Oniro CI/Testing integration with LAVA

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What is Oniro?

- a fully-connected all-scenario intelligent ecosystem within Eclipse foundation
- unique user experience across different consumer devices and scenarios
- providing every device maker with the same technology baseline, in an open trusted, transparent, collaborative way
- layered architecture built around the yocto project and bitbake build system
- consists of the kernel layer, system services layer, framework layer, and application layer (lot of things to test eh?)
What is LAVA?

- **Linaro Automated Validation Architecture**
- Test execution system: **testing software on real hardware**
  - Deploy, Boot and Test
- Usages
  - Boot testing: kernelci
  - System level testing: lkft
  - Power consumption
  - Benchmarks
  - Multinode
    - Test with many devices
  - ...

LAVA
linaro.org/lava
Brief introduction to LAVA

Without LAVA

% power on board
% telnet localhost 2000
<enter>
=> dhcp
=> setenv serverip 10.3.1.1
=> […]
=> bootm 0x01000000 - 0x03f00000
[…]
raspberry4 login: root
# run-test.sh
[…]
% power off board
Brief introduction to LAVA (cont.)

Oniro CI/Testing with LAVA

Testing with LAVA

- Power control
- Serial relay
- tftp&nfs server

LAVA server

Kernel, dtb, rootfs

worker

LAVA linaro.org/lava
**Supported methods**

<table>
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<th>deploy:</th>
<th>boot:</th>
<th>test:</th>
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<tr>
<td>● tftp</td>
<td>● cmsis</td>
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<td>● uboot</td>
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<td>● fastboot</td>
<td>● fastboot</td>
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<tr>
<td>● vexpress ums</td>
<td>● iso installer</td>
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</tr>
<tr>
<td>● ...</td>
<td>● ...</td>
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</tbody>
</table>
Brief introduction to LAVA (cont.)

Supported device-types: 307

- adb-nuc alpine-db am6 apq8016-sbc-uboot ar9331-dpt-module arduino101 armada-370-db armada-370-rd armada-3720-db armada-3720-espressobin armada-375-db armada-385-db-ap armada-388-clearfog armada-388-gpu armada-398-db armada-7040-db armada-8040-db armada-xp-db armada-xp-gp armada-xp-linksys-mamba armada-xp-openblocks-ax3-4 armdale at91m9200ek at91sam9261ek at91sam9m10g45ek at91sam9s2x25ek at91sam9x35ek at91-sama5d2_xplained at91-sama5d4_xplained b2120h410 b2260 base bcm2836-rpi-2-b bcm2837-rpi-3-b-32 bcm2837-rpi-3-b bcm2838-rpi-3-b bcm2839-rpi-3-b beaglebone-black-barebox beaglebone-black-beagle-xm cc1312-launchpad cc3220sf cubietruck d02 d03 da850-lcdk disco-l475-iot1 docker dove-cubox dra7-evm dragonboard-410c dragonboard-820c dragonboard-845c fdm-k64f fdrm-kw41z fsl-imx8mm-evk fsl-imx8mq-evk hi6220-hikey-bl hi6220-hikey hi6220-hikey-r2 hi960-hikey hifive-unleashed-a00 highbank hip07-d05 hsdk ifc6410 imx23-olinuxino imx27-phytec-phycards-rdki imx28-dockbill imx53-qrbr imx6dl-riotboard imx6q-nitrogen6x imx6q-sabrelite imx6ul-pico-hobbit imx7s-warp imx8m imx8mn-ddr4-evk jetson-tk1 juno juno-uboot juno-uefi kirkwood-db-88f6282 kirkwood-openblocks_a7 kvm lava-slave-docker lxc mediatek-873 meson8b-ec100 meson8b-odroid1 meson-g12a-sei510 meson-g12a-u200 meson-g12a-x96-max meson-g12b-a311d-khadas-vim3 meson-g12b-odroid-n2 meson-gxbb-nanopi-k2 meson-gxbb-p200 meson-gxl-s805x-libretech-ac meson-gxl-s805x-p241 meson-gxl-s905d-p230 meson-gxl-s905x-khadas-vim meson-gxl-s905x-libretech-cc meson-gxl-s905x-p212 meson-gxm-khadas-vim2 meson-gxm-q200 meson-sm1-sei610 mimxrt1050_evk minnowboard-max-E3825 minnowboard-turbot-E3826 moonshot-m400 mps mustang-grub-eufi mustang-mustang-uefi nexus10 nexus5 nexus5x nexus9 nrf52-nitrogen nucleo-l476rg nxp-ls2088 odroid-n2 odroid-x2 odroid-xu3 orion5x-rd88f5182-nas overdrive ox820-cloundengines-pogoplug-series-3 panda peach-pi pixel poplar qcom-qdf2400 qcs404-evb-1k qcs404-evb-4k qemu-aarch64 qemu r8a7791-porter r8a7795-salvator-x r8a7796-m3uleb r8a7796-m3ultcb-ff rk3228-rocket2-square rk3228-rockey-jaq rk3328-rockey rk3328-rocketx rk3339-gru-kevin rk3339-puma-haikou rzn1d sama53d sama5d34ek sama5d36ek sdm845-tpy sharkl2 snow soca9 socfpga-cyclone5-socrates ssh stm32-carbon stm32map157-cdk2 sun4i-a10-olinuxino lime sun50i-a64-bananapi-m64 sun50i-a64-pine64-plus sun50i-a64-pine64-rpi-55-libretti-all-h3 cc sun50i-h6-orangepi-3 sun50i-h6-orangepi-one-plus sun50i-h6-pine-h64 sun50i-h6-pine-h64-model-b sun5i-a13-olinuxino-micro sun5i-gr8-chip-pro sun5i-r8-chip sun6i-a31-app4-evb sun7i-a20-cubieboard2 sun7i-a20-olinuxino-lime2 sun7i-a20-olinuxino-micro sun8i-a23-evb sun8i-a33-olinuxino sun8i-a33-slininx-sina33 sun8i-a83t-allwinner-h8homlet-v2 sun8i-a83t-bananapi-m3 sun8i-h2-plus-bananapi-m2-zero sun8i-h2-plus-libretech-all-h3-cc sun8i-h2-plus-orangepi-1 sun8i-h2-plus-orangepi-zero sun8i-h3-libretech-all-h3-cc sun8i-h3-orangepi-pc sun8i-r40-bananapi-m2-ultra synquacer-acpi synquacer-dtb synquacer-tc2 tegra124-124-nyan-big-thunderx upsqure vexpress x15-bl x15 x86-atom330 x86-celeron x86 x86-pentium4 x86-x5-z8350 xilinx-zcu102
Remote Labs

The LAVA Server 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.

LAVA server stores the test results and hosts the web interface for all the distributed Workers and their associated DUTs. It appears as a single instance.
Utilizing remote labs in Oniro

- DUT management in the hands of originators/vendors
- Don’t need to educate central lab personnel on every board from every vendor
- No hardware shipping/return cycle with problematic board debug
- No hardware maintenance by lab personnel/reduces cost
- Decentralization: each member/contributor can add physical devices and different locations
- Sharing: Device added under testing can be shared via public cloud infrastructure
- Scalability: Each site can add one to hundreds of devices
Oniro LAVA deployment

- IAC
- Server in a cloud: https://lava.ostc-eu.org/
- Worker provisioning streamlined
  - Installation, configuration
- Upgrades
  - Automatic upgrades of remote labs based on server version
  - No upgrade downtime
- Remote lab deployment (Warsaw, Belgrade, Shanghai)
- Supported devices
  - Qemu
  - RPi4, Nitrogen, Arduino Nano BLE 33
  - Seco B68 & C61
Oniro CI/Testing

- Commit
- Report
- Bitbake
- Submit
- Artifacts
- Pipeline
- Trigger
- Rest API
- Test
- Test Results
- LAVA
- DUTs
Oniro CI/Testing explained

- Push MR, build artifacts
- Submit LAVA test jobs via CI pipeline
- Test
- Trigger the manual CI pipeline from LAVA to feed results back to Gitlab
- Report test results back to MR
- Profit
Thank you!

Join us at

oniroproject.org