Intel® Media Software Development Kit 2014 R2 for Linux* Servers Getting Started Guide

(Version 5.0.1603344.93446)

Overview

Intel® Media Software Development Kit for Linux* Servers (Intel Media SDK) is a software development library that exposes the media acceleration capabilities of Intel® platforms for decoding, encoding and video preprocessing.

This document covers the basics of installation and validating correct operation with the pre-compiled samples.

For more information on the sample source code provided see "`<unpack_folder[1]>/MSDK/<version>/l_MSDK/doc/MediaSDK Sample Guide.pdf`."

Another set of simplified examples can be found under the "tutorials" tab at https://software.intel.com/en-us/media-solutions-portal.

[1]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 Prerequisites

IMPORTANT NOTE: These prerequisite steps are required for all installations to achieve a supported configuration. Unlike software-only packages which can be expected to work across a wide variety of platforms and environments, Intel Media SDK is a combination of driver, library, and graphics stack components requiring specific hardware, Linux* distributions, kernel levels, etc. as described here.

1. Double check hardware, OS, Linux distribution, and kernel level. Only the specific configurations described in the release notes are supported.

   For **SUSE* Linux Enterprise Server 11**, the default kernel is correct.

   For **Ubuntu* 12.04 Server** please install the appropriate kernel as below. This specific kernel is required to match the drm/i915 module in the release.

For Intel® Xeon® E3-1285/E3-1286 v3 and 4th Generation Intel Core™ Processors, install kernel and headers as follows:

```
apt-get install linux-image-3.8.0-23-generic
linux-headers-3.8.0-23-generic
```

For 3rd Generation Intel Core™ Processors, install this set of kernel and headers instead

```
apt-get install linux-image-3.2.0-41-generic
linux-headers-3.2.0-41-generic
```

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

```
$ lspci -nn
...
00:02.0 VGA compatible controller [0300]: Intel Corporation Haswell
Integrated Graphics Controller [8086:0416] (rev 02)
...
```

2. Intel Media SDK for Linux Servers now includes a customized libdrm. To avoid conflicts please remove any other versions of libdrm from the system. Where this cannot be done through regular package management commands this can be accomplished as below

```
$ sudo find /usr –name 'libdrm*' (check files to remove)
$ sudo find /usr –name 'libdrm* –exec rm –rf {} \;
```

3. Add the user(s) who will run Media SDK applications to the video group

```
$ sudo usermod –a –G video lmsdk
```

4. Reboot into the kernel required for your hardware and Linux distribution. You can double check before beginning installation with `uname –r`.

Installation with install_media.sh

After booting into the correct kernel as described in the release notes and the prerequisites section,

1. Create a directory for the installation
2. Extract the tar.gz package contents
3. Run the installer.

```
$ export MEDIASDK_INSTALL_FOLDER=(some folder)
$ mkdir $MEDIASDK_INSTALL_FOLDER
$ mv intel-linux-media_{release}.tar.gz $MEDIASDK_INSTALL_FOLDER
$ cd $MEDIASDK_INSTALL_FOLDER
$ tar –xvzf intel-linux-media_{release}.tar.gz
$ sudo ./install_media.sh
```

The installer output should be similar to the text below. For a supported configuration using the specific kernel appropriate to your processor architecture press y to install the kernel-mode driver (KMD), which is the drm.ko, drm_kms_helper.ko and i915.ko patched for this specific configuration.

```
$ sudo ./install_media.sh
[sudo] password for lmsdk:
INFO... Install on Ubuntu ...
INFO... Installing New Driver...
INFO... MediaSDK installed successfully in /opt/intel/mediasdk!
INFO... Do you want to install KMD?
press 'y' to confirm, otherwise cancelled.y
INFO... Original i915.ko backuped in kmd_backup/i915.ko.2014-06-01_214205
INFO... Original drm.ko backuped in kmd_backup/drm.ko.2014-06-01_214205
INFO... Original drm_kms_helper.ko backuped in
kmd_backup/drm_kms_helper.ko.2014-06-01_214205
INFO... Trying to install  kmd...
INFO... Trying to install 3.2.42 kmd...
INFO... ./kmd/binary/xcode-ubuntu-12.04-k3.8-rel/i915.ko installed
successufully.
INFO... ./kmd/binary/xcode-ubuntu-12.04-k3.8-rel/drm.ko installed
successufully.
INFO... ./kmd/binary/xcode-ubuntu-12.04-k3.8-rel/drm_kms_helper.ko installed
successufully.
INFO... After reboot, you can 'lsmod' to identify whether i915.ko drm.ko
drm_kms_helper.ko loaded. if not, you have to rebuild kernel by yourself with
patched files (kdm/source) in this package.
update-initramfs: Generating /boot/initrd.img-3.8.0-23-generic
INFO... Kernel module updated successfully!
INFO... Package installation Done.
```

Installation via .rpm and .deb (NEW)

Intel Media SDK 2014 R2 introduces new installation options.

- .deb files for Ubuntu*
- .rpm files for SLES*

Working with system package management is preferable because it can avoid potential overwrites of important files by other packages and can simplify long-term updates/maintenance.

There are now two packages per Linux* distribution:

1. A runtime package, with libmfxhw64 and other binaries necessary to run Media SDK applications. This package is intended to simplify application deployment and to be redistributable to a large number of end users.

   To install **Ubuntu 12.04** runtime package:

   ```
   $ sudo dpkg –i intel-linux-media-runtime-ubuntu_16.3.2.22368_amd64.deb
   ```

   To install **SLES 11.3** runtime package:

   ```
   $ sudo rpm –i intel-linux-media-runtime-sles_16.3.2.22368-64bit.x86_64.rpm
   ```

2. A dev package, with include files, source for modified stack components, samples, tools, documentation, etc. This package is intended for use by Media SDK developers. It should be installed in addition to the runtime package on Media SDK development systems.

   To install **Ubuntu 12.04** development package:

   ```
   $ sudo dpkg –i intel-linux-media-dev-ubuntu_16.3.2.22368_amd64.deb
   ```

   To install **SUSE SLES 11.3** development package:

   ```
   $ sudo rpm –i intel-linux-media-dev-sles_16.3.2.22368-64bit.x86_64.rpm
   ```

CAUTION: Since the installation updates core libdrm components which may not be easy to remove by standard package management commands, "--force-all" may be necessary for dpkg, "--force" for rpm. Forcing could have long term impacts on package manager usability.

For Ubuntu 12.04, if --force-all is used any subsequent installs with apt-get or dpkg with DRM components as prerequisites (which could be a wide variety of packages interacting with the graphics stack such including libsdl and OpenGL/mesa) may abort with errors like

```
trying to overwrite <libdrm file>, which is also in package
intel-linux-media-runtime-ubuntu
```

The following approach may help:

1. sudo apt-mark hold libdrm-intel1 libdrm-dev
2. install Media SDK runtime (and, if necessary dev) packages with –force-all

This will prevent Ubuntu's package management from attempting to update the libdrm files overwritten by the Media SDK .deb package. Updates to these files will then be only via Media SDK.

Verifying correct installation

After rebooting, double check that the i915 module is loaded correctly

```
$ lsmod | grep 'i915'
i915                  617480       2
drm_kms_helper        49196        1      i915
drm                   285862       2      i915,drm_kms_helper
i2c_algo_bit          13564        1      i915
video                 19652        1      i915
```

Ensure that the Intel® Media SDK library can be found. By default, the dispatcher searches in `/opt/intel/mediasdk/lib64/8086/<device_id>/`. The libmfxhw-p.so.{version> and libmfxhw64.so files can also be located in convenient Linux library locations like `/usr/local/lib` or anywhere else according to standard Linux library search rules. For example, the library search path can be adjusted by the `LD_LIBRARY_PATH` variable:

```
$ export LD_LIBRARY_PATH=$MEDIASDK_INSTALL_FOLDER/bin/x64
```

Communication with the DRM library occurs via /dev/dri/cardx handles. Usually /dev/dri/card0, though there can be more entries if there are more graphics adapters. Quite often permissions are set so that root access is required for users not in the video group. Please add Intel Media SDK application users to the video group and/or ensure users have permissions to work as a regular user with `sudo chmod 666 /dev/dri/card0`.

Pre-built samples are included in `l_MSDK/samples/bin/x64`.

In case you don't have easy access to raw elementary streams, utilities like FFmpeg* can generate them for you:

```
$ ffmpeg -i input.mp4 -an -vcodec copy -bsf h264_mp4toannexb -f h264 out.h264
```

This can work with a wide variety of .mp4 content, including creative commons clips like Tears of Steel or Big Buck Bunny.

To test decode:

```
$ sample_decode_drm h264 -i in.264 -o out.yuv -hw
```

To test encode:

```
$ sample_encode_drm h264 -i in.yuv -o out.264 -hw -w <in.yuv width> -h <in.yuv height>
```

To test transcode:

```
$ sample_multi_transcode_drm -i::h264 in.264 -o::h264 out.264 -hw
```

Note: For Intel Media SDK for Linux Servers there is no software implementation, so for these samples to work -hw must be specified on the command line.

Compiling samples

The Intel® Media SDK samples are built with a version of CMake* which is newer than the one available by default via the Ubuntu* or SUSE* Linux* Enterprise Server package management system. Please install the latest version from www.cmake.org.

To build, make sure $MFX_HOME is set to the directory corresponding to your build then type

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

in the samples directory.

Please note: the build system 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.

For more information see `MediaSDK Sample Guide.pdf` in the doc directory.

Installing for non-supported configurations

There is a good chance Intel® Media SDK will work in other configurations. For full support using one of the supported configurations is required. However, you are free use the Intel Media SDK in other settings if you are willing to go through an extra step in reporting issues. **If an issue can be reproduced in one of the supported configurations it can be addressed, otherwise you are on your own.**

Since Intel Media SDK is based on hardware access via the video driver, the main concern with alternative installations will be making sure that all device IDs and other changes to the kernel are available. Usually patches required to enable working with the hardware are submitted to the kernel repository tip relatively quickly. If you use an advanced kernel or compile from close to the tip you are likely to get most, if not all, changes required for Intel Media SDK to work.

Unfortunately there are no guarantees at this point with this approach. Enabling Intel Media SDK to work on a wider set of configurations is a work in progress.

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