

# video encoding HW acceleration for nextcloud in docker

Add rendering devices to nextcloud container

## nextcloud.yml

```
devices:
  - /dev/dri/renderD128:/dev/dri/renderD128
  - /dev/dri/card0:/dev/dri/card0
```

execute inside the container

```
apt install -y vainfo
apt install -y intel-media-va-driver-non-free
```

allow www-data user to access rendering devices

```
groupadd -g 109 render
usermod -a -G video www-data
usermod -a -G render www-data
#docker restart root_app_1
```

simple checks

```
vainfo
```

```

error: XDG_RUNTIME_DIR is invalid or not set in the environment.
error: can't connect to X server!
libva info: VA-API version 1.17.0
libva info: Trying to open /usr/lib/x86_64-linux-gnu/dri/iHD_drv_video.so
libva info: Found init function __vaDriverInit_1_17
libva info: va_openDriver() returns 0
vainfo: VA-API version: 1.17 (libva 2.12.0)
vainfo: Driver version: Intel iHD driver for Intel(R) Gen Graphics - 23.1.1 ()
vainfo: Supported profile and entrypoints
    VAProfileNone           : VAEntrypointVideoProc
    VAProfileNone           : VAEntrypointStats
    VAProfileMPEG2Simple     : VAEntrypointVLD
    VAProfileMPEG2Simple     : VAEntrypointEncSlice
    VAProfileMPEG2Main       : VAEntrypointVLD
    VAProfileMPEG2Main       : VAEntrypointEncSlice
    VAProfileH264Main        : VAEntrypointVLD
    VAProfileH264Main        : VAEntrypointEncSlice
    VAProfileH264Main        : VAEntrypointFEI
    VAProfileH264Main        : VAEntrypointEncSliceLP
    VAProfileH264High        : VAEntrypointVLD
    VAProfileH264High        : VAEntrypointEncSlice
    VAProfileH264High        : VAEntrypointFEI
    VAProfileH264High        : VAEntrypointEncSliceLP
    VAProfileVC1Simple       : VAEntrypointVLD
    VAProfileVC1Main         : VAEntrypointVLD
    VAProfileVC1Advanced     : VAEntrypointVLD
    VAProfileJPEGBaseline    : VAEntrypointVLD
    VAProfileJPEGBaseline    : VAEntrypointEncPicture
    VAProfileH264ConstrainedBaseline: VAEntrypointVLD
    VAProfileH264ConstrainedBaseline: VAEntrypointEncSlice
    VAProfileH264ConstrainedBaseline: VAEntrypointFEI
    VAProfileH264ConstrainedBaseline: VAEntrypointEncSliceLP
    VAProfileVP8Version0_3   : VAEntrypointVLD
    VAProfileVP8Version0_3   : VAEntrypointEncSlice
    VAProfileHEVCMMain       : VAEntrypointVLD
    VAProfileHEVCMMain       : VAEntrypointEncSlice
    VAProfileHEVCMMain       : VAEntrypointFEI
    VAProfileHEVCMMain10     : VAEntrypointVLD
    VAProfileHEVCMMain10     : VAEntrypointEncSlice
    VAProfileVP9Profile0     : VAEntrypointVLD
    VAProfileVP9Profile2     : VAEntrypointVLD

```

## om host system

```
intel_gpu_top
```

```
intel-gpu-top: Intel Cometlake (Gen9) @ /dev/dri/card0 - 1149/1149 MHz; 0% RC6; 10.01/19.17 W; 2749 irqs/s
```

```

    IMC reads:    20947 MiB/s
    IMC writes:   7334 MiB/s

    ENGINES      BUSY
MI_SEMA MI_WAIT
    Render/3D  97.40% | 0% 0%
    Blitter    0.00% |
| 0% 0%
    Video 100.00% || 0% 0%
    VideoEnhance 0.00% |
| 0% 0%

```

```
ffmpeg -codecs |grep -e 265 -e 264
```

```
ffmpeg version 6.0.1 Copyright (c) 2000-2023 the FFmpeg developers
  built with gcc 12 (Debian 12.2.0-14)
...
DEV.LS h264                      H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 (decoders: h264 h264_v4l2m2m h264_qsv
libopenh264 h264_cuid ) (encoders: libx264 libx264rgb libopenh264 h264_amf h264_nvenc h264_omx h264_qsv
h264_v4l2m2m h264_vaapi )
DEV.L. hevc                      H.265 / HEVC (High Efficiency Video Coding) (decoders: hevc hevc_qsv hevc_v4l2m2m
hevc_cuid ) (encoders: libx265 hevc_amf hevc_nvenc hevc_qsv hevc_v4l2m2m hevc_vaapi libkvazaar )
```

```
ffmpeg version 5.1.4-0+deb12u1 Copyright (c) 2000-2023 the FFmpeg developers
  built with gcc 12 (Debian 12.2.0-14)

DEV.LS h264                      H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 (decoders: h264 h264_v4l2m2m h264_qsv
libopenh264 h264_cuid ) (encoders: libx264 libx264rgb libopenh264 h264_amf h264_nvenc h264_omx h264_qsv
h264_v4l2m2m h264_vaapi )
DEV.L. hevc                      H.265 / HEVC (High Efficiency Video Coding) (decoders: hevc hevc_qsv hevc_v4l2m2m
hevc_cuid ) (encoders: libx265 hevc_amf hevc_nvenc hevc_qsv hevc_v4l2m2m hevc_vaapi libkvazaar )
```

#### Some draft notes:



Test File: 000\_Intro.MOV (iPhone 13 Pro h.265 1080 HDR Video)

Duration: 00:00:52.76, start: 0.000000, bitrate: 7393 kb/s

Video: hevc (Main 10) (hvc1 / 0x31637668), yuv420p10le(tv, bt2020nc/bt2020/arib-std-b67), 1920x1080, 7110 kb/s, 25 fps, 25 tbr, 600 tbn, 600 tbc (default)

Stream #0:1(und): Audio: aac (LC) (mp4a / 0x6134706D), 44100 Hz, stereo, fltp, 203 kb/s (default)

Read HW/SW	speed	
ffmpeg -hwaccel vaapi -hwaccel_device /dev/dri/renderD128 -hwaccel_output_format vaapi -i 000_Intro.MOV -f null -	33.1x	
ffmpeg -hwaccel qsv -qsv_device /dev/dri/renderD128 -c:v hevc_qsv -i 000_Intro_h265_hdr.MOV -f null -	32.3x	
ffmpeg -i 000_Intro.MOV -f null -	13.8x	

#### test

```
ffmpeg -init_hw_device qsv -i /var/www/html/data/tmp/000_Intro_h265_hdr.MOV -c:v h264_qsv -profile:v high -vf
'format=nv12,hwupload=extra_hw_frames=16' -y output.mp4
```

```
ffmpeg -loglevel verbose -init_hw_device qsv -qsv_device /dev/dri/renderD128 -i /var/www/html/data/tmp
/000_Intro_h265_hdr.MOV -c:v h264_qsv -profile:v high -global_quality 24 -vf 'format=nv12,
hwupload=extra_hw_frames=16' -y output.mp4
```

#### on host system

```
lspci -vv -nn -s 00:02.0
```

```

00:02.0 VGA compatible controller [0300]: Intel Corporation Comet Lake UHD Graphics [8086:9bca] (rev 04) (prog-
if 00 [VGA controller])
    DeviceName: GPU
    Subsystem: Intel Corporation Comet Lake UHD Graphics [8086:2081]
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DisINTx+
    Status: Cap+ 66MHz- UDF- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort- <MAbort- >SERR- <PERR- INTx-
    Latency: 0, Cache Line Size: 64 bytes
    Interrupt: pin A routed to IRQ 162
    IOMMU group: 1
    Region 0: Memory at 6022000000 (64-bit, non-prefetchable) [size=16M]
    Region 2: Memory at 4000000000 (64-bit, prefetchable) [size=2G]
    Region 4: I/O ports at 3000 [size=64]
    Expansion ROM at 000c0000 [virtual] [disabled] [size=128K]
    Capabilities: [40] Vendor Specific Information: Len=0c <?>
    Capabilities: [70] Express (v2) Root Complex Integrated Endpoint, MSI 00
        DevCap: MaxPayload 128 bytes, PhantFunc 0
            ExtTag- RBE+ FLReset+
        DevCtl: CorrErr- NonFatalErr- FatalErr- UnsupReq-
            RlxdOrd- ExtTag- PhantFunc- AuxPwr- NoSnoop- FLReset-
            MaxPayload 128 bytes, MaxReadReq 128 bytes
        DevSta: CorrErr- NonFatalErr- FatalErr- UnsupReq- AuxPwr- TransPend-
        DevCap2: Completion Timeout: Not Supported, TimeoutDis- NROPrPrP- LTR-
            10BitTagComp- 10BitTagReq- OBFF Not Supported, ExtFmt- EETLPPrefix-
            EmergencyPowerReduction Not Supported, EmergencyPowerReductionInit-
            FRS-
            AtomicOpsCap: 32bit- 64bit- 128bitCAS-
        DevCtl2: Completion Timeout: 50us to 50ms, TimeoutDis- LTR- OBFF Disabled,
            AtomicOpsCtl: ReqEn-
    Capabilities: [ac] MSI: Enable+ Count=1/1 Maskable- 64bit-
        Address: fee00018 Data: 0000
    Capabilities: [d0] Power Management version 2
        Flags: PMEClk- DSI+ D1- D2- AuxCurrent=0mA PME(D0-,D1-,D2-,D3hot-,D3cold-)
        Status: D0 NoSoftRst- PME-Enable- DSel=0 DScale=0 PME-
    Capabilities: [100 v1] Process Address Space ID (PASID)
        PASIDCap: Exec- Priv-, Max PASID Width: 14
        PASIDCtl: Enable- Exec- Priv-
    Capabilities: [200 v1] Address Translation Service (ATS)
        ATSCap: Invalidate Queue Depth: 00
        ATSCtl: Enable-, Smallest Translation Unit: 00
    Capabilities: [300 v1] Page Request Interface (PRI)
        PRICtl: Enable- Reset-
        PRISta: RF- UPRGI- Stopped+
        Page Request Capacity: 00008000, Page Request Allocation: 00000000
    Kernel driver in use: i915
    Kernel modules: i915

```

```
lsmod |grep i915
```

```

i915                3043328  2
i2c_algo_bit        16384  1 i915
ttm                  86016  1 i915
drm_kms_helper       307200  1 i915
cec                  61440  2 drm_kms_helper,i915
drm                  606208  4 drm_kms_helper,i915,ttm
video                53248  1 i915

```

test update to media converter plugin

```
        if($codec == "qsv"){
            $cmd = " ffmpeg -y -init_hw_device qsv -i ".escapeshellarg($file)." -c:a copy -c:v
h264_qsv -profile:v high -global_quality 24 -level 41 -sn -filter_complex 'vpp_qsv=w=1920:h=1080:format=nv12' ".
escapeshellarg(dirname($file) . '/' . pathinfo($file)['filename']).".$output);
        } else {
            $cmd = " ffmpeg -y -i ".escapeshellarg($file)." ".$middleArgs." ".escapeshellarg(dirname
($file) . '/' . pathinfo($file)['filename']).".$output);
        }
    }
```

**Links:**

<https://trac.ffmpeg.org/wiki/Hardware/QuickSync>