Linaro connect
Hong Kong 2018

HKG18-TR11 - LAVA on your desk BoF

About this BoF

aimed at

- individual kernel engineers, subsystem maintainers and other interested individuals
- a single device-under-test attached to a development box and able to triage results coming out of LKFT and other systems based on LAVA
- allowing re-running LKFT test jobs with locally patched kernel tree etc.
- not having to cope with dozens of devices

Are these assumptions correct?

- already able to run LAVA locally
- locally automate jobs working with already-supported/known-automatable devices
- locally automate jobs working with correct/same version of firmware
- replicating lab hardware is not always affordable/desirable/available
- 100's of jobs reliability rather than 100K's of jobs reliability target is ok
- world-wide sourceable control hardware is preferable
- accurately describable/reproducible control hardware is important
- HiKey 6220 is a great working example *"the most problematic board due to various reasons"* (LAVA Integration Stories)

Rolling your own LAVA automation?

Many have tried ...

Lessons learned?

Re-cap What LAVA Needs for (local) Target Control

- Automation-compatible serial connection
  - screen can work
  - ser2net is better
  - udev rules
- Power control
  - Putting the device in a known state. Power off for dev boards is usually unambiguous
  - Automated reset. Working assumption for most devices is that simply cycling power is sufficient for a full reset
- USB control (assuming Hikey example)
  - OTG port can be used for loading images via fastboot
  - We need a mechanism to switch off the OTG port after loading the image so that the Type A port starts working and brings up the connected USB ethernet adapter

Device Dictionary entries for Target Control

`connection_command` *(combination of ser2net entry and udev rules)*

`power_on_command`

`power_off_command`

`hard_reset_command` *(power cycle)*

`pre_power_command` *(power up the OTG connection)*

`pre_os_command` *(power down the OTG connection)*

e.g.

```
{% set power_off_command = 'python /usr/bin/relay-ctrl.py 3 LOW' %} \
{% set power_on_command = 'python /usr/bin/relay-ctrl.py 3 HIGH' %} \
{% set hard_reset_command = 'python /usr/bin/relay-ctrl.py 3 RESET' %} \
{% set connection_command = 'telnet localhost 7000' %} \
{% set soft_reset_command = 'fastboot reboot -s 547E6F8B000B0909' %} \
{% set pre_power_command = 'python /usr/bin/relay-ctrl.py 4 HIGH' %} \
{% set pre_os_command = 'python /usr/bin/relay-ctrl.py 4 LOW' %} \
{% set fastboot_serial_number = '547E6F8B000B0909' %}"
```

Sourcing of DUT Control Hardware

- Expensive hardware that is the same as the hardware in the lab
  - Known to work
  - Expensive
  - World-wide availability?
- Other ‘pro’ level hardware
  - May be well documented & hopefully should work
  - Expensive - can’t try all available models
- Branded consumer hardware
  - Hopefully cheap
  - Poor documentation
  - May get lucky
- Unbranded consumer hardware (Ebay, Ali etc)
  - Very cheap
  - Things that look the same might not be the same
- Community hardware designs
  - Cheap
  - Often well documented
  - WW availability pretty good (may be copies)

DUT Power Control Implementations (PDU/uPDU)

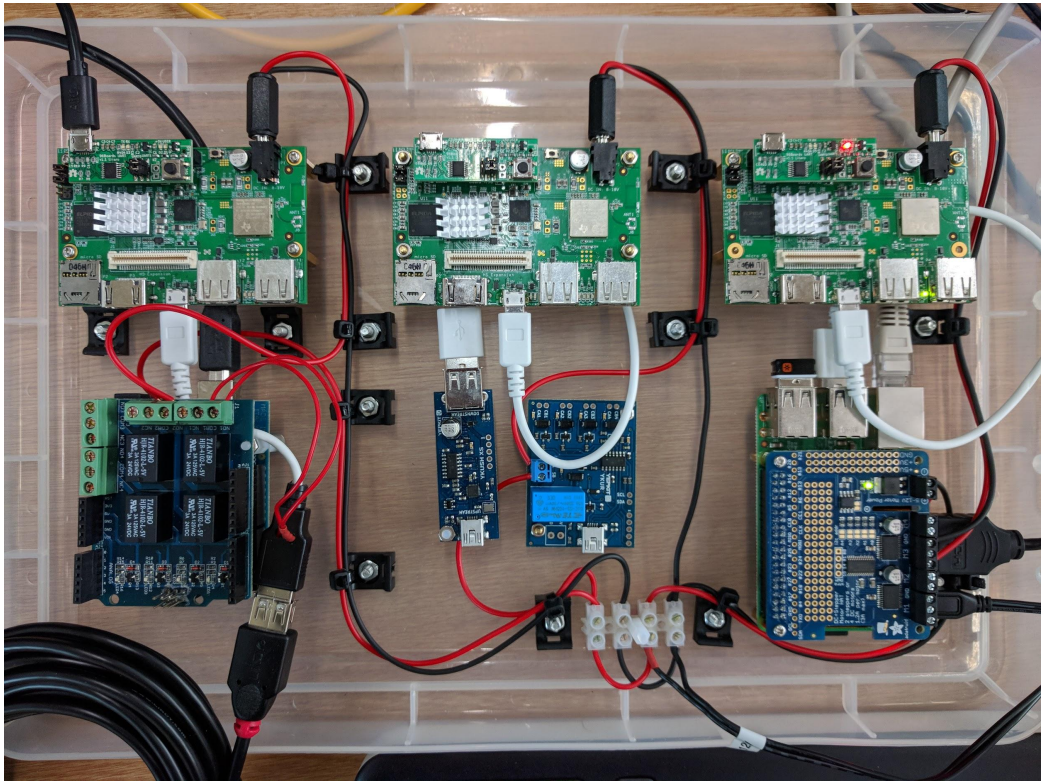
Method	Detail	Pros/Cons
Mains switching products	• Managed PDUs, controlled via telnet or SNMP • Consumer controllable switches	Replicate Lab setup Depends on budget, space and availability
Mains switching crafted solutions	• Inserting a (hopefully mains-rated) relay into the line	Danger of death (bad) and even possible equipment destruction (worse). Not recommended
Low voltage switching	• USB controlled relays • Ethernet controlled relays • Microcontroller hosted via Shield/Cape/Hat relay boards • Transistor switching via motor control boards	Some solutions require complex/conflicting USB driver setups (since e.g. they repurpose FTDI chips for PIO rather than serial)

USB Control Implementations

Method	Detail	Pros/Cons
USB Cable Hacking	• Modify USB cables to route 5V via a relay • Hack hubs to add relays or switching transistors	Depends on craft skills?
Downstream hub control	• Pro (expensive) hubs like Cambrionix https://cambrionix.com • Dev board (cheap) hubs like Yepkit https://www.yepkit.com/ • Very few consumer hubs actually support per-port power switching. There's a list here https://github.com/mvp/uhubctl	Depends on budget, or what have/can find locally
Root hub control	• quite a few modern motherboards have built-in root hubs that do support this feature • BBB and RPi host ports are controllable	• Depends on motherboard • can use a BBB/RPi remotely via usbip

Discussion

Demo Friday



- 3 Hikeys
- automated in 3 different ways
- running standard LAVA jobs from the lab

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Thank You

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