled]
Memory Mapped I/O above 4GB        [Disabled]
Onboard Video                      [Enabled]
Internal Graphics                  [Enabled]
Primary Display                    [Onboard Video]
▶ NIC Configuration
▶ PCIe Port Oprom Control
```

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