Mainline Linux on Motorola Droid 4

Sebastian Reichel
Collabora
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Mainline supported phones

- Openmoko Freerunner (Samsung S3C2442 [armv4t])
- Nokia N900 (OMAP3 [armv7])
- Goldelico GTA04 (OMAP3 [armv7])
- Motorola Droid 4 (OMAP4 [armv7])
- Nokia N950, N9 (OMAP3 [armv7])
- Maybe a few more, that I’m not aware of?
Why so few?

- (Most) Phone vendors don’t care
- Lot’s of code required (SoC support, Peripheral support)
- Low code quality out-of-tree code, often needs rewrite
- Chicken-and-egg problem (userspace vs kernel)
- No datasheets/documentation available
- Debug access may be hard
Debug interface - N900
Debug interface - Droid 4
SoC Support

PMIC - Motorola CPCAP

- Regulators
- ADC
- Battery/Charger
- RTC
- Status LED
- Audio

source: nxp.com, MC13783 product page
Peripherals

- Touchscreen (MXT224E)
- Keyboard
- Buttons
- Vibrator (PWM)
- HDMI
- LCD Panel (Command mode DSI panel)
- Backlight (LM3532)
- Temperature Sensor (TMP105)
- Accelerometer (LIS3DH)
- Compass (AKM8975)
- Proximity / Ambient Light (ISL29030)
Connectivity Peripherals

- WLAN / Bluetooth / FM (TI WL1285C)
  - WLAN
  - Bluetooth
  - FM
- 2G/3G modem (MDM6600)
  - data connection
  - GPS
  - voice call
- 4G modem (W3GLTE)
  - Does not yet work
Camera Peripherals

- LED flash (LM3559)
- Main camera (OV8830?)
- Selfie Camera (MT9M114?)
Userland

- Here be dragons...
- FSO, phone middleware, inactive upstream
- Ofono, high-level modem middleware, actively maintained upstream
  - possibly to be used with telepathy-ring
- Android (does not run on mainline, but WIP)
  - »Running Android on the Mainline Graphics Stack« from Robert Foss in K1.105
- Normal Linux distributions (Debian, Fedora, ...)
  - Mostly useless without HW keyboard
Userland

- SHR (inactive upstream)
- FirefoxOS (discontinued)
- SailfishOS (still not fully open source)
- Tizen (?)
- Purism (in development)
- PostmarketOS (in development)
- Maemo Leste (in development)
Userland
Conclusion

- Interesting topic to get into kernel development
  - Getting in touch with many subsystem
  - Learning about different hardware components
- Each new kernel driver helps
  - Hardware components are often re-used
  - SoC function blocks are re-used in newer generations
- Big hurdles
  - 3D acceleration
  - Camera support
  - Missing proper userspace
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Thanks!
Q & A

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Demonstration

Demo

See for yourself...

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