

# Intel® Media Server Studio 2015 – Driver, SDK for Windows Server\* Release Notes

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## 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 2015 – Graphics driver, version 15.36.4223
- Intel® Media Server Studio 2015 – Software Development Kit, version 6.0.0000.388
- Intel® Media Server Studio 2015 – Screen Capture plug-in, version 1.16.2.89
- Intel® Media Server Studio 2015 – Advanced AVC Encode plug-in, version 1.16.5.85
- Intel® Media Server Studio 2015 – Samples are not a part of this package, but they can be downloaded from [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 1.16. This version is backwards compatible with the previous API version 1.15.

Following fixes, improvements and features were added:

- Intel® Xeon E3 v4 and 5<sup>th</sup> Generation Intel® Core™ i7 support added.

- mfxInfoMFX:MaxDecFrameBuffering tri-state option, to allow decoder decide number of surfaces allocation based on max\_dec\_frame\_buffering bitstream restriction flag in VUI header.
- Tri-state options to disable or change specific flags in VUI header added to mfxExtCodingOption3 extended buffer: AspectRatioInfoPresent; OverscanInfoPresent; OverscanAppropriate; TimingInfoPresent; BitstreamRestriction.
- mfxExtCodingOption3 extended with IntRefCycleDist option, allowing to enable Intra Refresh mode with specified distance in frames between cycles.
- Look Ahead 1:N analysis quality improved.
- AVC and MPEG-2 encode HRD compliance improved.
- Memory leak on opaque memory and MFX\_IMPL\_VIA\_D3D11 fixed.
- RecoveryPointSEI now supported without Intra Refresh functionality and can be inserted for each I frame.
- HEVC Main10 profile support added (for Intel® Xeon E3 v4 and 5<sup>th</sup> generation Intel® Core™ i7 only).
- VP9 decode support added (for Intel® Xeon E3 v4 and 5<sup>th</sup> generation Intel® Core™ i7 only).
- VPP Composition Reset support added.
- VPP Alpha Blending first frame processing and background processing added.
- Picture drop when aspect ratio changes in MPEG-2 decoder fixed.
- Support for Intra Refresh on base layer when temporal scalability enabled added.
- Maximum supported resolution for Screen Capture plug-in increased to 4096x4096
- Multiple memory leak issues for Screen Capture plug-in fixed.

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`"

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 processor models are supported and validated as a target platform for server and embedded usage:

- Intel® Xeon® Processor E3-1285L v4 with Intel® Iris™ Pro Graphics P6300
- Intel® Xeon® Processor E3-128\* v3 with Intel® HD Graphics \*
- Intel® Xeon® Processor E3-1284L v3 with Intel® Iris™ Pro Graphics P5200
- Intel® Core™ i7-5850HQ CPU @ 2.70GHz Intel® Iris™ Pro Graphics 6200
- Intel® Core™ i7-5600U CPU @ 2.60GHz Intel® HD Graphics 5500
- Intel® Core™ i7-5650U CPU @ 2.20GHz Intel® HD Graphics 6000
- Intel® Core™ i7-5557U CPU @ 3.10GHz Intel® Iris™ Graphics 6100
- Intel® Core™ i7-4850HQ CPU @ 2.30GHz Intel® Iris™ Pro Graphics 5200
- Intel® Core™ i7-4950HQ CPU @ 2.40GHz Intel® Iris™ Pro Graphics 5200
- Intel® Core™ i7-4770K CPU @ 3.50GHz Intel® HD Graphics 4600
- Intel® Core™ i7-4770S CPU @ 3.10GHz Intel® HD Graphics 4600
- Intel® Core™ i7-4550U CPU @ 1.50GHz Intel® HD Graphics 5000
- Intel® Core™ i7-4770R CPU @ 3.20 GHz Intel® Iris™ Pro Graphics 5200

The following processor models were validated for development usage:

- Intel® Core™ i5-5257U CPU @ 2.70GHz Intel® HD Graphics 6100
- Intel® Core™ i5-5350U CPU @ 1.80GHz Intel® HD Graphics 6000
- Intel® Core™ i3-4110E CPU @ 2.60GHz Intel® HD Graphics 4600
- Intel® Core™ i5-4250U CPU @ 1.30GHz Intel® HD Graphics 5000
- Intel® Core™ i5-4350U CPU @ 1.40GHz Intel® HD Graphics 5000
- Intel® Core™ i5-4210H CPU @ 2.90GHz Intel® HD Graphics 4600
- Intel® Core™ i5-4590T CPU @ 3.10GHz Intel® HD Graphics 4600
- Intel® Core™ i5-4670T CPU @ 2.30GHz Intel® HD Graphics 4600

### Software

- Microsoft Windows Server\* 2012 R2, 64-bit Microsoft Windows\* 8.1 for server/embedded usage. 64-bit Microsoft Windows\* 7 for development purpose only.

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

**Note:** Other combinations of Microsoft Windows Server 2012 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 2015 – SDK installs under C:\Program Files\Intel\Intel® Media Server Studio 2015 R6\– this is referenced as <sdk-install-dir> in the remainder of this document.

<pre>&lt;sdk-install-dir&gt;\media_studio_2015_sdk_release_notes.pdf</pre>	<p>Intel® Media Server Studio 2015 – Driver, SDK Release Notes (this file)</p>
<pre>&lt;sdk-install-dir&gt;\Software Development Kit\bin\x64</pre>	<p>Intel® Media Server Studio 2015 – SDK Dynamic Library, software implementation:</p> <p>libmfxsw64.dll for Intel® 64 architecture</p> <p><b>Note:</b> Hardware implementation of Intel® Media Server Studio 2015 – SDK Dynamic Library libmfxhw64.dll is packed and installed with Intel® Media Server Studio 2015 – Graphics Driver (default location is C:\Program Files\Intel\Media SDK)</p>
<pre>&lt;sdk-install-dir&gt;\Software Development Kit\bin\22d62c07e672408fbb4cc20ed7a053e4</pre>	<p>Intel® Media Server Studio 2015 – Screen Capture plug-in:</p> <ul style="list-style-type: none"> <li>• Screen Capture plug-in mfxplugin64_screen_capture.dll</li> <li>• Configuration file plugin.cfg</li> </ul>
<pre>&lt;sdk-install-dir&gt;\Software</pre>	<p>Intel® Media Server Studio 2015 –</p>

<p>Development Kit\bin\588f1185d47b42968dea377bb5 d0dcb4</p>	<p>Advanced AVC Encode plug-in:</p> <ul style="list-style-type: none"> <li>Advanced AVC Encode plug-in (implements 1:N Look Ahead optimization) mfxplugin64_h264la_hw.dll</li> <li>Configuration file plugin.cfg</li> </ul>
<p>&lt;sdk-install-dir&gt;\ Software Development Kit\doc</p>	<p>Intel® Media Server Studio 2015 – SDK documentation</p>
<p>&lt;sdk-install-dir&gt;\ Software Development Kit\include</p>	<p>External Intel® Media Server Studio 2015 – SDK headers:</p> <ul style="list-style-type: none"> <li>Type definitions in <code>mfxdefs.h</code></li> <li>Structure definitions in <code>mfxstructures.h</code></li> <li>Function definitions in C in <code>mfxvideo.h</code></li> <li>C++ wrapper of the SDK functions in <code>mfxvideo++.h</code></li> <li>Extensions for Multi-view Video Coding options <code>mfxmvc.h</code></li> <li>Extensions for User-Defined Functions <code>mfxplugin.h</code></li> <li>C++ wrapper for User-Defined Functions <code>mfxplugin++.h</code></li> <li>Extensions for JPEG*/Motion JPEG Video coding options <code>mfxjpeg.h</code></li> </ul>
<p>&lt;sdk-install-dir&gt;\Software Development Kit\lib\x64</p>	<p>Intel® Media Server Studio 2015 – SDK Static Dispatcher Library <code>libmfx.lib</code></p>
<p>&lt;sdk-install-dir&gt;\Software Development Kit\igfx_s3dcontrol</p>	<p>Intel® Media Server Studio 2015 – SDK Stereoscopic 3D API for Intel Iris and HD Graphics hardware, includes:</p> <ul style="list-style-type: none"> <li>S3D API definitions <code>igfx_s3dcontrol.h</code></li> <li>Static S3D Control Library <code>igfx_s3dcontrol.lib</code></li> <li>Displaying S3D with Intel® HD Graphics Developers Guide</li> </ul>
<p>&lt;sdk-install-dir&gt;\Software Development Kit\tools</p>	<p>Contains the following tools in binary form:</p> <ul style="list-style-type: none"> <li>SDK Tracer in folder <code>mediasdk_tracer</code>. This utility</li> </ul>

	<p>performs runtime recording of Intel SDK API calls and parameters to a log file.</p> <ul style="list-style-type: none"> <li>• SDK System Analyzer in folder <code>mediasdk_sys_analyzer</code>. This utility analyzes the system and reports back the SDK related capabilities, graphics driver and components status.</li> </ul>
<code>&lt;sdk-install-dir&gt;\Software Development Kit\opensource</code>	Source code of Intel® Media Server Studio 2015 – SDK Dispatcher

## Documentation

You can find more information on how to use Intel® Media Server Studio 2015 - 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\mediasdkscreenap-man.pdf`  
“Intel® Media Server Studio - SDK Screen Capture Decoder Reference Manual”

## Known Limitations

The Intel® Media Server Studio - SDK libraries 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 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
  - mfxInfoMFX::MaxDecFrameBuffering
- 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.
  - mfxExtCodingOption2::AdaptiveI, AdaptiveB, UseRawRef
  - mfxExtAVCEncodedFrameInfo::MAD, BRCPanicMode, QP
  - MFX\_PLUGINID\_VP8D\_HW
  - mfxExtCodingOption2::EnableMBQP, DirectBiasAdjustment, GlobalMotionBiasAdjustment
  - mfxExtChromaLocInfo
  - mfxExtMBQP
  - MFX\_PLUGINID\_HEVCE\_HW, MFX\_EXTBUFF\_HEVC\_PARAM, mfxExtHEVCParam
  - MFXInitEx, MFXDoWork, mfxInitParam, mfxExtThreadsParam

- o `mfxInfoMFX::LowPower`
- o `mfxInitParam::GPUCopy`
- o `mfxExtPredWeightTable`
- o `mfxExtDirtyRect`
- o `mfxExtMovingRect`
- o `mfxExtCodingOption3::ScenarioInfo`
- o `mfxExtCodingOption3::ContentInfo`

## Functional

- 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.
- Frames for different views in single AU in MVC encoder must be provided to encoder in order specified by `mfxMVCViewDependency`.
- `AFX_EXTBUFF_AVC_REFLIST_CTRL` and `AFX_EXTBUFF_CODING_OPTION_SPSPPS` external buffers are not supported by MVC encoder.
- MVC encoder supports `AFX_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.
- Known limitations for H.264 Multiple-Segment Encoding:
  - o Hardcoded HRD parameters: `bit_rate_scale = 0`, `cpb_size_scale = 3`
  - o 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).
  - o 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).
  - o Encoded `time_scale`, `num_units_in_tick` could be both multiplied by 2 if the `time_scale` from original SPS is odd.
  - o 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.
- If the MPEG-2 Video encoder `mfxVideoParam::mfxInfoMFX::CodecProfile` is initialized to 0, then the stream will be encoded as `AFX_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.
- 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 in software implementation is known to have a non-monotonic quality vs. bitrate dependency.
- MPEG-2 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, MPEG-2 Video and JPEG decoders.
- VPP in software implementation 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 in software implementation 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.
- Encoders and VPP don't support `mfxExtVppAuxData::PicStruct`.
- VPP scaling in software implementation may produce slightly blurred frames for RGB32 interlaced content.

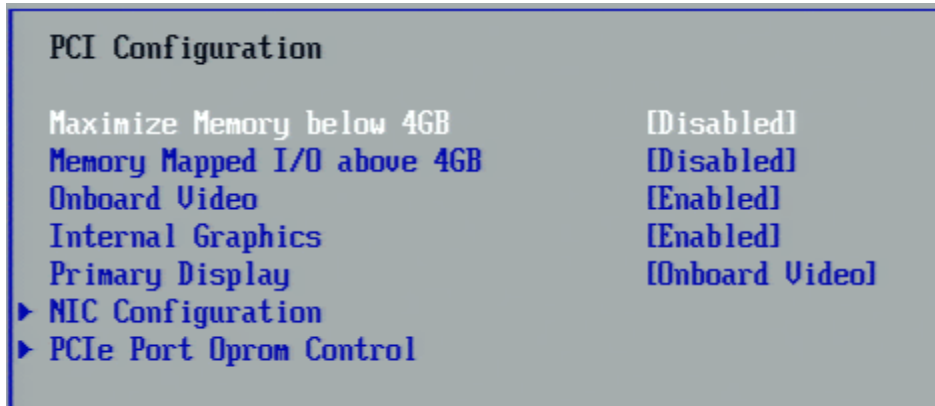
- JPEG decoder does not set `Corrupted` flag of `mfxFrameData` structure, and does not accept `MXF_BITSTREAM_EOS` as `DataFlag` of `mfxBitstream` structure.
- MPEG-2 Video decoder returns `MXF_ERR_UNDEFINED_BEHAVIOR` instead of `MXF_ERR_MORE_DATA` when part of sequence header is absent and `MXF_BITSTREAM_COMPLETE_FRAME` flag is set.
- The look ahead bitrate control mode may produce non HRD compliant encoded streams.
- `VPP::Query` in software implementation mistakenly indicates support for `MXF_FRCALGM_FRAME_INTERPOLATION` while it is actually not available.
- 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.
- `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 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.
- `mfxExtCodingOption2::LookAheadDS` currently supports only `MXF_LOOKAHEAD_DS_OFF` and `MXF_LOOKAHEAD_DS_2x`, `MXF_LOOKAHEAD_DS_4x` will give the same result as `MXF_LOOKAHEAD_DS_2x`. `MXF_LOOKAHEAD_DS_OFF` is the default value for target usage 1 and 2. `MXF_LOOKAHEAD_DS_2x` is the default value for target usages 3-7.
- The value reported via `mfxExtEncoderCapability::MBPerSec` may be bigger than the actual maximum processing rate of the encoder.
- This release supports only 64-bit Microsoft\* Windows\* applications.
- Microsoft DirectX\* 11.1 is the only supported acceleration infrastructure (due to headless mode requirement).
- HW HEVC decode plugin is limited to 4096x2304 resolution and doesn't implement SW fallback for higher resolutions. You may use software implementation of HEVC decode from Intel® Media Server Studio 2015 - Professional Edition to support higher resolutions.
- 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.
- MPEG-2 encode will change last frame type from B frame to P frame.
- 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.

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

## Other Limitations

- For Intel® Server Systems R1304RPMSHOR/ R1208RPMSHOR:
  - 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](http://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:



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