INTEL CORPORATION

Intel® Embedded University Program
LAB 7.1

Embedded Application Graphic and Video Performance with the Intel® Atom™ Processor E6XX Series Based Platform

Username: **inforce**

Password: **inforce123**

Lab Folders: **/home/inforce/lab**

Instructions:

Hardware Video Acceleration Overview

Hardware Video Acceleration is the use of a specialized video engine to decode video streams (such as MPEG-2, MPEG-4, H.264 and VC-1) in order to free up the processor from having to do all of the decoding. Only some chipsets (such as the Intel® System Controller Hub US15W and
Intel® Atom™ Processor E6xx Series) support a video engine. The flow of video through the various components generally is as follows:

1. The video player, such as the Intel® Embedded Media and Graphics Driver (Intel® EMGD)-validated MPlayer, reads a video file and determines the type.
2. Based on type, the proper codec shared library object is loaded.
3. The codec loads the VA library shared library object.
4. The VA library loads the emgd_drv_video.so shared library object.
5. The emgd_drv_video.so communicates, over the X wire protocol, with the Intel EMGD X driver to send encoded video to the hardware for decoding.

Installation steps:

1) start a terminal and switch to root by typing
   - *su*

   the password is *inforce123*

2) Download the libva rpms from the following locations:
   http://repo.meego.com/MeeGo/releases/1.0.1/core/repos/ia32/packages/i586/libva-1.0.1-3.4.i586.rpm
   http://repo.meego.com/MeeGo/releases/1.0.1/core/repos/ia32/packages/i586/libva-devel-1.0.1-3.4.i586.rpm
   Note*: you also can find the two files under /home/inforce/labs

3) Install the rpms with the following commands:
   - *cd /home/inforce/lab*
   - *rpm -ivh --force libva-1.0.1-3.4.i586.rpm*
   - *rpm -ivh --force libva-devel-1.0.1-3.4.i586.rpm*

4) verify libVA
   - *vainfo*

5) Install the MI-X package from the driver directory:

- *cd etc/X11/emgd/Feb_22PKG.pkg_installation/IEMGD_HEAD_Linux/IEMGD_HEAD_Linux/common/video_plugin*
- *rpm -Uvh mixcommon-0.1.8-1.1.moblin2.i586.rpm*
- *rpm -Uvh mixvbp-0.1.15-1.1.moblin2.i586.rpm*
- *rpm -Uvh mixvideo-0.1.15-3.1.moblin2.i586.rpm*
- *rpm -Uvh gst-plugins-mixvideo-0.10.16-1.2.moblin2.i586.rpm*

6) Run gst-inspect to check installed codecs
   - *gst-inspect*

   Or get more details on codes properties:

   - *gst-inspect MixVideoEncoder*

7) copy emgd_drv_video.so to /usr/lib/dri
   - *cp /usr/lib/xorg/modules/drivers/emgd_drv_video.so /usr/lib/dri*

8) play video files
   - *cd /home/inforce/Videos*
   - *gst-launch filesrc location=/home/inforce/Videos/big_buck_bunny_480p_h264.mov ! qtdemux ! queue ! MixVideoDecoder ! MixVideoSink*

Video Encoding

1) Check CPU Utilization by System Monitor

   go to menu, open "Applications/System Tools/System Monitor"

2) View the camera
   - *gst-launch v4l2src ! video/x-raw-yuv ! xvimagesink*

3) Record Video From Camera (SW Accelerated)
   - *cd /home/inforce/lab*
   - *gst-launch v4l2src ! ffmpegcolorspace ! 'video/x-raw-yuv,width=320,height=240,framerate=15/1' ! x264enc name=enc ! queue ! avimux ! queue ! filesink location=/home/inforce/lab/H264_1.avi enc.*
   - *Press Ctrl-C to stop recording*

4) Record Video From Camera (HW Accelerated)
   - *gst-launch v4l2src ! ffmpegcolorspace ! 'video/x-raw-yuv,width=320,height=240,framerate=15/1' ! MixVideoEncoder rate-control=CBR bit-rate=2000000 need-display=0 ! queue ! avimux ! queue ! filesink location=/home/inforce/lab/H264_2.avi*
   - *Press Ctrl-C to stop recording*

5) Encode video from file (SW Accelerated)

- gst-launch -v filesrc location=/home/inforce/lab/1280x720_Barcelona.raw use-mmap=TRUE blocksize=1382400 ! video/x-raw-yuv,width=1280,height=720,framerate=30/1,format=\(fourcc\)I420 ! x264enc ! queue ! avimux ! filesink location=/home/inforce/lab/H264_3.avi/opt/mplayer/bin/mplayer –vo vaapi –va vaapi /root/lab/H264_3.mp4 -fps 30

6) Encode Video From file (HW Accelerated)
   - *gst-launch -v filesrc location=/home/inforce/lab/1280x720_Barcelona.raw use-mmap=TRUE blocksize=1382400 ! video/x-raw-yuv,width=1280,height=720,framerate=30/1,format=\(fourcc\)I420 ! MixVideoEncoder bit-rate=10000000 rate-control=NONE need-display=0 ! queue ! avimux ! filesink location=/home/inforce/lab/H264_4.avi*

Video Playback:

1) use mplayer to play the video

   - */opt/mplayer/bin/mplayer -vo vaapi -va vaapi /home/inforce/lab/H264_<*>.avi -fps 30*

Run demo script:

1) the demo script includes the 4 user cases
   - *cd /home/inforce/lab*
   - *./demo.sh*

Backup

1) compare CPU Untilizaion with VLC which is not using acceleration
   - open Applications/Sounds & Video/VLC media player
   - from File option, open one video clip
   - check CPU utilization

Appendix:

Network setting:

1) Check network connection:
   Could need add proxy , such as:
   In file \etc\bashrc, add “export http_proxy=http://proxy01.ch.intel.com:911”

2) If you are facing problems with firewalls blocking yum, the next step may help.
   Edit fedora.repo and fedora-updates.repo at /etc/yum.repos.d:
   a. cd /etc/yum.repos.d/

b. vi fedora.repo
c. Comment out mirrorlist (using #), uncomment baseurl (remove the #), disable gpgcheck (=0), for example, as below:

[fedora.repo]
name=Fedora $releasever - $basearch
failovermethod=priority
baseurl=http://download.fedoraproject.org/pub/fedora/linux/
releases/$releasever/Everything/$basearch/os/
#mirrorlist=https://mirrors.fedoraproject.org/
metalink?repo=fedora-$releasever&arch=$basearch
enabled=1
metadata_expire=7d
gpgcheck=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-fedora-$basearch

d. vi fedora-updates.repo
e. Comment out mirrorlist (using #), uncomment baseurl (remove the #), disable gpgcheck (=0), for example, as below:

[fedora-updates.repo]
name=Fedora $releasever - $basearch
failovermethod=priority
baseurl=http://download.fedoraproject.org/pub/fedora/linux/
releases/$releasever/Everything/$basearch/
#mirrorlist=https://mirrors.fedoraproject.org/
metalink?repo=fedora-$releasever&arch=$basearch
enabled=1
metadata_expire=7d
gpgcheck=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-fedora-$basearch

3) Reboot

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