

Intel® Media Server Studio 2017 Driver, SDK for Linux* Getting Started Guide

Overview

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

Intel® Media Server Studio 2017 for Linux* provides software development tools and libraries needed to develop enterprise grade media solutions on Intel® server products.

This document covers installing the package components, which include source code, libraries, user mode graphics stack components, and kernel module patches.

A set of simplified examples which can be used to validate the install can be found under Intel® Media Server Studio Product Page-> Support -> Code Samples -> [Tutorials Package](#).

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

Installation Procedure

IMPORTANT NOTE: The installation procedure for this release is different than previous installations. This product is a combination of driver, library, and graphics stack components requiring specific hardware, Linux* distributions, and kernel versions.

For Intel® Media Server Studio 2017, there is a new Gold OS and a new approach to installing kernel updates. Supported processors also change from Intel® Media Server Studio 2016.

Double check the processor on your system with “`cat /proc/cpuinfo`” before starting.

This release adds support for 6th Generation Intel® Core™ processors (formerly “Skylake”) with integrated graphics. It also covers 5th Generation Intel® Core (formerly “Broadwell”). **Note:** 4th Generation Core™ and earlier processors are not supported by Media Server Studio 2017.

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This article describes the processor and OS support matrix:

<https://software.intel.com/en-us/articles/driver-support-matrix-for-media-sdk-and-opencl>

Please consult this article and the release notes for more background and details.

This release is validated with CentOS 7.2 using patches to its default kernel (3.10.0-327.13.1.x86_64), referred as “Gold” as well as the 4.4.0 kernel from www.kernel.org for your specific Linux OS distribution, and referred as “Generic”.

Prerequisite Steps

Add the user(s) who will run Intel® Media Server Studio – SDK applications to the video group

```
$ usermod -a -G video [LOGIN]
```

Check that an Intel VGA adapter can be found with `lspci`:

```
$ lspci -nn -s 0:02.0
```

```
00:02.0 VGA compatible controller [0300]: Intel Corporation Broadwell-U  
Integrated Graphics [8086:193b] (rev 09)
```

The command output above shows 193b as the graphics device ID. The ID reported by `lspci` may be different for your machine. The main thing to look for is that an Intel graphics adapter is available. If not, you may need to check your BIOS settings and hardware configuration.

For Media Server Studio hardware access:

1. The chipset must support integrated graphics and the motherboard must be wired for display from the processor. This is generally always the case for Intel® Core™-based systems, but may need to be checked for systems using Intel® Xeon® processors. The best place to start is your hardware documentation.
2. Intel integrated graphics must be enabled in the BIOS. For many server machines there is also a small graphics adapter on the motherboard which can be configured separately. Usually integrated graphics should be enabled and the motherboard adapter disabled. Some experimentation may be required to find the best configuration for your system if your hardware documentation does not indicate the settings to use.
3. You must have a processor with Intel integrated graphics (see product release notes for specific processor details.)

If all of these criteria are met and `lspci` shows an Intel graphics adapter you are ready to proceed with Media Server Studio installation.

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Make sure that proxies, network connections, firewalls, etc. are set up to allow yum and wget to download packages.

CentOS 7.2 “Gold” installs

These steps are intended for use with the CentOS 7.2 kernel (3.10.0-327.13.1.x86_64).

Only the CentOS 7.2.1511 version of CentOS is fully supported. Other distributions, as well as other versions/updates of CentOS 7.2 are considered Generic installs.

CentOS installs assume the "Development and Creative Workstation" base environment for included scripts. Other configurations will require additional packages which are not installed by default.

Installation scripts are in the install_scripts_centos*.tar.gz bundle. Install is simplified to a single “install_sdk_CentOS.sh” script.

```
$ tar -xzf MediaServerStudio*.tar.gz
$ cd MediaServerStudio*
$ tar -xzf SDK2017*.tar.gz
$ cd SDK2017*/CentOS
$ tar -xzf install_scripts_*.tar.gz
$ su
# ./install_sdk_CentOS.sh
# reboot
```

These steps represent an improvement over the Intel® Media Server Studio 2016 install method. There is no longer a need to recompile the kernel. All steps to install components and rebuild the i915 module are now merged into one script.

Note: you may see several warnings from depmod about “needs unknown symbol”. This is from a step intended to remove previous installs and does not indicate that anything is missing from the current install. These warnings can be ignored.

“Generic” Steps

The commands below show the steps to install using the Generic approach in the Gold CentOS 7.2.1511 environment. These steps may need to be modified for other configurations. For a version of the script ready to cut and paste as well as info for other distros see <https://software.intel.com/en-us/articles/mss-2017-generic-install>

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```

#!/usr/bin/bash

# install prerequisite packages
yum -y -t groupinstall "Development Tools"
yum -y -t install kernel-headers kernel-devel bc wget bison ncurses-
devel hmaccalc zlib-devel binutils-devel elfutils-libelf-devel rpm-
build redhat-rpm-config asciidoc hmaccalc perl-ExtUtils-Embed pesign
xmlto audit-libs-devel binutils-devel elfutils-devel elfutils-libelf-
devel newt-devel numactl-devel pciutils-devel python-devel zlib-devel
mesa-dri-drivers openssl-devel

GENERIC_KERNEL_SRC=linux-4.4.tar.xz
GENERIC_KERNEL_WEB_PATH=http://www.kernel.org/pub/linux/kernel/v4.x

#install Media Server Studio packages
find . -name 'libdrm*' -exec rm {} \;
find . -name 'libkms*' -exec rm {} \;
find . -name 'libva*' -exec rm {} \;

/bin/cp -r etc/* /etc
/bin/cp -r opt/* /opt
/bin/cp -r lib/* /lib
/bin/cp -r usr/* /usr

#get generic kernel source
if [ ! -f ./${GENERIC_KERNEL_SRC} ]; then
    wget ${GENERIC_KERNEL_WEB_PATH}/${GENERIC_KERNEL_SRC}
fi

if [ ! -f ./${GENERIC_KERNEL_SRC} ]; then
    echo -e "Failed to get ${GENERIC_KERNEL_SRC}, please try download it
manually from ${GENERIC_KERNEL_WEB_PATH}, put it same folder as this
script, then run this script again." 1>&2
    exit 1
fi

tar -xJf ${GENERIC_KERNEL_SRC}

cp /opt/intel/mediasdk/opensource/patches/kmd/4.4/intel-kernel-
patches.tar.bz2 .

tar -xjf intel-kernel-patches.tar.bz2

cd linux-4.4
for i in ../intel-kernel-patches/*.patch; do patch -p1 < $i; done

make olddefconfig
make -j 8
make modules_install
make install

```

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Standalone OpenCL Installs

The Linux Intel(R) SDK for OpenCL(TM) applications components may be updated in separate standalone releases. Steps are similar to above, but may diverge occasionally. Instructions on how to install these standalone versions are included with those releases.

Verifying correct installation

The `/opt/intel/mediasdk` directory should be populated

```
$ ls /opt/intel/mediasdk/  
builder doc include lib lib64 opensource plugins samples tools
```

The `/dev/dri` directory should have a `renderD` interface.

The `vainfo` utility should show the current driver, Media SDK's `iHD` (from `/opt/intel/mediasdk`) and several codec entry points.

```
$ vainfo | grep -v 'unknown'  
libva info: VA-API version 0.99.0  
libva info: va_getDriverName() returns 0  
libva info: User requested driver 'iHD'  
libva info: Trying to open /opt/intel/mediasdk/lib64/iHD_drv_video.so  
libva info: Found init function __vaDriverInit_0_32  
libva info: va_openDriver() returns 0  
vainfo: VA-API version: 0.99 (libva 1.67.0.pre1)  
vainfo: Driver version: 16.5.53384-ubit  
vainfo: Supported profile and entrypoints  
    VAProfileH264ConstrainedBaseline: VAEntrypointVLD  
    VAProfileH264ConstrainedBaseline: VAEntrypointEncSlice  
    VAProfileH264Main                 : VAEntrypointVLD  
    VAProfileH264Main                 : VAEntrypointEncSlice  
    VAProfileH264High                 : VAEntrypointVLD  
    VAProfileH264High                 : VAEntrypointEncSlice
```

Prebuilt samples are available for install smoke testing in `MediaSamples_Linux_*.tar.gz`

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```
$ tar -xzf MediaSamples_Linux_16.5-53384.tar.gz
$ cd MediaSamples_Linux_bin
$ ./sample_multi_transcode -i::h264 ../content/test_stream.264 -o::h264
test_out.h264 -hw -la
```

Expected output:

Multi Transcoding Sample Version 7.0.16053447

```
libva info: VA-API version 0.99.0
libva info: va_getDriverName() returns 0
libva info: User requested driver 'iHD'
libva info: Trying to open /opt/intel/mediasdk/lib64/iHD_drv_video.so
libva info: Found init function __vaDriverInit_0_32
libva info: va_openDriver() returns 0
Pipeline surfaces number: 120
MFX HARDWARE Session 0 API ver 1.17 parameters:
Input  video: AVC
Output video: AVC
```

Session 0 was NOT joined with other sessions

Transcoding started

Transcoding finished

```
Common transcoding time is 0.18 sec
MFX session 0 transcoding PASSED:
Processing time: 0.18 sec
Number of processed frames: 101
```

The test PASSED

Samples and Tutorials

Media Server Studio package includes MediaSamples_Linux_2016_bin.tar.gz tar ball with released samples binaries for testing after install. RPM package with latest samples binaries will not auto installed by installation script.

Samples and tutorials are available at <https://software.intel.com/en-us/intel-media-server-studio-support/code-samples>

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Samples are longer, more complex, and their main purpose is to show a broad range of the capabilities in Media Server Studio. Tutorials are shorter, clearer, and intended to be starting points for understanding how to develop code with the SDK.

Example code can be downloaded from

<http://software.intel.com/sites/default/files/mediasdk-tutorials-0.0.3.tar.gz>

Test content is available in the samples package and at

http://software.intel.com/sites/default/files/sample_video_content_0.zip

Building Intel® Media Server Studio Tutorials:

The tutorials are intended to be simple and clear starting points. They are built with standard makefiles. By default executables can be found in the `_build` directory.

To get more info on tutorial parameters use

`[executable name] --help`

Note: example programs in the tutorials package are suitable for SDK API study only. It has limited functionality and were not intended for any kind of SDK and media stack validation.

Building Intel® Media Server Studio Samples:

The Intel® Media SDK samples are built with a recent version of CMake*. This can be downloaded from www.cmake.org or installed via standard package management. To install samples prerequisites in CentOS 7.2.1511:

```
yum install cmake mesa-libGL-devel
```

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To build, make sure \$MFX_HOME is set to the directory corresponding to your build (by default /opt/intel/mediasdk) then type

```
perl build.pl --cmake=intel64.make.release -build
```

in the /opt/intel/mediasdk/samples directory.

The build.pl script will only build samples if the prerequisites can be found. For most cases only libdrm is needed. If X11 is not installed the _x11 samples will not be built.

The transcode sample is a great starting point to check your system:

```
sample_multi_transcode -i::h264 test_in.h264 -o::h264 test_out.h264 -hw
```

If you see an error that i965 cannot be found, here is a workaround:

```
cd /opt/intel/mediasdk/lib64
ln -s iHD_drv_video.so i965_drv_video.so
```

To test OpenCL:

Download the OpenCL Linux samples package from <https://software.intel.com/en-us/intel-opengl-support/code-samples>

The CapsBasic sample prints OpenCL query results for your system, and makes an excellent smoke test.

```
cd CapsBasic; make; ./CapsBasic
```

This should show a functioning GPU device.

The matrix multiply sample tests launching kernels:

```
cd GEMM; make; ./GEMM -t gpu
```

Some OpenCL examples are included in the Media Server Studio samples package. They are not built with cmake like the other samples. These samples illustrate use of the vector motion estimation (VME) extensions.

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For example, from the samples directory

```
$ cd samples/ocl_motion_estimation/MotionEstimation
$ make
```

More samples are available from <https://software.intel.com/en-us/intel-openccl-support/code-samples>. Use OpenCL 1.2 Samples for Linux.

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