Intel® Media Server Studio 2016 - Driver, SDK, Samples for Linux* Getting Started Guide

Overview

For the most up to date version please refer the Intel® Media Server Studio Support documentation page.

Intel® Media Server Studio 2016 R1 for Linux* is a software development library that exposes the media acceleration capabilities of Intel® platforms for decoding, encoding and video processing.

This document covers installing the package components, which include source code, libraries, user mode graphics stack components, and kernel 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.** Hardware and Linux* distributions supported are not the same as the Intel® Media Server Studio 2015 R1 and R2. This product is a combination of driver, library, and graphics stack components requiring specific hardware, Linux* distributions, and kernel versions. In R1 and R2 Intel provided a pre-built i915 kernel module for LTS kernels. **This release requires custom patching and compilation of the Linux kernel.**

Double check the processor on your system with "cat /proc/cpuinfo" before starting.

This release supports:

Intel® Core™ Processors	Intel® Xeon® Processors
4th Generation Intel Core™ Processors with Intel Iris™ Pro Graphics, Intel Iris Graphics or Intel HD Graphics 4200+ Series. 5th Generation Intel Core™ Processors with Intel Iris™ Graphics or Intel HD Graphics (5500, 6000, 6100).	Intel® Xeon® Processor E3 v3 Family with Intel® HD Graphics P4700. Intel® Xeon® Processor E3 v4 Family with Intel® Iris™ Pro Graphics P6300. (C226 chipset is required to use integrated graphics with Xeon processors)

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More information on supported hardware can be found in the release notes and at ark.intel.com.

Only the following configurations are considered "gold". This means that issues can be filed and the developer teams can respond to issues.

Linux Distribution	Kernel
CentOS 7.1.1503	CentOS 7.1.1503 default kernel

Please note: this may no longer be the most recent CentOS. Patches are prepared specifically for the CentOS 7.1.1503 release. To find this release, search for the 7.1.1503 directory at your local mirror or http://vault.centos.org/7.1.1503/isos/x86_64/.

A "Generic" option based on LTB 3.14.5 kernel is now available. This opens up the potential for Media Server Studio to work on a wide variety of Linux distributions and versions. The main requirements are glibc >=2.12 and gcc >=4.7. The main thing to remember with the Generic path is that issues will need to be reproducible in a Gold configuration (preferably CentOS 7.1).

Prerequisite Steps For All Installs

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

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

2. Check that an Intel VGA adapter can be found with `lshw` or `lspci –nn`

```
$ lspci -nn -s 00:02.0
00:02.0 VGA compatible controller [0300]: Intel Corporation Device
[8086:0d22] (rev 08)
       ^^^^ (PCI id of the Intel graphics device)
```

This is an example 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.

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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. If your hardware documentation does not indicate the settings to use some experimentation may be required to find the best configuration for your system.
3. You must have a processor with Intel integrated graphics (see supported processors above)

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

CentOS 7.1 Steps

CentOS installs should use the "Development and Creative Workstation" base environment. Other configurations will require additional packages which are not installed by default.

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

Uncompress the Media Server Studio package. Install starts with the SDK directory. Install scripts are tarred together and must be unpacked.

```
$ tar -xvzf MediaServerStudio*.tar.gz
$ cd MediaServerStudio*
$ tar -xvzf SDK*.tar.gz
$ cd SDK*
$ cd CentOS
$ tar -xvzf install_scripts*.tar.gz
```

Install has three stages.

1. SDKs and user-mode driver (UMD) components:
   install_sdk_UMD_CentOS.sh
2. Kernel-mode driver (KMD) changes. Apply patches to the i915 driver as well as to the rest of the kernel. Rebuild and package as RPMs:
   build_kernel_rpm_CentOS.sh
3. Install the kernel RPMs built by step 2. (If installing on multiple machines you can copy the RPMs to new systems instead of rebuilding.)

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```
(as root)
# ./install_sdk_UMD_CentOS.sh
# mkdir /MSS
# chown {regular user}:{regular group} /MSS

(as regular user)
$ cp build_kernel_rpm_CentOS.sh /MSS
$ cd /MSS
$ ./build_kernel_rpm*.sh

(as root)
# cd /MSS/rpmbuild/RPMS/x86_64
# rpm -Uvh kernel-3.10.*.rpm
# reboot
```

When rebooting, please make sure to start with the recently installed kernel.

Please note: the build_kernel_rpm script must be run from a very short path. Kernel RPM preparation may fail if a longer build directory path is used.

After running the UMD install script, check that /opt/intel/mediasdk has been populated. If not, there may have been conflicts with system components like libdrm. You can work around this by installing the Media Server Studio SDK .rpm packages manually using --force:

```
(cd to SDK directory)
# rpm --force -Uvh *.rpm
```

As with Generic installs(below) only one version of libdrm and libva should be on your system after install completes. If versions exist in other directories than /usr/lib64 after install please remove them before proceeding.

Generic Steps

Due to the large number of Linux distributions and the variations between them the steps described below may not be an exact match. The intent is to provide the basic sequence and it will be up to you to adapt it.

1. Check that glibc is >=2.12 (ldd --version)
2. Uncompress the generic package and cd to that directory

UMD (user mode driver and components) install steps:

3. Copy the contents of etc, opt, and usr to /etc, /opt/ and /usr (destinations, paths, etc. may need to be tweaked depending on your distro)
4. Remove other versions of libdrm and libva from the /usr directory. Multiple versions of these libraries can cause problems.
5. Rebuild and install libdrm from /opt/intel/mediasdk/opensource/libdrm. Some prerequisites like libxcb-devel and libpciaccess-devel may be required

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6. Rebuild and install libva from /opt/intel/mediasdk/opensource/libva/. Installing some prerequisites may be required to complete its configure stage
7. Set these environment variables in /etc/environment

```
LD_LIBRARY_PATH="/usr/local/lib;/usr/lib64"
LIBVA_DRIVER_NAME=iHD
LIBVA_DRIVERS_PATH=/opt/intel/mediasdk/lib64
```

KMD (kernel mode driver) install steps

8. Download the 3.14.5 kernel from www.kernel.org

```
$ wget
https://www.kernel.org/pub/linux/kernel/v3.x/linux-3.14.5.tar.xz

$ tar -xJf linux-3.14.5.tar.xz
```

9. Apply kernel patches

```
$ cp
/opt/intel/mediasdk/opensource/patches/kmd/3.14.5/intel-kernel-patche
s.tar.bz2 .
$ tar -xvjf intel-kernel-patches.tar.bz2
$ cd linux-3.14.5
$ for i in ../intel-kernel-patches/*.patch; do patch -p1 < $i; done
```

10. Build the kernel

```
$ make olddefconfig
$ make -j 8
$ make modules_install
$ make install
```

11. Reboot

Important Note: With using own kernel configuration please make sure CONFIG_MMU_NOTIFIERS=y is enabled. It can be disable implicitly with disabling virtualization support.

Verifying correct installation

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After rebooting, check kernel version and that new i915 loaded with uname -r.

double check that the i915 module is loaded correctly (as example) and used by other drivers:

```
$ lsmod | grep 'i915'
i915                  837369  4
drm_kms_helper        44256  1 i915
drm                   294746  3 i915,drm_kms_helper
```

Please try running one of the example applications as described below:

Samples and Tutorials

Example code can be downloaded from
http://software.intel.com/sites/default/files/mediasdk-tutorials-0.0.3.tar.gz

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

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.

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: Code snippets in 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.

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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
```

To test OpenCL:

Some OpenCL examples are included in the samples package. They are not built with cmake like the other samples.

from the samples directory

```
$ cd opencl_motionestimation/MotionEstimation
$ make
$ ./motion_estimation
```

More samples are available from
https://software.intel.com/en-us/intel-opencl-support/code-samples

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