Testing Video4Linux Applications and Drivers

Hans Verkuil
Cisco Systems Norway
Utilities
Utilities

- v4l2-compliance: V4L2 compliance driver testing.
- v4l2-ctl: command line Swiss army knife for v4l2.
- qv4l2: Qt test application.
- v4l2-dbg: allows access to DBG_G_CHIP_INFO, DBG_G/S_REGISTER.
- Core debugging: 'echo 1 >/sys/class/video4linux/video0/debug'.
  - 1: show ioctl name
  - 2: show arguments as well
- V4L2 support was added to valgrind 3.10.
Utilities: v4l2-compliance

- Started 7 years ago.
- Early last year tests for streaming were added.
- New drivers must pass the compliance tests.
- Close to 900 tests are performed.
- Covers all 82 V4L2 ioctls except 7 ioctls: the cropping and selection ioctls (although some partial testing is now done for these) and the overlay ioctls.
- It is more strict than the V4L2 specification: it assumes drivers use the correct core frameworks which means that there is no excuse to e.g. support VIDIOC_S_CTRL but not VIDIOC_S_EXT_CTRLS.
- Always compile from the v4l-utils git repository to get the latest tests.
- Demo!
Utilities: v4l2-ctl and qv4l2

- 'Golden Reference' utilities: v4l2-ctl can control V4L2 devices from the command line, qv4l2 is the Qt4 GUI equivalent.
- Kept in sync with the kernel and support for new V4L2 kernel APIs is always added to these utilities.
- v4l2-ctl is ideal for embedded systems.
- qv4l2 is ideal for interactive testing.
- Demo!
Test Drivers
Test Drivers

- vim2m: memory-to-memory test driver
- vivid: video capture & output, vbi capture & output, radio receiver & transmitter, software defined radio capture. Closely emulates what 'real' hardware will do. Replaces the old vivi in kernel 3.18.
- Most V4L2 devices only support a (very) limited subset of the V4L2 API. Without test drivers (or a huge collection of hardware) it is impossible to test your application, but with the vivid driver you can.
- Demo!
Cropping, Scaling and Composing

HDMI Cable

HDMI 1280x720

HDMI Receiver Hardware

Cropped 1024x576

Scaled 1280x720

Memory

Composed 1280x720

DMA Engine

openGL

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Resources

- Documentation/video4linux/v4l2-framework.txt and v4l2-controls.txt
- include/media/videobuf2-core.h
- Documentation/video4linux/vivid.txt
- Skeleton driver: Documentation/video4linux/v4l2-pci-skeleton.c
- v4l-utils git repository: [http://git.linuxtv.org/v4l-utils.git](http://git.linuxtv.org/v4l-utils.git)
Questions?