

Intel® Media Server Studio 2015 – Driver, SDK for Linux* Release Notes

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Overview

For the most up to date version please refer the Intel® Media Server Studio Support [documentation page](#).

The Intel® Media Server Studio – Driver, SDK for Linux* 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 Linux server operating systems to utilize Intel® Iris™ and Intel® HD Graphics hardware acceleration capabilities.

The package includes the following components:

- Intel® Media Server Studio 2015 – Graphics Driver, version 16.4.2.39163
- Intel® Media Server Studio 2015 – SDK, version 6.0.16043166.166
- Intel® Media Server Studio 2015 – Samples are not a part of this package. The latest version of samples package (with all samples binaries and corresponding source code) could be downloaded from [Intel\(R\) Media Server Studio 2015 Support](#).

This document covers product features, system requirements and known limitations. For installation procedures description please see the `<unpack-folder>/media_server_studio_sdk_getting_started_guide.pdf`.

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Important Note: CentOS 7.0, Ubuntu* 12.04 LTS and SUSE* Linux* Enterprise Server 11 support have been discontinued. For this release only CentOS* 7.1 and SUSE* Linux* Enterprise Server 12 are supported configurations. For more information please see <https://software.intel.com/en-us/intel-mediasdk-supported-versions-server>

Starting from next major release support of SUSE* Linux* Enterprise Server 12 will be discontinued.

What's New

Intel® Media Server Studio 2015 – SDK (hereinafter referred to as “SDK”):

Version 6.0.16043166.166

- SDK API version increased to 1.16 to adopt new enhancements.
- Support of dynamic SDK calls from dynamic library implemented in dispatcher
- Added control to turn on/off GPU copy (for frame data copy between video and system memory)
- Frame/surface corruption detection and reporting for new CPU models implemented
- Support of opaque memory type in VP8 GPU-accelerated encoder added
- Enabled 8K x 8K HW support in MJPEG decoder
- Bug fixes:
 - o MPEG-2 encoder: fixed issue with corruption when encoder initialized with unknown picture structure
 - o MPEG-2 and H.264 (AVC) decoders: fixed failures with certain corrupted streams, improved decoder robustness
 - o VP8 GPU-accelerated encoder: fixed visual corruption issue with big bitrates
 - o VPP Resize: quality improved for interlaced content
 - o VPP Advanced Deinterlace: performance improved
 - o VPP Composition: GPU hang with N:1 transcoding fixed
 - o VPP Interpolated FRC: fixed issue with end of stream processing

Version 6.0.16043138.138

- Bug fixes
 - o MPEG2 encoder: fixed issue with insertion of VideoSignalInfo header at wrong position; improved encoder robustness.
 - o H.264 encoder: fixed MBQP for interlaced encode; H.264 LA was fixed for default GOPRefDist in the case of no B-pyramid.
 - o MPEG2 decoder: fixed issue of dropping a frame when aspect ratio changed in the stream.
 - o H.264 decoder: fixed issue with SEI order when using GetPayload() function.

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- VPP: fixed issue in VPP impacting ability to enable Deinterlacing and Denoising filters. VPP FieldCopy filter issue (MFX_WRN_FILTER_SKIPPED at Init) was fixed.
- Performance regression of VPP ADI was fixed.
- Opaque memory handling issues in pipelines with VC1 decoder and plugins (VP8, HEVC) were fixed.
- Memory leaks in GPU copy and MJPEG decoder were fixed.
- Samples: incorrect handling of surfaces for ADI 30i->60p was fixed in sample_vpp. OpenCL™ rotation plug-in sample regression fixed.
- Corruption of X11 Gnome* terminal was fixed.
- Enabled support of Interpolated FRC in sample_vpp.
- Improved latency due to new synchronization scheme for major components by using “spin free” blocking call of libva.
- Support for ftrace API to improve Intel® VTune™ Amplifier XE granularity and provide information on pipeline components.
- New version of metrics_monitor tool supporting new CPU architecture was included into release.

Version 6.0.16042112.112 (This is Beta release)

- SDK API version changed to 1.15 to adopt new enhancements.
- Enabled support of CPU models with former codename “Broadwell”.
- HW accelerated decoding of VP8 streams by decoder plugin was added.
- Pure SW library libmfx64sw.so was added.
- MPEG2 encoder. Fixed the issue with correct placement of SignalInfo header.
- MPEG2 encoder. Support of Skip Frames encoding (CQP mode) was implemented
- MPEG2 encoder. Fixed MBQP issue.
- Small performance/latency improvements for 1,2 sessions by tuned synchronization
- New threading control API and implementation are introduced in this drop
- Issue with 4K LA encoding was fixed

Version 5.0.16043100.100

- SDK API version changed to 1.14.
- Implemented support of MPEG2 MBQP
- Implemented HRD compliancy for CQP mode of H.264 encoder
- Implemented Frame Type report for H.264 decoded surface
- Improved memory consumption to increase transcoding capacity
- New SDK API level tracer was implemented (Preview)
- Fixed Intra-coded P and B fields for B-pyramid in H.264 encoder
- Fixed panic mode for H.264 LA BRC
- Fixed YV12 color conversion for MJPEG SW encoder
- Fixed VPP Interpolated FRC
- Fixed regression in VPP ADI with default filter setting for 30i->60p
- Enabled VPP sharpness (detail) filter

Version 5.0.1604374.74 Hot Fix

- Hot fix for SDK for enabling back default deinterlacing when VPP received interlaced source and progressive output without configuration of deinterlacing in extended buffer.

Version 5.0.1604373.73

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- Multi-threading issue for Intel® Media Server Studio 2015 – HEVC GPU Accelerated Encode plugin was fixed.

Version 5.0.1604368.68

- New features:
 - SDK API changed to version 1.13
 - Performance of H.264 Encode Configurable Slice Size feature for Video Conferencing scenarios was improved.
 - GPU accelerated copy for CPU-GPU memory interexchange was enabled.
 - VPP Advanced De-interlace algorithm was enhanced to use motion information which leads to improved quality of de-interlace.
- The following MPEG2 Decode issues were fixed:
 - MPEG2 Decode may fall in infinite MFX_WRN_DEVICE_BUSY loop on certain severely corrupted streams. Now it will return MFX_ERR_UNDEFINED_BEHAVIOR and application is expected to close and re-initialize the decode component.
 - MPEG2 Decode doesn't report downsize resolution change. Fix: now reports via MFX_WRN_VIDEO_PARAM_CHANGED as per API specification.
 - Timestamps pass-through from input to output doesn't work properly in COMPLETE_FRAME mode.
- The following VPP Composition and Alpha Blending issues were fixed:
 - VPP composition uses the first stream as background in destination surface. Fix: now customizable background color is used as per API specification.
Note: a new issue appeared as a side effect of this fix, please check Known Limitations section for details.
- The following H.264 encoder improvements:
 - Several quality improvements modes for H.264 encoder were added
 - Bitrate control MFX_RATECONTROL_LA with sliding window has been improved
 - Buffering Period SEI insertion control for AVC Encode was implemented.

Version 5.0.1604246.46

- This is Pre-Release version.
- New features:
 - Support of Render Nodes was added.
 - VP8 Hybrid Encoder was added.

Version 5.0.1604227.27

- This is Pre-Release version.
- OS and hardware support:

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- Ubuntu* 12.04 LTS and SUSE* Linux* Enterprise Server 11 support discontinued.
- CentOS* 7.0, SUSE* Linux* Enterprise Server 12 support was added.
- Set of patches for open source components on top of 3.14.5 kernel suitable for other variants of Linux OSes
- This release is for Intel® 4th Generation Core/Xeon E3-128X(L) v3 processors
- New features:
 - New packages structure including per-component packages suitable for using default package managers
 - OpenCL™ 1.2 for GPU runtime and development packages, please see details in respective release notes in intel-ocl-1.2-16.4.tar.gz.
 - JPEG/MJPEG HW Decoder was enabled.
 - H.264 Encode Configurable Slice Size feature for Video Conferencing scenarios was added.
 - VPP Field Copy filter was added.

Features

Intel® Media Server Studio 2015 – SDK included in this package implements SDK API 1.16 and contains the following components:

| Component | Supported features | Limitations |
|---------------|--|---|
| H.264 decoder | Supported Profiles: <ul style="list-style-type: none"> ● Baseline ● Main ● High | Maximum supported resolution: 4096x2304 |
| H.264 encoder | Supported Profiles: <ul style="list-style-type: none"> ● Baseline ● Main ● High Supported BRC methods: <ul style="list-style-type: none"> ● Constant QP (CQP) ● Constant Bit Rate (CBR) ● Variable Bit Rate (VBR) ● Look Ahead (LA) | Maximum supported resolution: 4096x2304 |

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| | | |
|----------------------------|---|---|
| MPEG-2 decoder | Supported Profiles: <ul style="list-style-type: none"> • Simple • Main • High | Maximum supported resolution: 1920x1088 |
| MPEG-2 encoder | Supported Profiles: <ul style="list-style-type: none"> • Simple • Main • High Supported BRC methods: <ul style="list-style-type: none"> • Constant QP (CQP) • Constant Bit Rate (CBR) • Variable Bit Rate (VBR) | Maximum supported resolution: 1920x1088 |
| VC1 decoder | Supported Profiles: <ul style="list-style-type: none"> • Simple • Main • Advanced | Maximum supported resolution: 1920x1088 |
| MJPEG encoder (SW only) | Supported Profiles: <ul style="list-style-type: none"> • Baseline mode, 8bit | Maximum supported resolution: per ISO/IEC 14495-1 and system memory limitations |
| MJPEG decoder | Supported Profiles: <ul style="list-style-type: none"> • Baseline mode, 8bit | Maximum supported resolution: per ISO/IEC 14495-1 and system memory limitations |
| VP8 decoder | Supported Profiles: <ul style="list-style-type: none"> • Version 0 mode, 8bit | Maximum supported resolution: 1920x1088 |
| VP8 encoder | Supported Profiles: <ul style="list-style-type: none"> • Version 0 mode, 8bit | Maximum supported resolution: 1920x1088 |
| Video Pre Processing (VPP) | Supported Algorithms: <ul style="list-style-type: none"> • Color Conversion • Scaling • De-Interlacing • De-noising • Frame Rate Conversion • Interpolated Frame | Maximum supported resolution: 4096x2304 |

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| | | |
|--|---|--|
| | Rate Conversion, 30p->60p <ul style="list-style-type: none"> • Composition • Alpha Blending • Sharpness | |
|--|---|--|

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.

NOTE: Please use `Query` functions to check feature availability on any given machine at runtime. Availability of features depends on hardware capabilities as well as driver version.

Please see the Intel® Media Server Studio 2015 - SDK Reference Manual for details
 "<sdk-install-folder>/doc/mediasdk-man.pdf"

System Requirements

Hardware

The following processor models are supported:

- Intel® Xeon® Processor E3-128x v4
- 5th Generation Intel Core™ Processors with Intel Iris™ Pro Graphics, Intel Iris™ Graphics or Intel HD Graphics (5500, 6000, 6100, 6200).
- Intel® Xeon® Processor E3-128x v3
- 4th Generation Intel Core™ Processors with Intel Iris™ Pro Graphics, Intel Iris Graphics or Intel HD Graphics 4200+ Series (chipset compatibility is usually not an issue for Core™ processors.)

Chipset limitations:

- Chipset must have processor graphics enabled, make sure to check the datasheet.
- Among Intel Server Chipsets only C226 is supported.
- For platforms/motherboards based on Intel Server Chipsets, having a C226 chipset is necessary but **not** sufficient. Make sure to consult with specific platform/board vendor regarding processor graphics being supported. Check our product website for the approved/recommended platforms list at <https://software.intel.com/en-us/intel-media-server-studio/details#professional>

Note:

- Intel Core processors earlier than 4th Generation are not supported
- Intel Celeron®, Intel Pentium® and Intel Atom™ processors are not supported

Software

- CentOS 7.1 (1503) or 64-bit architecture or SUSE* Linux* Enterprise Server 12 GM for 64-bit architecture with its default kernels

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- Xf86-video-intel driver (needed only for if local rendering is required with the LibVA X11 backed). Recommended version: 2.20.10, <http://cgit.freedesktop.org/xorg/driver/xf86-video-intel/snapshot/xf86-video-intel-2.20.10.tar.gz>
- Generic OS install uses kernel 3.14.5 from www.kernel.org.

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Package Contents

Intel® Media Server Studio 2015 – Driver, SDK for Linux* package includes the following components, where <id> is Graphics Driver version:

| Component | Description |
|--|--|
| CentOS/intel-ocl-1.2-<id>.el7.x86_64.rpm CentOS/intel-ocl-1.2-devel-<id>.el7.x86_64.rpm CentOS/intel-ocl-1.2-<id>.tar.gz SLES/intel-ocl-1.2-<id>.x86_64.rpm SLES/intel-ocl-1.2-devel-<id>.x86_64.rpm SLES/intel-ocl-1.2-<id>.tar.gz | Intel® Media Server Studio 2015 OpenCL™ packages |
| CentOS/intel-linux-media-<id>.el7.x86_64.rpm SLES/intel-linux-media-<id>.x86_64.rpm | Intel® Media Server Studio 2015 – Driver & SDK runtime package. |
| CentOS/intel-linux-media-devel-<id>.el7.x86_64.rpm SLES/intel-linux-media-devel-<id>.x86_64.rpm | Intel® Media Server Studio 2015 – Driver & SDK development package. |
| CentOS/libdrm*-<id>.el7.x86_64.rpm CentOS/drm-utils*-<id>.el7.x86_64.rpm SLES/drm-<id>.src.rpm SLES/drm-kmp*-<id>.x86_64.rpm SLES/libdrm*-<id>.x86_64.rpm SLES/libkms*-<id>.x86_64.rpm SLES/libdrm-tools*-<id>.x86_64.rpm | Direct Rendering Manager runtime library runtime, development, etc. |
| CentOS/libva*-<id>.el7.x86_64.rpm CentOS/libva-utils*-<id>.el7.x86_64.rpm SLES/libva*-<id>.x86_64.rpm SLES/vaapi-tools*-<id>.x86_64.rpm | Video Acceleration (VA) API runtime, development, etc. |
| CentOS/install_scripts_centos_<id>.tar.gz SLES/install_scripts_sles_bdw_<id>.tar.gz | Intel® Media Server Studio 2015 – Driver & SDK installation scripts. |
| CentOS/intel-linux-media-samples-<id>.el7.x86_64.rpm SLES/intel-linux-media-samples-<id>.x86_64.rpm | Intel® Media Server Studio 2015 – Samples package (binaries only). |

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| | |
|---|---|
| rpm | |
| Generic/intel-linux-media-ocl_generic_<id>_64bit.tar.gz | Intel® Media Server Studio 2015 – Driver & SDK package for Generic OS. |
| intel-linux-media-patches-<ID>.tar.gz | Optional tar ball may include additional patches for open source components. All details please see in README file within the tar ball. |
| media_server_studio_sdk_release_notes.pdf media_server_studio_sdk_getting_started_guide.pdf Intel(R) Media Server Studio EULA.pdf redist.txt site_license_materials.txt third_party_programs.txt | Intel® Media Server Studio 2015 – SDK documentation: this file, Getting Started Guide, EULA, EULA’s accompanying files. |

Installation Folders

Intel® Media Server Studio 2015 – SDK installs under /opt/intel/mediasdk – this is referenced as <sdk-install-dir> in the remainder of this document.

| Component | Description |
|---------------------------|--|
| <sdk-install-dir>/lib64 | Intel® Media Server Studio 2015 – SDK Dynamic Library, hardware implementation libmfxhw64-p.so.* software implementation libmfxsw64-p.so.* |
| <sdk-install-dir>/doc | Intel® Media Server Studio 2015 – SDK documentation |
| <sdk-install-dir>/include | External Intel® Media Server Studio 2015 – SDK headers: <ul style="list-style-type: none"> • Structure definitions in mfxstructures.h, mfxastructures.h, mfxvstructures.h and mfxcommon.h • Audio function definitions in C in mfxaudio.h |

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| | |
|--|---|
| | <ul style="list-style-type: none"> • C++ wrapper for Media SDK audio functions in <code>mfxaudio++.h</code> • Type definitions in <code>mfxdefs.h</code> • <code>mfxVideoENC</code> functions definitions <code>mfxenc.h</code> • <code>mfxVideoPAK</code> functions definitions <code>mfxpak.h</code> • Extensions for Motion JPEG Video coding options <code>mfxjpeg.h</code> • Extensions for standalone Look Ahead algorithm <code>mfxla.h</code> • Extensions for Multi-view Video Coding options <code>mfxmvc.h</code> • Extensions for User-Defined Functions <code>mfxplugin.h</code> • C++ wrapper for User-Defined Functions <code>mfxplugin++.h</code> • Session management function definitions in <code>mfxsession.h</code> • Function definitions in C in <code>mfxvideo.h</code> • C++ wrapper of the SDK functions in <code>mfxvideo++.h</code> • VP8 Extension definition <code>mfxvp8.h</code> |
| <code><sdk-install-dir>/lib/lin_x64</code> | Intel® Media Server Studio 2015 – SDK Static Dispatcher Library: <code>libmfx.a</code> |
| <code><sdk-install-dir>/plugins</code> | Intel® Media Server Studio 2015 – SDK plug-ins: <ul style="list-style-type: none"> • Advanced AVC Encode plug-in (implements 1:N Look Ahead optimization) <code>libmfx_h264la_hw64.so</code> • VP8 Hybrid Encode plug-in <code>libmfx_vp8e_hw64.so</code> • VP8 Decode plug-in <code>libmfx_vp8d_hw64.so</code> • Configuration file <code>plugins.cfg</code> |
| <code><sdk-install-dir>/opensource/mfx_dispatch</code> | Source code for the Intel® Media Server Studio 2015 – SDK Dispatcher |
| <code><sdk-install-dir>/tools/drmserver</code> | Intel® Media Server Studio - SDK DRM Authentication Server |
| <code><sdk-install-dir>/tools/metrics_monitor</code> | Metrics Monitor – tool for monitoring GPU metrics |

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| | |
|---|---|
| <code><sdk-install-dir>/tools/tracer</code> | SDK Tracer – tool for dumping API level logging information |
|---|---|

Intel® Media Server Studio 2015 – Graphics Driver installs in the following locations:

| Component | Description |
|---|--|
| <code><sdk-install-dir>/lib64</code> | Intel® Media Server Studio 2015 – Graphics Driver, SDK |
| <code><sdk-install-dir>/opensource/libdrm</code> | Source code for Direct Rendering Manager runtime library |
| <code><sdk-install-dir>/opensource/libva</code> | Source code for Video Acceleration (VA) API |
| <code><sdk-install-dir>/opensource/patches/kmd</code> | Source code of Intel® Media Server Studio 2015 – Graphics Driver, Kernel Mode Driver (KMD) |
| <code>/usr/include</code> | Direct Rendering Manager runtime library, Video Acceleration (VA) API includes |
| <code>/usr/lib64</code> | Direct Rendering Manager runtime library, Video Acceleration (VA) API libraries |
| <code>/usr/bin</code> | Direct Rendering Manager runtime library, Video Acceleration (VA) API utilities. |

OpenCL™ Driver installs in the following locations:

| Component | Description |
|---|--|
| <code>/opt/intel/opencl/include/CL</code> | OpenCL™ Driver includes |
| <code>/opt/intel/opencl</code> | OpenCL™ Driver libraries |
| <code>/etc/OpenCL/vendors</code> | Configuration for Khronos OpenCL ICD library |

You could find more information about OpenCL™ Driver in corresponding Release Notes in `intel-opencl-1.2-16.4.tar.gz`.

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Documentation

For the most up to date versions please refer the Intel® Media Server Studio Support [documentation page](#).

You can find more information on how to use Intel® Media Server Studio 2015 - SDK in the following documentation:

- `<sdk-install-folder>/doc/mediasdk-man.pdf`
"Intel Media Server Studio - SDK Reference Manual" describes the Intel Media SDK API.
- `<sdk-install-folder>/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-folder>/doc/mediasdkjpeg-man.pdf`
"Intel® Media Server Studio - SDK Reference Manual for JPEG*/Motion JPEG" describes SDK API for JPEG* processing.
- `<sdk-install-folder>/doc/mediasdkvp8-man.pdf`
"Intel® Media Server Studio - SDK Reference Manual for VP8*" describes SDK extension to support VP8* video codec.

Known Limitations

This release is subject to the following known limitations:

- **API:**

Intel® Media Server Studio - 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, RepeatPPS, BRefType`
 - `mfxHandleType::MFX_HANDLE_VA_DISPLAY`
 - `mfxImpl::MFX_IMPL_VIA_VAAPI, mfxIMPL::MFX_IMPL_AUDIO`

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- `CodecFormatFourCC::MFX_CODEC_HEVC`, `CodecLevel::HEVC` level and tier definitions, `CodecProfile::HEVC` profile definitions
- `BRefControl`
- `mfxFrameData::PitchHigh`, `PitchLow`
- Only the following features among those introduced in API 1.9 are supported:
 - `mfxExtVPPComposite`, `mfxVPPCompInputStream::LumaKeyEnable`, `LumaKeyMin`, `LumaKeyMax`, `GlobalAlphaEnable`, `GlobalAlpha`, `PixelAlphaEnable`
 - `mfxExtAVCRefLists`
 - `mfxExtAVCEncodedFrameInfo::secondFieldOffset`
 - `mfxExtCodingOption2::SkipFrame`, supported for AVC and MPEG2 Encode
 - `ColorFourCC::MFX_FOURCC_P010`, `MFX_FOURCC_A2RGB10`
 - `mfxExtCodingOption2::MaxSliceSize`
- 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`
 - `mfxExtCodingOption2::BufferingPeriodSEI` and enum `{MFX_BPSEI_DEFAULT, MFX_BPSEI_IFRAME}`
- Only the following features among those introduced in API 1.11 are supported:
 - `mfxExtCodingOption3::WinBRCAvgKbps`, `WinBRCAvgKbps`
 - `mfxFrameData:: NumExtParam`, `ExtParam`
 - `mfxExtVPPFieldProcessing`, enum `VPPFieldProcessingMode`, enum `PicType`
 - `RateControlMethod::MFX_RATECONTROL_LA_HRD`
 - `ExtendedBufferID::MFX_EXTBUFF_CODING_OPTION3`, `MFX_EXTBUFF_VPP_FIELD_PROCESSING`
- Only the following features among those introduced in API 1.12 and 1.13 are supported:
 - `mfxExtVP8CodingOption` for VP8 encoder except `NumTokenPartitions`.
 - `mfxExtCodingOption2::UseRawRef`

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- `mfxExtCodingOption3::DirecrBiasAdjustment, GlobalMotionBiasAdjustment, MVCostScalingFactor, MBDisableSkipMap, EnableMBQP.`
- `mfxExtChromaLocInfo`
- `mfxExtMBDisableSkipMap`
- `mfxExtMBQP`
- `MFVideoUSER_LoadByPath()`
- For `mfxExtVPPDeinterlacing` extended buffer only `DeinterlacingModes` `AFX_DEINTERLACING_BOB` and `AFX_DEINTERLACING_ADVANCED` are supported
- Only the following features among those introduced in API 1.14 are supported:
 - `mfxExtDecodedFrameInfo`
 - `mfxExtTimeCode`
- Only the following features among those introduced in API 1.15 are supported:
 - `mfxExtThreadsParam` and `AFX_EXTBUF_THREADS_PARAM` enumerator
- Only the following features among those introduced in API 1.16 are supported:
 - `GPUCopy` enumerator and control in `mfxInitParam` structure.

NOTE: Please use Query functions to check feature availability on any given machine at runtime. Availability of features depends on hardware capabilities as well as driver version.

- **Performance:**

- Advanced De-Interlacing provides better quality but might be slower than BOB DI in some cases. This is especially affects N:N multi-transcoding sessions. API control `mfxExtVPPDeinterlacing` provides application control of de-interlacing method.
- GPU copy (for copying frames from video memory to system memory and vice versa) is disabled for pipelines with VPP Composition, CPU copy having lower performance will be used instead.
- The product was fully validated only with the default values of `mfxExtThreadsParam`. Executing application or initializing the SDK library internal threads under real time scheduling policies (SCHED_FIFO or SCHED_RR) with specific Priority levels may lead to significantly increased latency, increased total processing time and/or increased CPU usage. Included patch set can reduce such negative implications but is provided only as an experimental/preview solution.

- **H.264 decode:**

- `GetPayload` may output SEI associated with top and bottom field in the wrong order.

- **H.264 encode:**

- Encoder may produce non-bit exact streams.

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- Usual Look Ahead BRC may generate non HRD-compliant streams. Use LA_HRD mode if you need HRD compliance.
 - 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.
 - SkipFrame feature has the following limitations:
 - works only with CQP BRC mode
 - only `MXF_SKIPFRAME_INSERT_DUMMY` is supported
 - If GOP has only P frames, arbitrary P can be skipped. When skipped, it is made non-reference.
 - If GOP has B frames, only non-reference B can be skipped.
 - MBQP mode is applicable only for CQP BRC and can be set in value range 1-51.
 - MBQP mode doesn't work with dynamic configuration through Reset, Close-Init must be called.
- **MPEG-2 decode:**
 - Decoder may produce non-bit exact streams.
 - **MPEG-2 encode:**
 - Encoder may produce non-bit exact streams.
 - 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.
 - MBQP mode is applicable only for CQP BRC and can be set in value range 1-122.
 - SkipFrame feature has the following limitations:
 - works only with CQP BRC mode
 - only `MXF_SKIPFRAME_INSERT_DUMMY` is supported
 - If GOP has only P frames, arbitrary P can be skipped. When skipped, it is made non-reference.
 - MBQP mode doesn't work with dynamic configuration through Reset, Close-Init must be called.
 - **VP8 hybrid encode:**
 - Is a Beta version.
 - Target usages are not supported for this release.

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- VBR may produce worse quality compared to CBR, 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
 - JPEG/MJPEG HW decoder supports only resolutions ≤ 8192 . In case of bigger resolution fallback to SW will be notified via MFX_WRN_PARTIAL_ACCELERATION from Init/Query/QueryIOSurf functions.
- **VPP:**
 - Interpolated FRC is supported only for 30p->60p configuration. It will insert a duplicated frame if interpolated frame had worse quality than a duplicated one, ratio of interpolated frames to duplicated frames is content dependent.
 - When composition is used for 8 or more channels AND at least one channel has GlobalAlphaEnable=true AND first channel has GlobalAlphaEnable=false => first channel is composed with artifacts looking like certain global alpha value was applied to it despite GlobalAlphaEnable is false.

Workaround: For the first stream, replace GlobalAlphaEnable=false with GlobalAlphaEnable=true plus GlobalAlpha=255. This combination is visually equal to GlobalAlphaEnable=false and works correctly.
- **Misc:**
 - Software library is provided for demo/internal testing purposes only, it is not a product quality piece.
 - Due to specifics of GPU Copy implementation it is now required to close/destroy SDK associated resources (including VADisplay and frame surfaces) only after MFXClose call.
 - Encode quality may be different (non-bit exact) between CPU generations.
 - mfxExtThreadsParam::NumThread is not supported

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