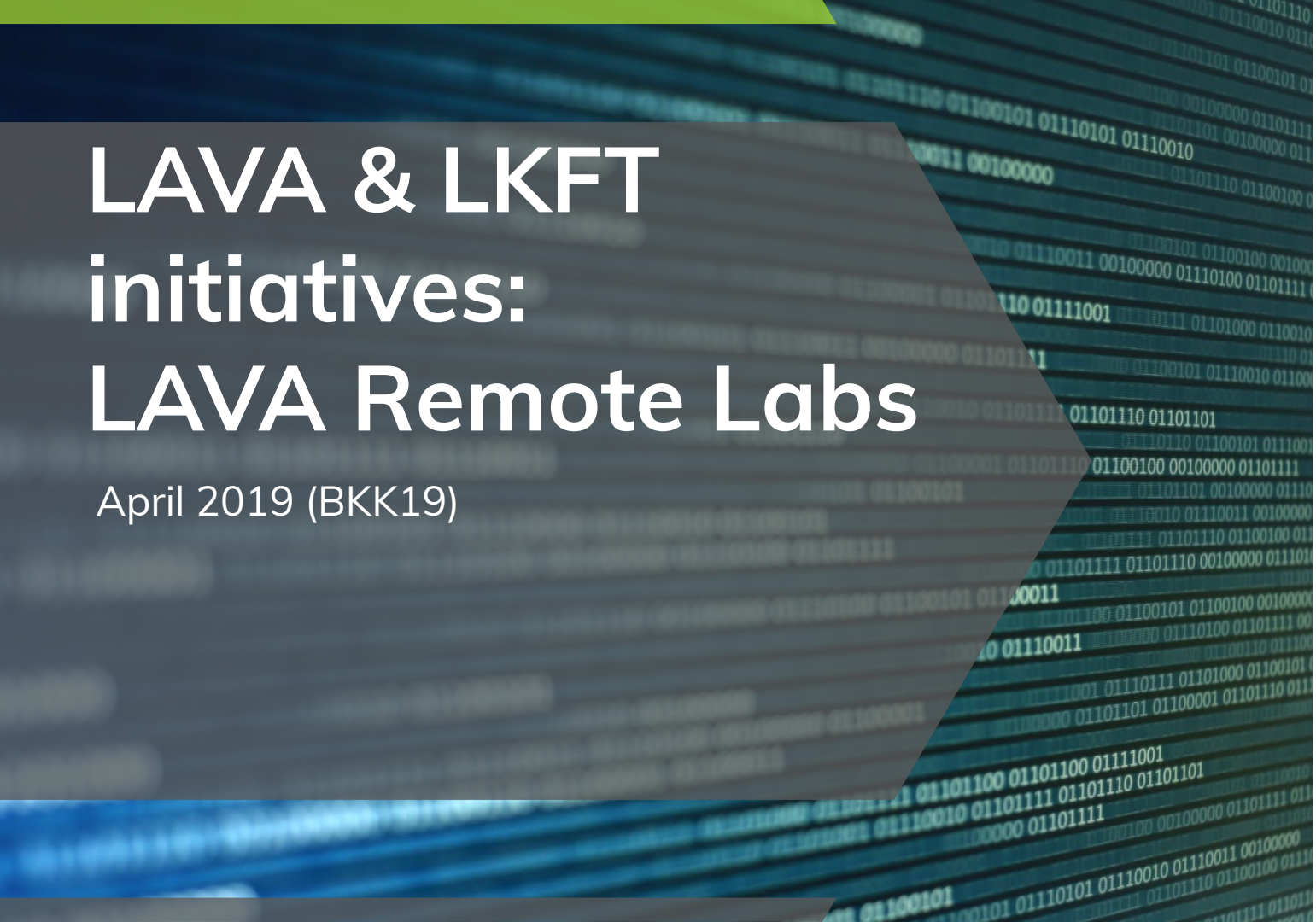
LAVA & LKFT initiatives: LAVA Remote Labs

April 2019 (BKK19)



Linaro

LAVA & LKFT initiatives - Remote Labs Summary

LAVA evolution allowing CI with a single dashboard server and distributed board farms typically in vendor premises.

We see the following benefits:

- DUT management in the hands of originators/owners
- Don’t need to educate central lab personnel on every board from every vendor
- No hardware shipping/return cycle with problematic board debug
- Can reach “consortium scale” with no single bottleneck/resource sink

Linaro is looking at this as a deployment and/or service with lead SoC vendors for:

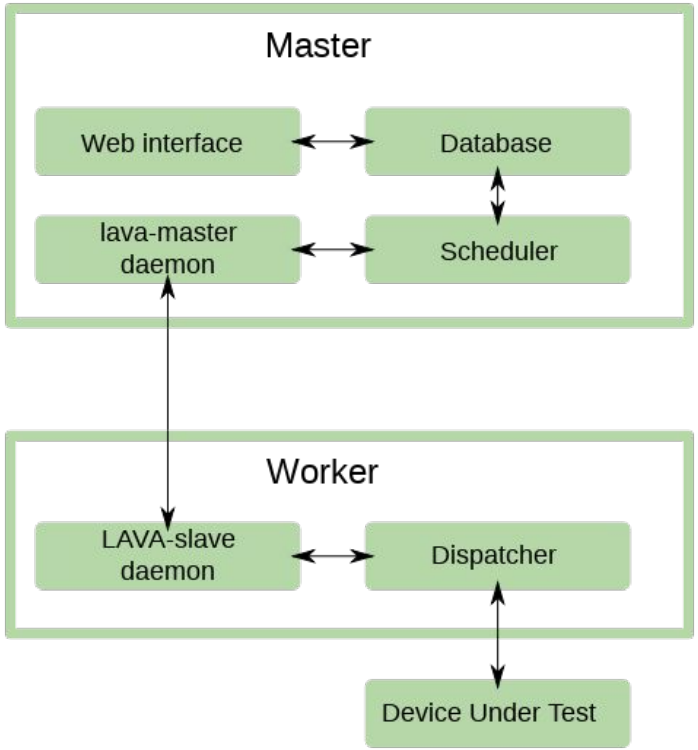
- Kernel Functional Test (LKFT)
- Trusted Firmware Project (TF-A & TF-M CI)

Potential benefit for anyone sourcing kernels from multiple vendors

LAVA Overview

A LAVA instance consists of a **Master** and one or more **Workers**. The Devices Under Test (DUTs) are connected to the **Workers**.

Jobs are submitted to the Master, scheduled by the Master and executed by the Worker(s). The Master stores the test results and hosts the web interface.

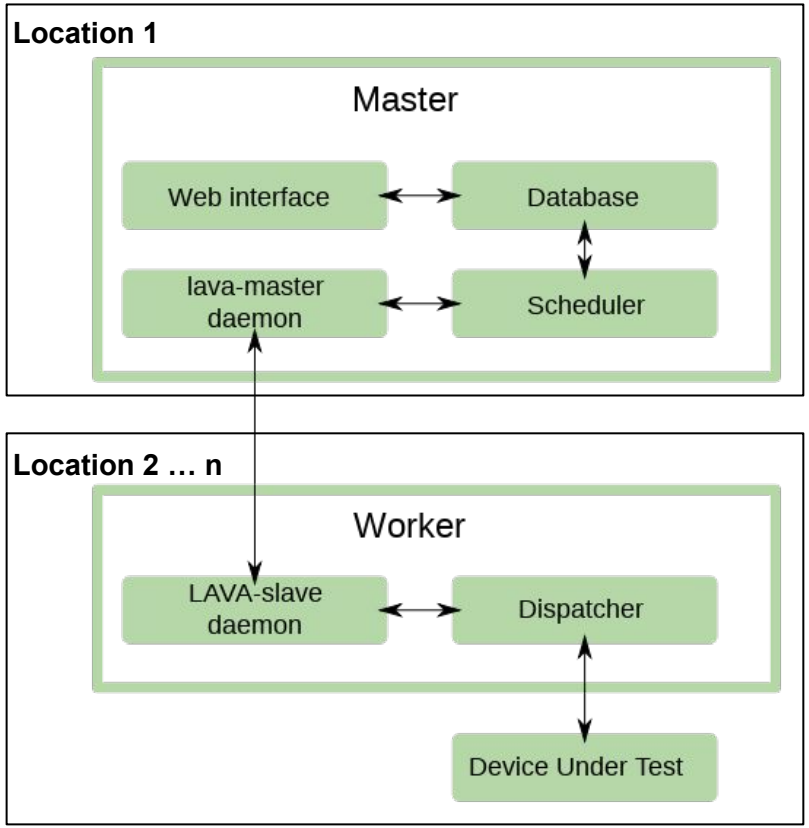


Remote Labs

The LAVA Master and associated Worker(s) can optionally be physically located in different places

Multiple Workers for an instance can be distributed in multiple locations. Each group of Workers is called a **Remote Lab**.

The Master stores the test results and hosts the web interface for all the distributed Workers and their associated DUTs. It appears as a single instance.



Pros & Cons

Benefits

- DUT management in the hands of originators/owners
- Don’t need to educate central lab personnel on every board from every vendor
- No hardware shipping/return cycle with problematic board debug
- Can reach “consortium scale” with no single bottleneck/resource sink

Concerns/Limitations

- Can’t run an arbitrary fork of LAVA on a remote Worker
- Master needs to be updated each time a board is added

Communication Mechanism

- There is a single public LAVA Master
- A Remote Lab Worker initiates communication with the Master in every case
- VPN isn't required for a Remote Lab and co-existence with corporate firewalls may be possible*
- Communication is done via the ZMQ protocol (over TCP) using pre-shared TLS keys

* but this can't be guaranteed, unfortunately

Remote Lab Considerations

Operation

Remote Lab needs to be resourced to act in a daily/timely manner for:

- Infrastructure failures
- Device unbricking
- Periodic maintenance

Installation

- There are minimum requirements (CPU, memory, I/O robustness) for the hardware that hosts the Worker instance
- DUT interface hardware (USB, power control) needs to be robust
- For a many-Worker Remote Lab, scalable administration, deployment & configuration tools should be used

Next Steps

- An SLA is needed to manage interchanges between the Master Administration and Remote Lab Administration
- A communication test can be done for a given remote location with a containerized LAVA Worker before Remote Lab installation starts

Longer Term Vision

- LAVA Master and Worker deployment as containers can already be done and are under active development
- Remote Labs can participate in LAVA Fed https://federation.lavasoftware.org/ to verify that new LAVA versions do not have regressions on remotely hosted hardware
- Private DUTs and Workers - can be discussed separately

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