Tutorial:

Howto setup a

Remote Test Lab

(not only) within the

AGL CI Infrastructure

ALS Jun 2017 Jan-Simon Möller

Introduction

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- AGL Release Manager, EG-CIAT Lead

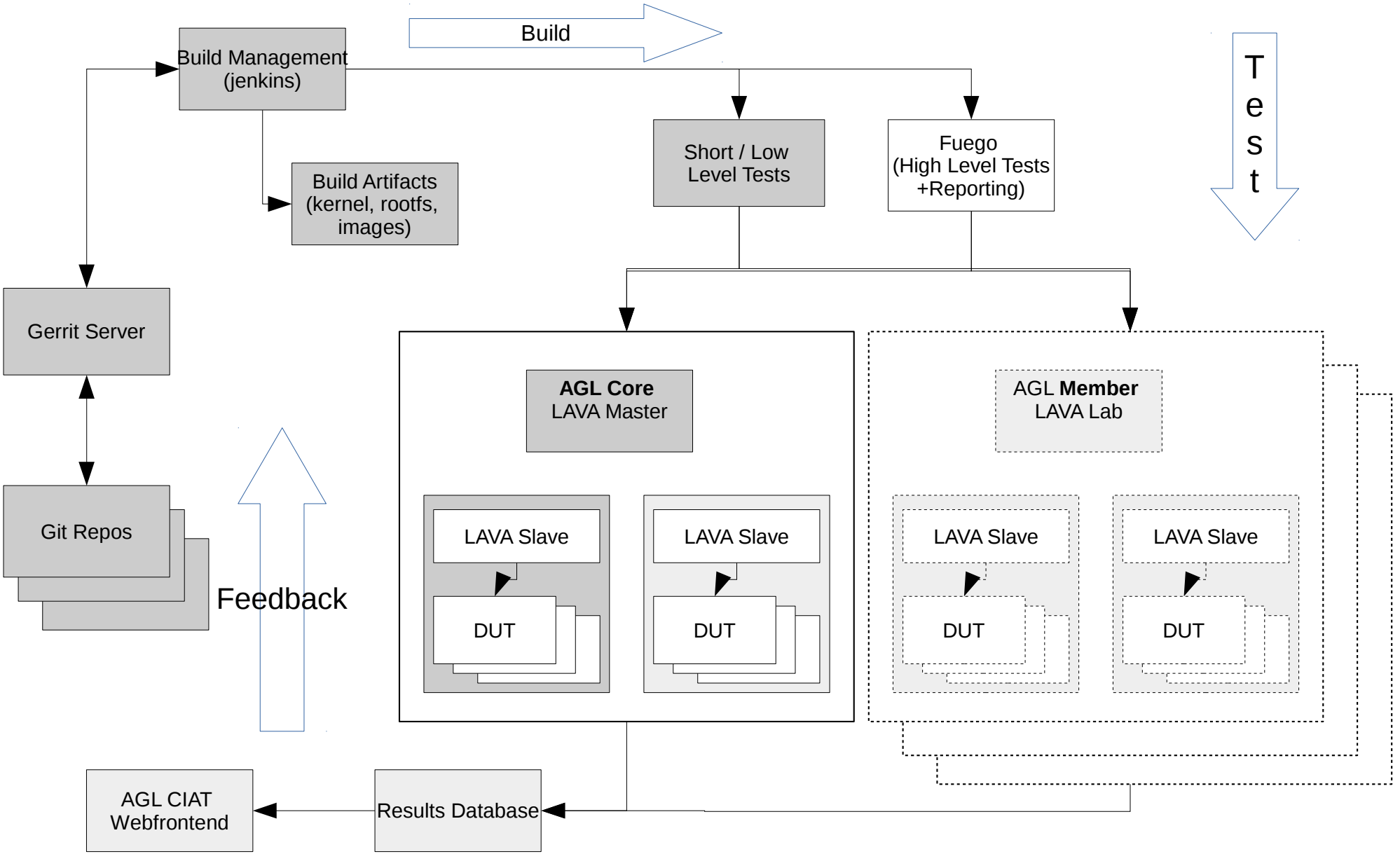
Topics

- AGL builds-up a distributed infrastructure to allow a large number of target boards to be tested early in the development of the distribution.
- Main target are the reference platforms plus community boards.

Topics II

- The results serve as direct feedback to the developers in gerrit (gerrit.automotivelinux.org)
- This Tutorial session will cover the steps needed to set up a satellite LAB for AGL which integrates into the AGL CIAT infrastructure.

CI Loop overview



Why ?

- Choose from:
  - No developer can test on 'all' boards
  - As a developer, you want the tests run in parallel
  - Late integration is time-consuming and painful
  - Board not available @location
  - Board cannot be shipped
  - ….
  - add your own

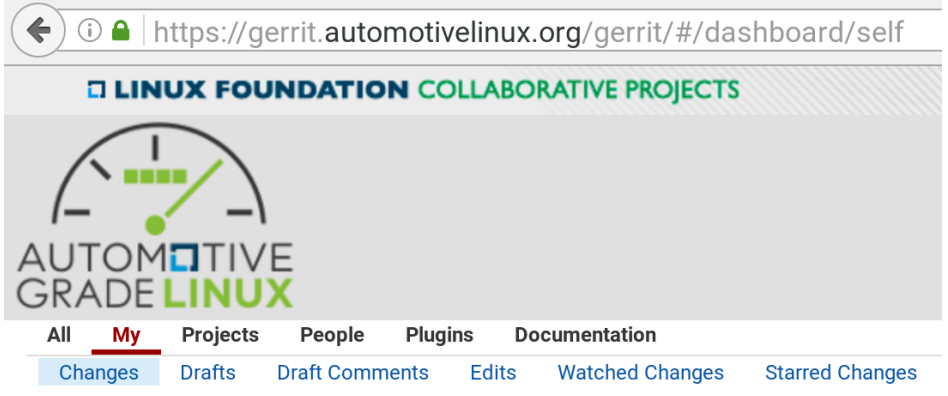
Win-win

- For companies:
  - your board is actively used in the AGL CI
  - issues are visible early and upfront
  - ==> board is well-supported
- For developers:
  - the board is available remotely for tests
  - debugging info can be shared
  - access to multiple platforms

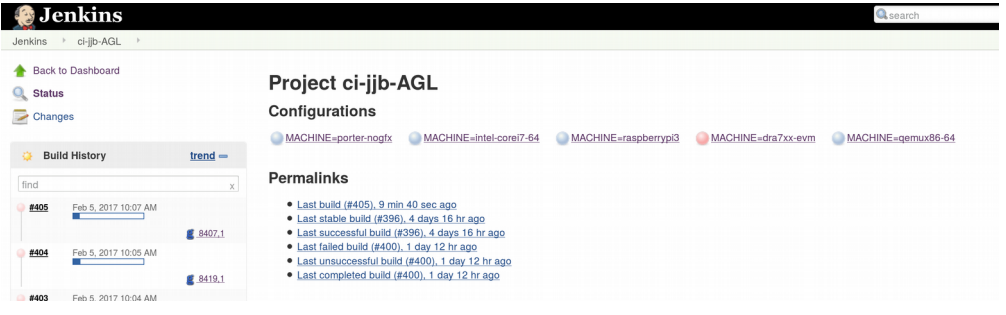
Requirements

- Board is **reference platform**
- Board is **selected community platform**
- BSP layer has a **matching yocto branch**
- BSP layer has been added to AGL upstream repos and device template exists
- Necessary BSP adaptations have been added to meta-agl-bsp

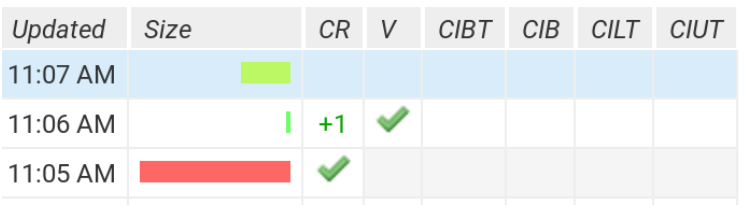
Overview / Components



- AGL Gerrit
  - Review of the changes
  - Change triggers CI



- AGL Jenkins
  - Job building matrix of all reference boards
  - Pass if all boards pass (what? - "build")
  - Label: **CI** – **B**uild ==> CIB



AGL specialities

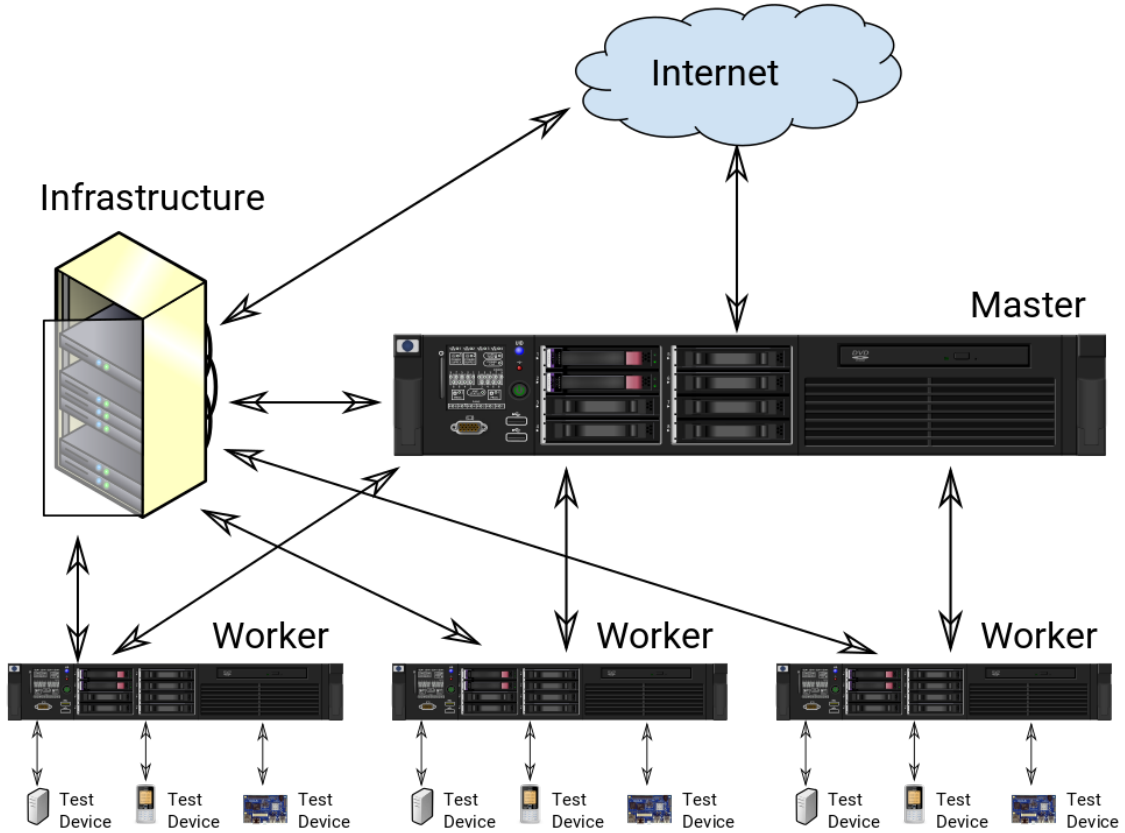
- AppFW and security labels enforce NBDroot as boot medium
  - Patches are being developed already and being reviewed upstream
- Single master

  hosted by LF +

  multiple

  remote worker

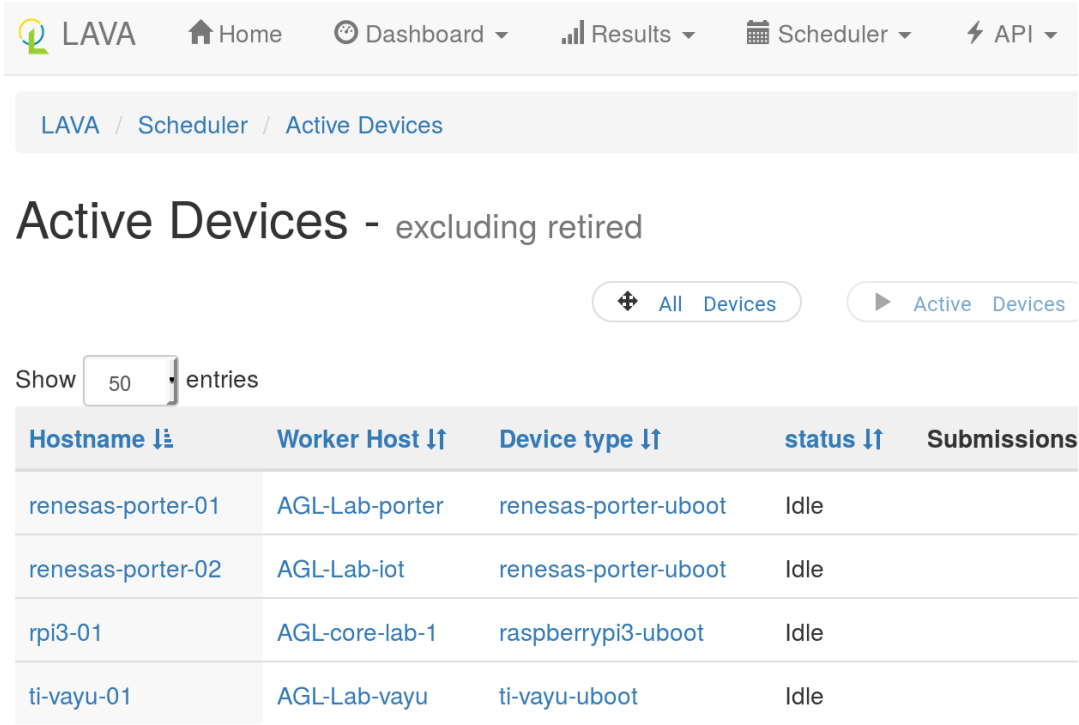
  setup



New: Boot-test on real HW

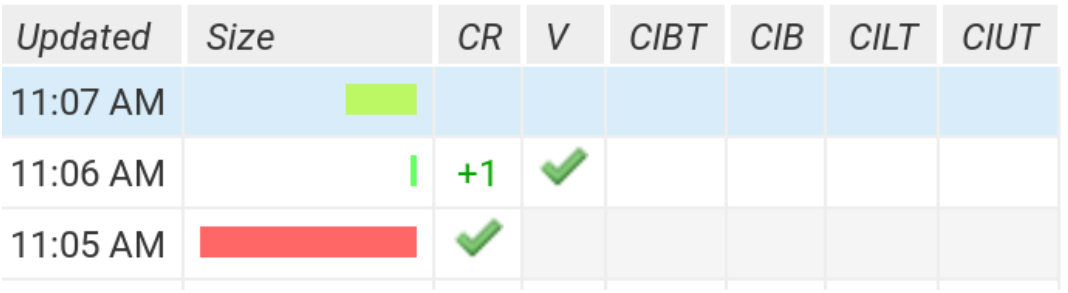
- Next goal is to add a simple boot or short smoke-test on real target hardware
- We do that with LAVA lava.automotivelinux.org
- AGL has installed

  a LAVA server
- This is the frontend



Feedback to Gerrit

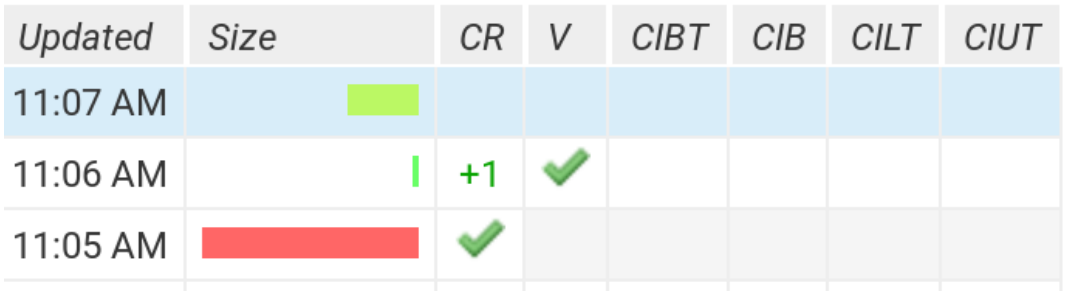
- The simple boot-test or short "smoke" test is executed for every changeset
- Thus the whole process needs to be short (target 10-15 min max)
- We use the label **CI-Boot-Test** ==> **CIBT** in gerrit.automotivelinux.org



Future ideas:

- **Not in deployed right now, but possible:**
- **CI LTSI Test ==> CILT**
  - e.g. JTA-AGL or Fuego
- **CI - UI - Test ==> CIUT**
  - not used atm,

    e.g. openQA

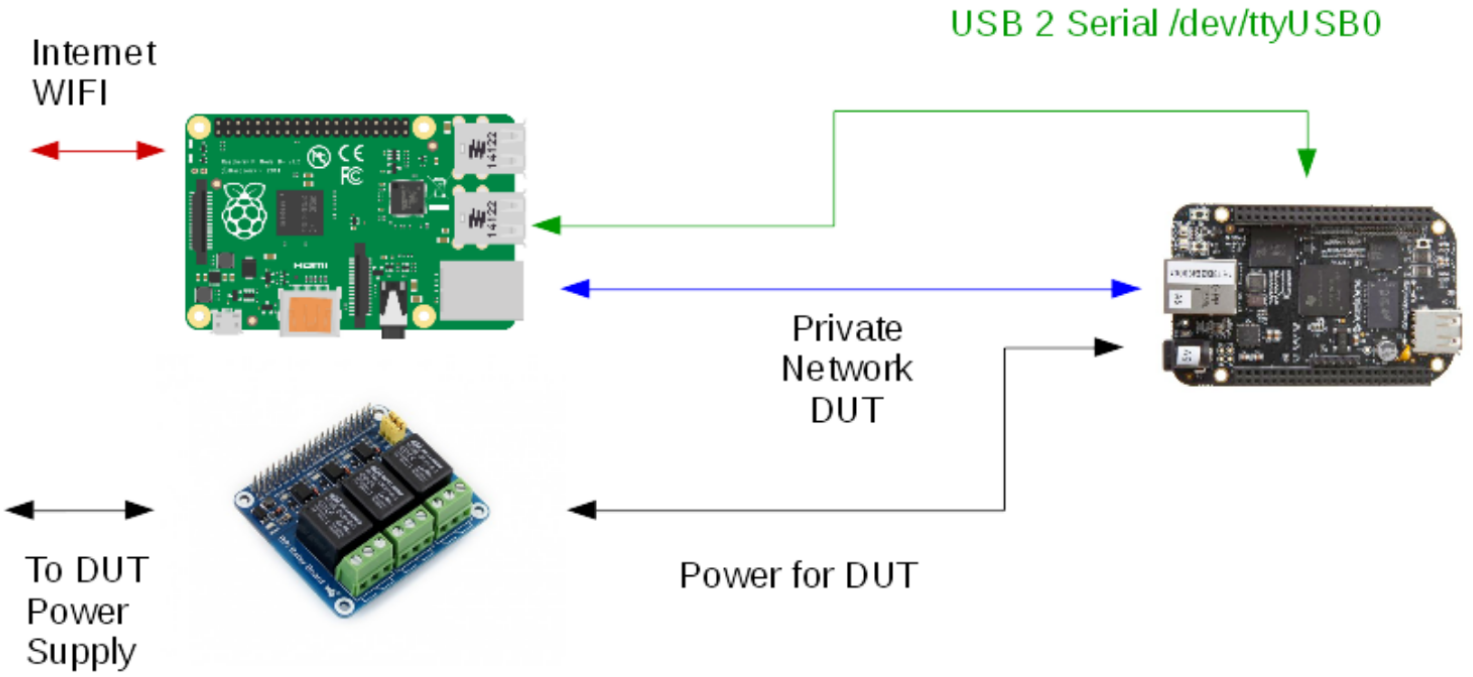


The LAVA Worker Setup

- Why we're here today:

Public IP: 192.168.8.x (see mark on box)

DUT Network: 192.168.111.1 (RPi3)
192.168.111.x (DUT)

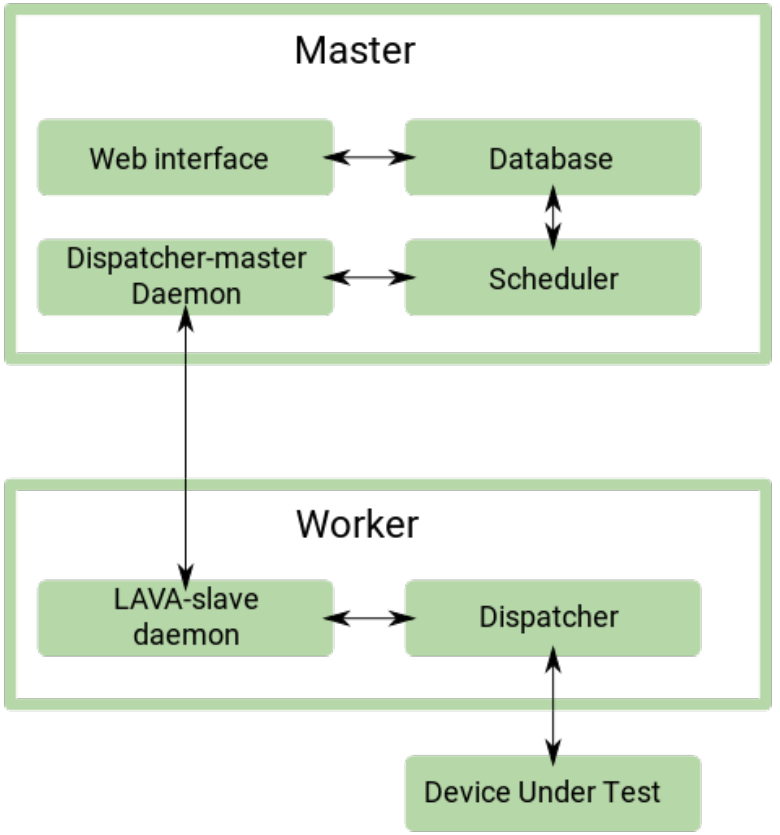


Images: wikicommons/User:Lucasbosch, wikicommons/User:HandySmurf, waveshare

Details about the Worker

- We use LAVA v2 and

  the newer pipeline model
- The slave is a simple executor that attaches to the master and receives the job description to execute
- The connection is an encrypted ZMQ



Details about the Worker

- It needs serial or telnet access to the tty
- It needs to be able to switch-on/off power
- The 2nd network is DUT only and allows firewalling of the DUT.

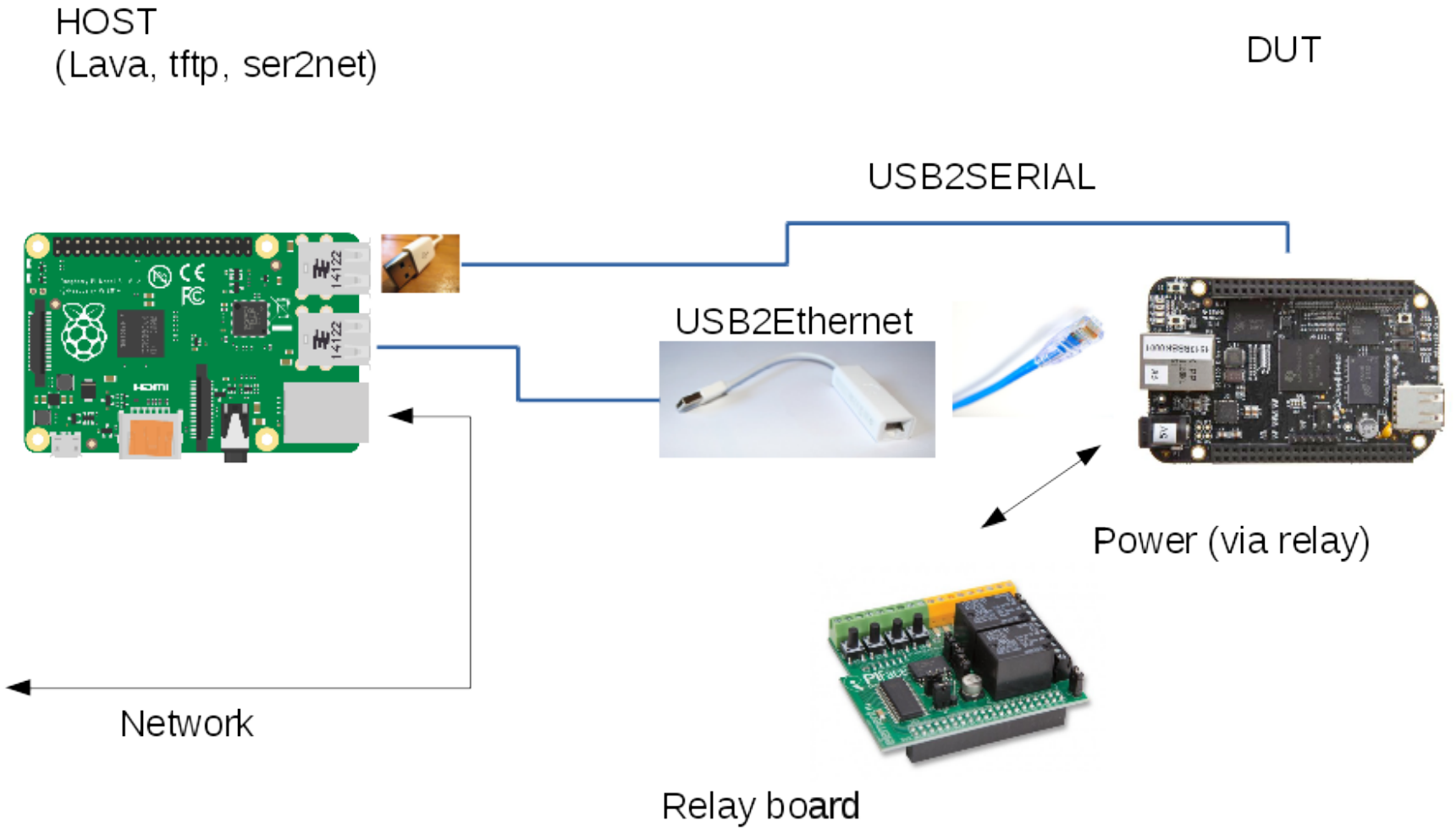
Details about the Worker

- Thus DUT usually has **NO** internet access
- Only the Worker will D/L the files
- We use boot-over-network
- Worker needs to provide DHCP, TFTP,

  NFS, NBD Servers on the internal/DUT network

A minimalistic setup

- Optional: example w/o WIFI , 2 NICs



Images: wikicommons/User:Lucasbosch, wikicommons/User:HandySmurf, Element14 .

BOM

- RaspberryPi 3
- usb 2 ethernet
  - recommended ASIX USB2/3
- USB 2 Serial (if not built-in)
  - recommended FTDI (due to built-in chip-ID)

BOM (II)

- Relay HAT or Network Relay Box, e.g.:
  - http://www.waveshare.com/rpi-relay-board.htm
  - or Network Relay Box: https://goo.gl/q5HBI2
- SDCard (just for the bootloader)
  - U-Boot is highly preferred
  - PXE works, too
- Option: for better results, add network switch between Worker and DUT

SETUP Summary

- The Worker needs a DEBIAN JESSIE (raspbian) !
- The LAVA documentation has detailed steps here:
  - https://staging.validation.linaro.org/static/docs/v2/installing_on_debian.html
- **Important**: AGL needs patches

  (they're still in review upstream, thus not default)
  - For our AGL-specific setup, there is a google doc here with 'exact steps':
    - https://goo.gl/GLQapw

Install Lava slave

- We use a specific version of lava-dispatcher
  - This is due to "nbdroot" support
  - Get it from:
- Configure /etc/lava-dispatcher/lava-slave
- Check tftp-hpa (see lava install doc)
- Create lava lab key (see lava install doc)
- Setup dhcp on DUT network (dnsmasq)
  - IP should be 192.168.111.1 /24

Options

- Simplify serial detection through udev rules
- ser2net to access serial through telnet / nc
- wrapper scripts for power-on/off

Collect info for master

- public part of the LAB key generated
- IP for the DUT network (192.168.111.0/24)
- command to turn-on the board
- command to turn-off the board
- how to connect to serial (cu, telnet, nc)

- Create a jira ticket for AGL admins

Outcome:

LAVA / Scheduler / All Devices

All Devices

All Devices | Active Devices | Pipeline Devices

Show 50 entries

Search

Hostname	Worker Host	Device type	status	Submissions restricted to	Health	JSON jobs	Pipeline jobs	tags
renesas-porter-01	AGL-Lab-porter	renesas-porter-uboot	Idle		Unknown	✔	✔	
renesas-porter-02	AGL-Lab-iot	renesas-porter-uboot	Idle		Unknown	✔	✔	
rpi3-01	AGL-core-lab-1	raspberrypi3-uboot	Idle		Unknown	✔	✔	
ti-vayu-01	AGL-Lab-vayu	ti-vayu-uboot	Idle		Unknown	✔	✔	

Lava test job

```
device_type: raspberrypi3-uboot
job_name: rpi3-uboot

timeouts:
  job:
    minutes: 15
  action:
    minutes: 5
  connection:
    minutes: 2
priority: medium
visibility: public
```

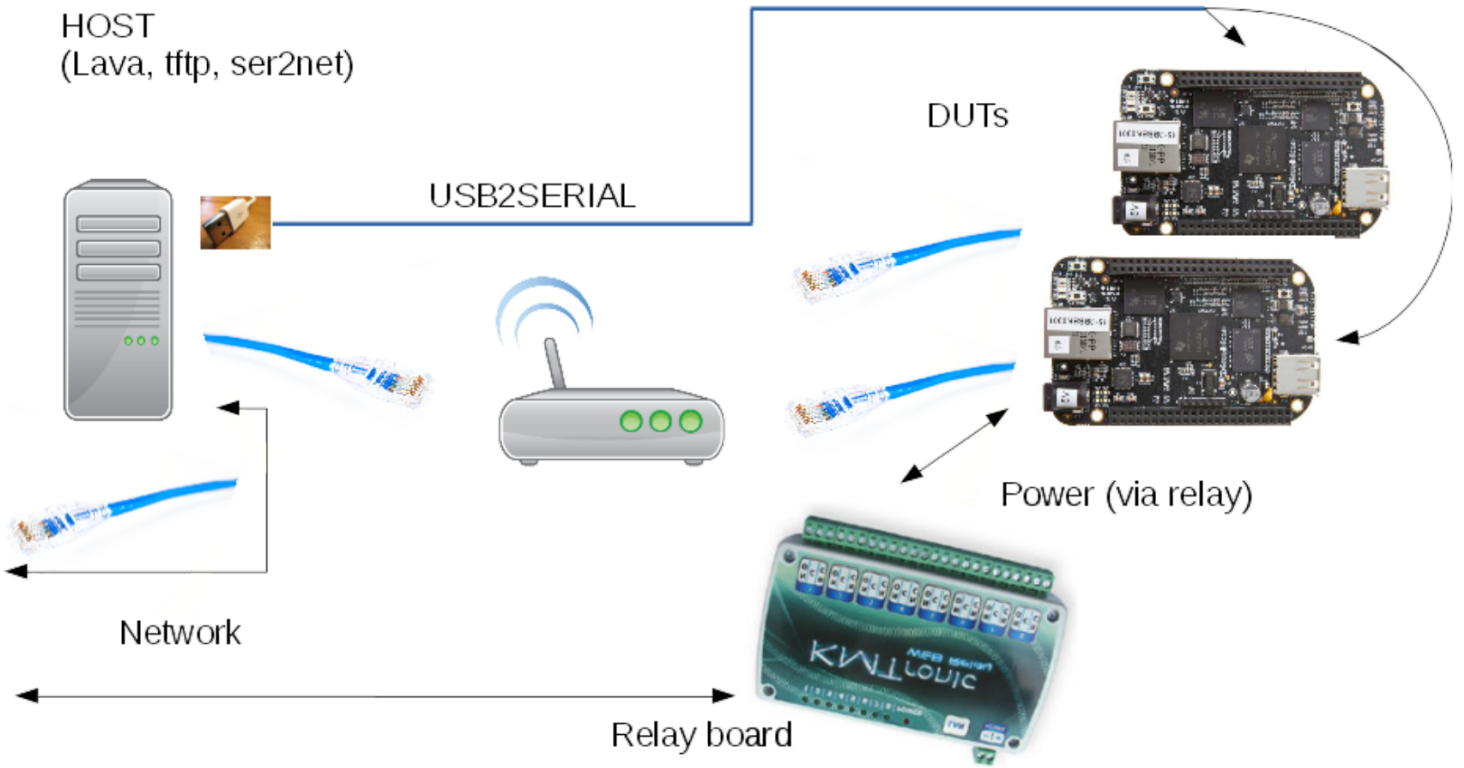
Lava test job

```
# ACTION_BLOCK
actions:
- deploy:
    to: nbd
    dtb:
      url: 'https://dl.al.org/rpi3/deploy/images/rpi3/Image-bcm2710-rpi-3-b.dtb'
    kernel:
      url: 'https://dl.al.org/rpi3/deploy/images/rpi3/Image'
    ramdisk:
      url: 'https://dl.al.org/rpi3/deploy/images/rpi3/initramfs-netboot-image-rpi3.ext4.gz'
      allow_modify: false
    nbdroot:
      url: 'https://dl.al.org/rpi3/deploy/images/rpi3/agl-demo-platform-rpi3.ext4.xz'
      compression: xz
    os: debian
```

Lava test job

```
# BOOT_BLOCK
- boot:
    method: u-boot
    commands: nbd
    type: bootz
    prompts: ["root@debian:"]
```

Scaling the lab



Images: wikicommons/User:HandySmurf, kmtronic, libreoffice cliparts .

Scaling the lab

- quadcore PC , 2 NIC
- separate DUT network (switch)
- Multiple usb2serial (FTDI)
  - When scaling the lab, we need to identify each serial port uniquely
  - This works only well if ther usb2serial chip has some form of unique ID (and FTDIs have one)
- Relay box or PDU

QA

- Questions ?

- Hands-on in the LAB session
  - follows next
  - Got board with you ?
  - (or we have loaners)

End or part 1 ...

… stay for the hands-on session !

… and thanks for contributing a lab soon ;)