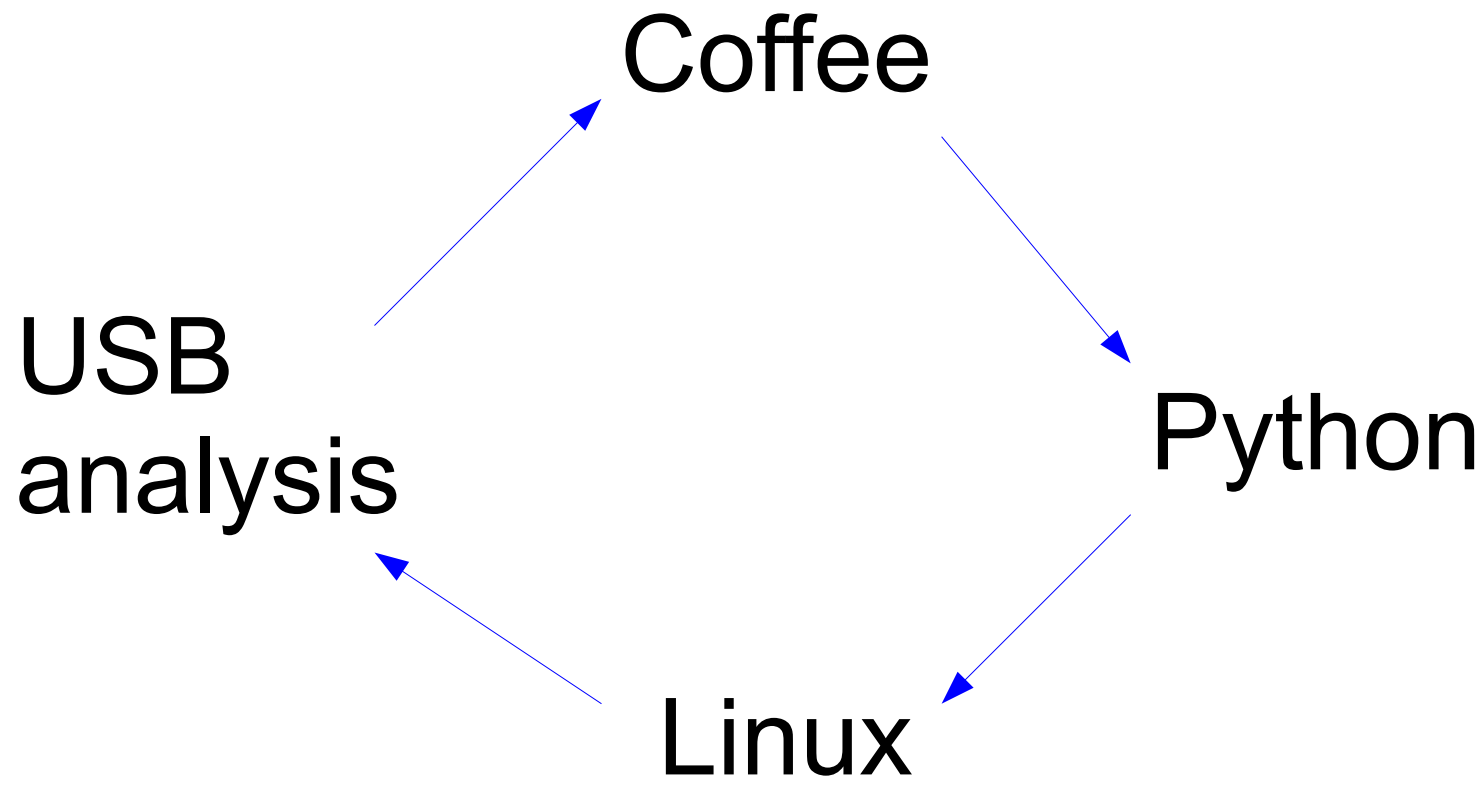


Linux powered coffee roasting

Andrew Tridgell
Samba Team



Coffee Roasting

- Inputs

- green coffee beans
- heat (needs to get to about 210°C)
- stirring (to distribute the heat)
- time (about 15 minutes)

- Outputs

- roasted coffee!

- Rule of 2

- green beans OK for 2 years
- roasted beans OK for 2 weeks
- ground coffee OK for 2 minutes

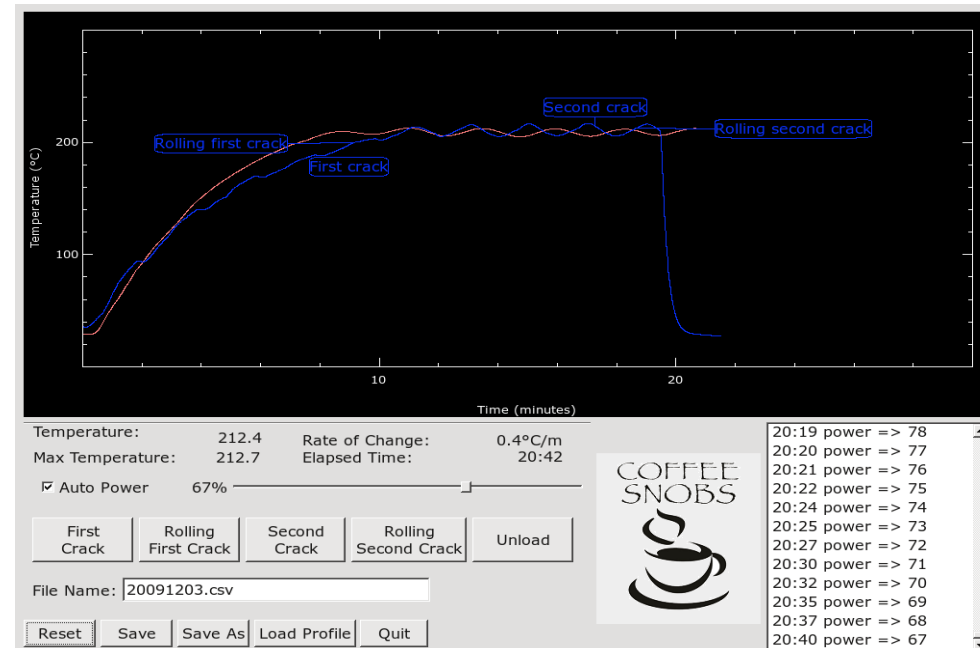
Corretto roaster

- Lots of coffee roasting communities
 - coffeesnobs.com.au is best known one in Australia
 - very active group of enthusiasts
- 2006 - “Corretto” roaster started
 - bread machine
 - heat gun
 - listen to the roast!



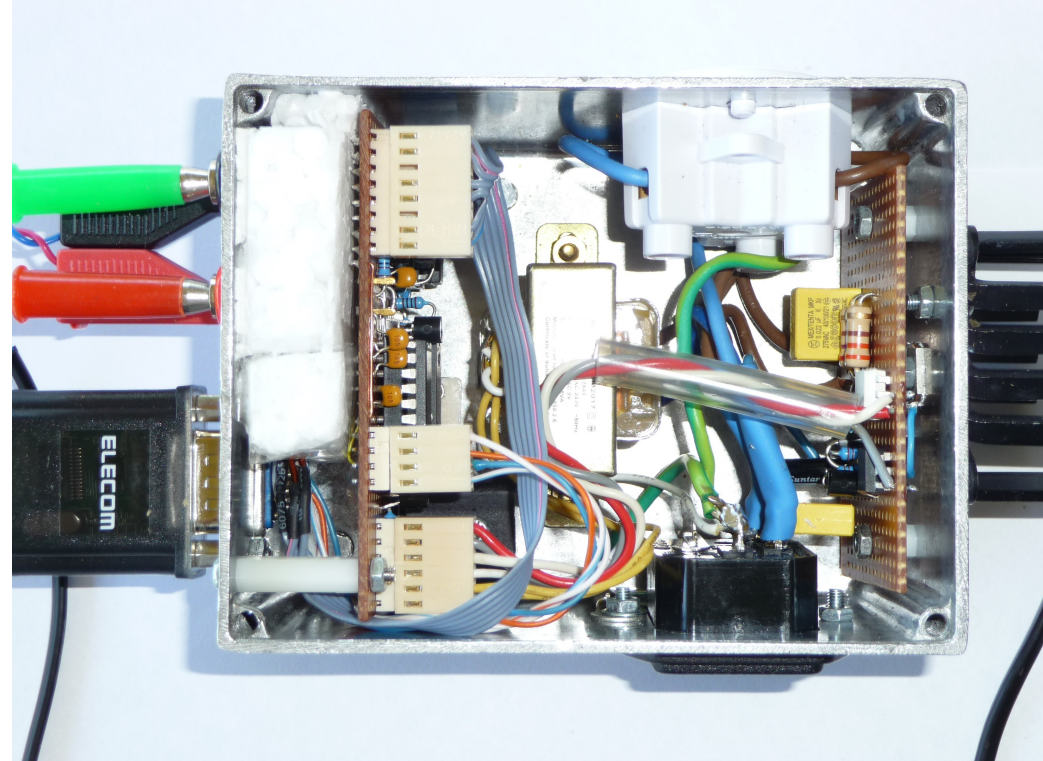
pyRoast

- Python coffee roasting control
 - feedback loop for temperature control
 - configurable roast profiles
 - data logging
- Temperature control support
 - USB thermocouple
 - 'paulus' thermocouple
- PyQt4 interface
 - built with designer-qt4



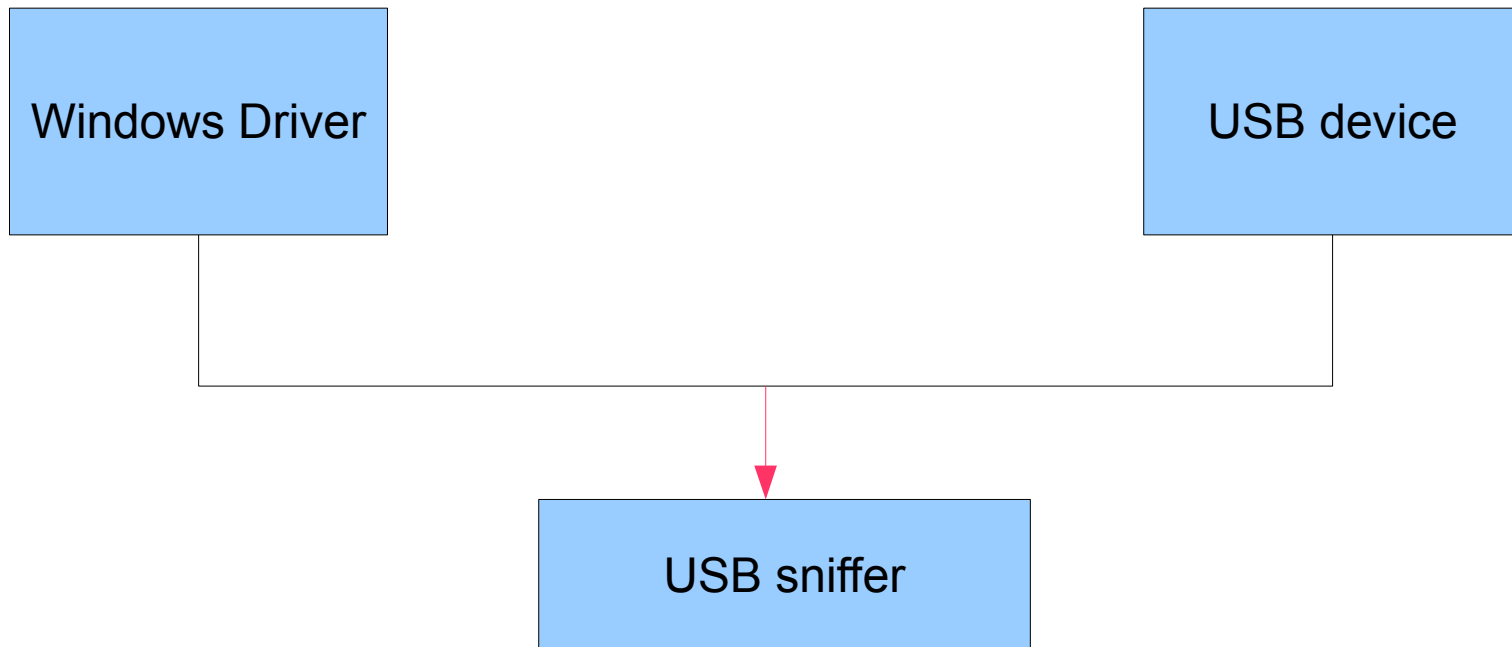
Power control

- How to control power of a heat gun?
 - needs to be controllable from pyRoast
 - solution: ask Paulus!



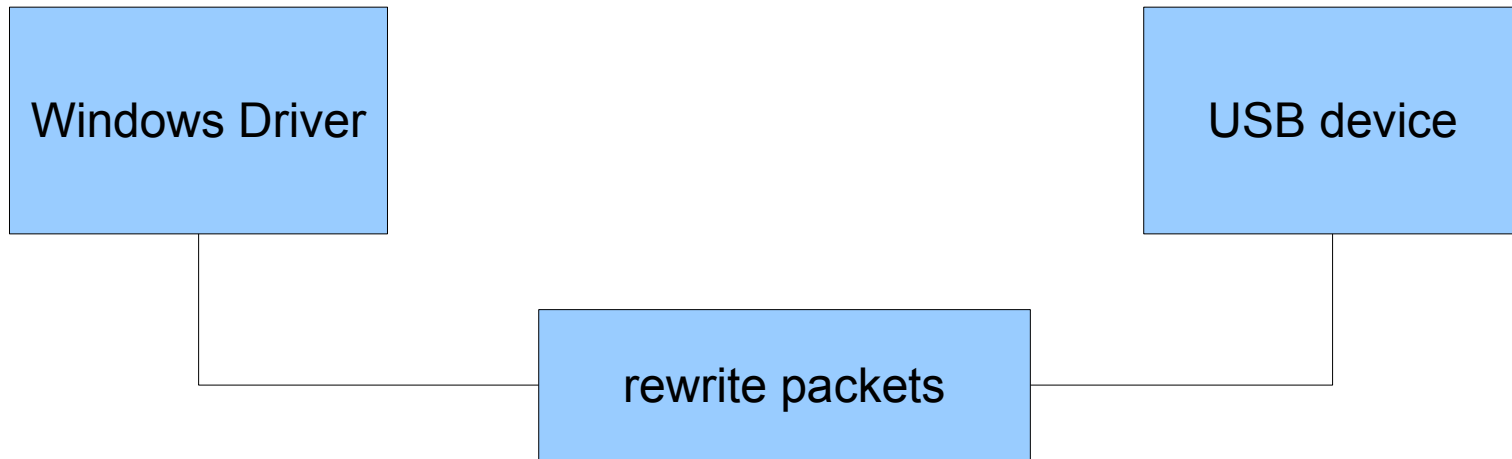
USB protocol analysis

- How to decode a USB protocol?
 - have a windows driver, no Linux driver
- Usual setup



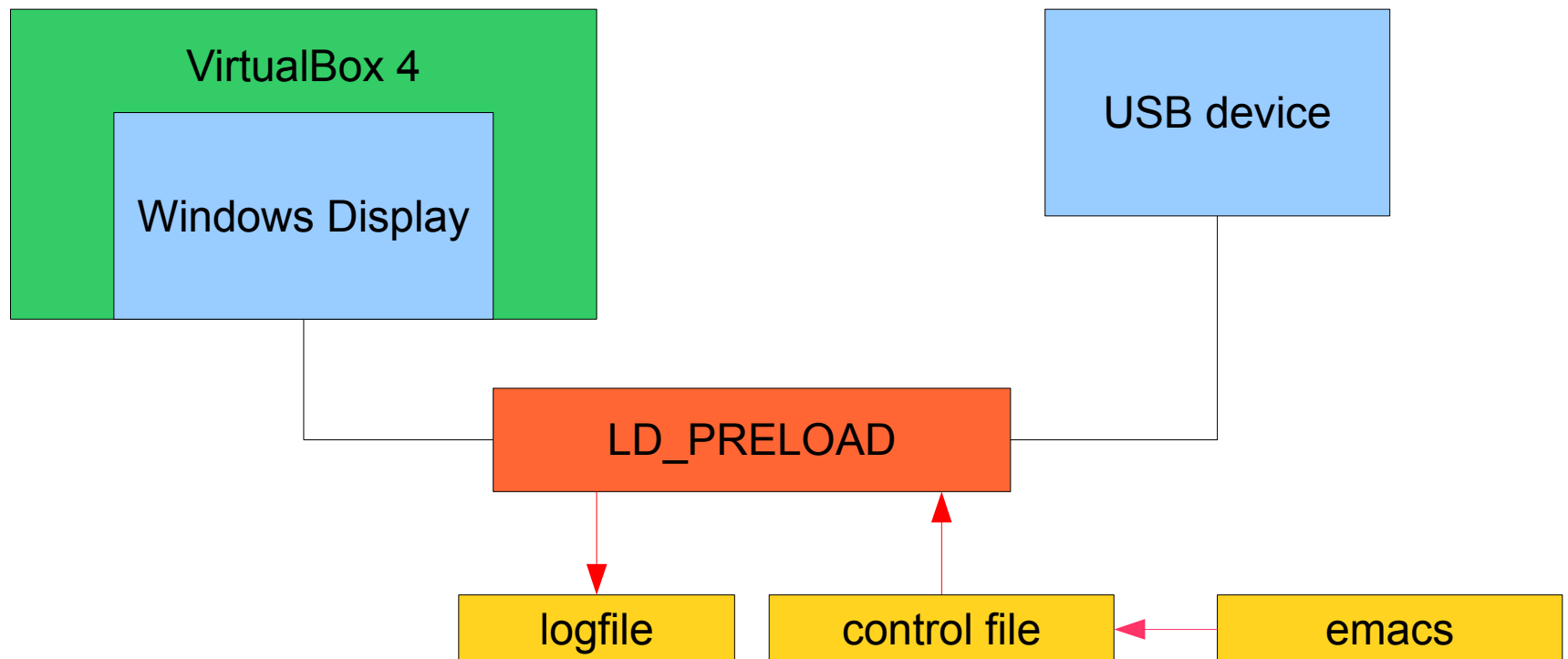
protocol filtering

- Much easier if you can modify packets
 - can test protocol format theories
 - fast development cycle



VM USB filtering

- LD_PRELOAD intercept
 - preload reads instructions from a file
 - developer uses text editor to control USB filtering



USB intercept

- Userspace USB controlled by ioctl()
 - USBDEVFS_SUBMITURB
 - send a USB USB to a device
 - USBDEVFS_REAPURBNDELAY
 - receive reply from device
- Preload hooks
 - open() - check if device name matches, remember fd
 - ioctl() - intercept REAPURB, possibly replace data
- Simple replacement
 - check USB data size
 - replace data with hex bytes from /tmp/usb.data

Protocol analysis

- Stage 1: experimenting
 - start with an existing data blob
 - edit and watch result on windows display
 - try to work out patterns
- Stage 2: theory testing
 - write tool to produce desired data
 - test against windows display
- Stage 3: write Linux driver
 - easy once you know the protocol

Questions?

- More info:
 - Coffeesnobs:
 - <http://coffeesnobs.com.au>
 - usb_preload:
 - http://git.samba.org/?p=tridge/junkcode.git;a=tree;f=preload_usb
 - DMM app
 - <http://git.samba.org/?p=tridge/junkcode.git;a=tree;f=DMM>

COFFEE
SNOBS

