Upgrading your Android Phone

Or: how to make bricks

Why?

- Manufacturer ended support (if there ever was)
- "Pure" Android experience
- Minimal Google integration (eg just Play store)
- Bored ;-)

What?

- Custom ROM (pre-compiled)
  - LineageOS (former Cyanogenmod)
  - AospExtended ROM
  - /e/ (no Google integration at all)
- ROM (from source)
  - Find device on LineageOS and follow instructions
  - **Caution**
    - downloads ~100GB
    - build can take a day and then fail
- Samsung phones require flashing via heimdall
  (open-source replacement of Samsung's Odin tool)

How?

- Example
  - Moto G4 Play XT1602
- Download custom ROM
  - /e/
  - motostock roms
- Custom recovery software
  - TWRP
- Unlock bootloader and install images via
  - adb and fastboot
- Other phones, like Samsung, may require
  - heimdall

Install heimdall

- Download zip

  https://gitlab.com/BenjaminDobell/Heimdall/tree/master

- Install requirements

  sudo apt-get install build-essential qt5-default libusb-1.0-0-dev libusb-dev libgl1-mesa-glx libgl1-mesa-dev cmake zlib1g-dev

- Compile

  unzip -q Heimdall-master.zip

  cmake .

  make

  sudo make install

- Troubleshooting

  - how to fix problem with linking to libusb

    https://github.com/Benjamin-Dobell/Heimdall/issues/423

    heimdall/CMakeFiles/heimdall.dir/link.txt
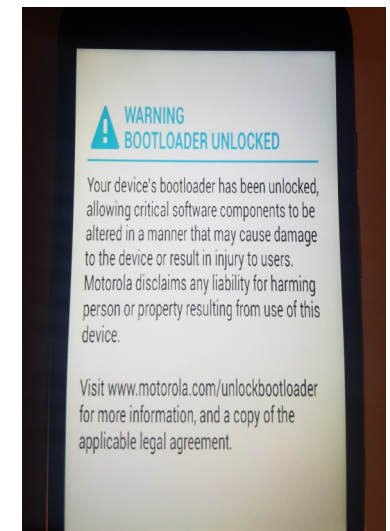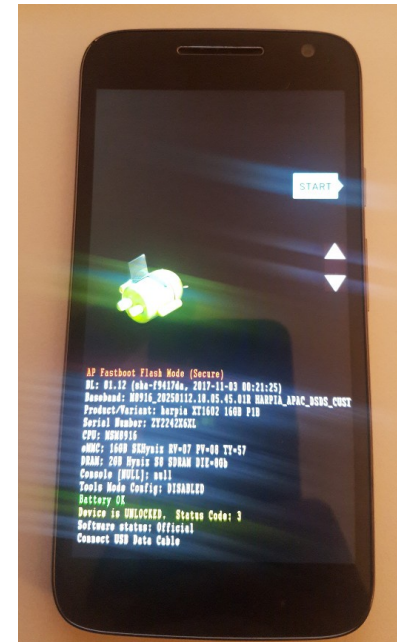
    add -lusb-1.0 to the end

NB: Not required for the Moto G4, but listed here to save you some headache and a few hours...

Unlock bootloader

- Follow instructions, eg /e/

- Unlock bootloader (Motorola instructions)

  – adb reboot bootloader

  – fastboot devices

     troubleshooting permissions

  – fastboot oem get_unlock_data

  – paste device ID as one string on Motorola page to receive unlock key XXX in email

  – fastboot oem unlock XXX

     Phone is unlocked successfully!

NB: Not every phone will require unlocking the bootloader

Install recovery image

- /e/ instructions ("Installing a custom recovery using")
  - download TWRP
  - execute commands
    - adb reboot bootloader
    - fastboot devices
    - fastboot flash recovery twrp-x.x.x-x-harpia.img
  - reboot into recovery mode to verify installation
    - fastboot: Power+VolumeDown, select "Recovery mode"
    - adb reboot recovery

Install ROM

- /e/ instructions ("Installing /e/ from custom recovery")

- Boot into recovery mode, eg via

    adb reboot recovery

- Main menu -> Wipe data

- Format data

- Go back, Advanced Wipe: Cache + System

- Sideload ROM zip

    – Advanced -> ADB sideload

    – on computer: adb sideload filename.zip

- If sideload doesn't work, try copying it onto SD card

    – adb push filename.zip /sdcard/

- Once finished, reboot

Install Google Apps

- Done via OpenGApps
- Different amount of "Googleness"
  - *pico* – bare minimum to get Play store
  - *nano* – *pico* + functionality not in Play store
  - *micro* – *nano* + Gmail, Calendar, Google Now
  - *mini* – most popular apps
  - *full* – similar to *stock*, does not replace non-Google stock-applications
  - *stock* – all Google apps that come with Nexus devices
  - *super* – all Google apps that were ever shipped
- Arm or Arm64?

Install OpenGApps

- LineageOS instructions

- Copy OpenGApps zip on sdcard

  adb push filename.zip /sdcard/

- Boot in recovery mode

  adb reboot recovery

- choose "install zip" or "Apply update" and navigate to the zipfile copied earlier

If you are lucky,
you are up and running now :-)

Peter Reutemann