Complex Cameras MC

Camera hardware has undergone a rapid transformation in the last few years. It has evolved from a black box that produces frames, to a group of configurable blocks that stream and process frames, to a set of programmable blocks (like the GPUs) that need to interact with the NPU/TPUs or the GPUs.

Unfortunately, the open-source camera software stack has lagged behind, creating a bottleneck that prevents the full utilisation of the latest hardware innovations.

There have been efforts to tackle these issues openly:

- libcamera provides a high level API for configurable cameras.
- ISP (Kcam) is a kernel subsystem to schedule operations on programmable ISPs.
- SoftISP is an effort to implement complex cameras purely in software.

Until we have a proper solution some distros are using vendor-provided blobs, which is almost impossible to support in a secure way and does not allow fully open developments.

This micro conference is required to finally support Complex Cameras in Linux. More particularly, we need to answer the following questions:

- What kind of Kernel API is required for Complex Cameras?
- What level of hardware documentation do we require from vendors?
- In which kernel subsystems should Complex Cameras reside?
- How can we interact with other subsystems like NPUs/GPUs?
- What does the perfect camera software stack look like?
- How can we support proprietary use cases in an open stack?
- How can we allocate/share memory efficiently between the different subsystems?

The following actors are invited to this micro-conference:

- Linux Kernel Maintainers:
  - V4L2: Hans Verkuil, Mauro Carvalho Chehab, Sakari Ailus
  - DRM: Dave Airlie, Sima Vetter
  - Memory Management: Christoph Hellwig, Sumit Semwal, James Jones
  - Accel: Sima Vetter, Tomeu Vizoso

- Userspace camera stack
  - libcamera: Laurent Pinchart (*)
  - Android camera team: Eddy Talvala
  - ChromeOS camera team: Ricky Liang, Becker Hsieh
  - Pipewire: Wim Taymans, George Kiagiadakis

- Distros:
  - Red Hat: Hans de Goede, Maxime Ripard
  - Ubuntu: Andrea Righi
  - Debian: TBD
- ChromeOS: Ricardo Ribalda (*), Tomasz Figa, Hidenori Kobayashi

- Vendors:
  - Intel: Jerry W Hu (*)
  - Qualcomm: Suresh Vankadara
  - MediaTek: TBD

Right now the following people marked with (*) has shown their interest in the conference and confirmed their presence.

We have the right contact for the others and we expect that they will join.

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**Track Classification:** LPC Microconference Proposals