LXC support in LAVA

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Agenda

- Introduction to LXC
- Considerations for LAVA
- LXC device type
- Android testing use case
- LXC in LAVA V2
- LXC device dictionary
- LXC samples
Introduction to LXC

- LXC - Linux Containers - OS level virtualization
- Linux kernel support
  - cgroups (2.6.24 version of Linux kernel)
  - isolated namespaces
  - uses same kernel as host
- Lightweight
  - own process
  - network space
- Security
  - unprivileged containers
  - privileged containers
  - no direct access to hardware
Considerations for LAVA

- Multiple Distribution / Distro
- Multi-arch support
- Sandbox
- Transparent
- Lightweight
  - starts on same dispatcher as device
- Access to peripherals
- Complex networking support
- Features
  - persistence
  - scratch hack-boxes
  - hacking sessions with security
- Scope for future use-cases such as openstack testing
LXC as a device type

- Dedicated devices in LAVA
- Aids testing in different distros
- Alternative to kvm devices

/lxc status

Current state

<table>
<thead>
<tr>
<th>Running Jobs</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queued Jobs</td>
<td>0</td>
</tr>
<tr>
<td>Checks/failures</td>
<td>Graphical reports</td>
</tr>
<tr>
<td>Health Checks</td>
<td>one every 10 jobs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Active devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idle</td>
</tr>
<tr>
<td>Offline</td>
</tr>
<tr>
<td>Retired</td>
</tr>
</tbody>
</table>

Devices list

<table>
<thead>
<tr>
<th>Hostname</th>
<th>Worker Host</th>
<th>status</th>
<th>Submissions restricted to</th>
<th>Health</th>
<th>JSON Jobs</th>
<th>Pipeline Jobs</th>
<th>tags</th>
</tr>
</thead>
<tbody>
<tr>
<td>lxc01</td>
<td>dispatcher01.lavalab</td>
<td>Idle</td>
<td></td>
<td>Pass</td>
<td>✗</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>lxc02</td>
<td>dispatcher01.lavalab</td>
<td>Idle</td>
<td></td>
<td>Pass</td>
<td>✗</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
Android Testing Use Case

- Start container dynamically
- Interface between dispatcher and DUT
- Same dispatcher as DUT is connected
- Direct adb and fastboot commands
- Sandbox
- No requirement for MultiNode
- Less wait time - only DUT availability is required
- lava-test-shell on different distros
Android Testing with LXC
LXC in LAVA V2

- LXC is a protocol like multinode and vland
- Protocol options:
  - name: pipeline-lxc-test
  - template: debian
  - distribution: debian
  - release: sid
  - arch: amd64
  - mirror: http://ftp.us.debian.org/debian/
  - security_mirror: http://mirror.csclub.uwaterloo.ca/debian-security/
- Containers gets created from cache
- Introduces ‘namespace’
  - Ties related actions together
  - Aids execution of actions in the desired order
LXC Nexus device dictionary

{% extends 'nexus4.jinja2' %}
{% set adb_serial_number = '04f228d1d9c76f39' %}
{% set fastboot_serial_number = '04f228d1d9c76f39' %}
{% set device_path = ['/dev/bus/usb/001'] %}

● Complete device configuration
  ○ https://git.linaro.org/lava/lava-dispatcher.git/blob_plain/HEAD:/lava_dispatcher/pipeline/devices/nexus4-01.yaml
LXC Sample - Jobs and Job Runs

- Sample LXC job
  - https://git.linaro.org/lava-team/refactoring.git/blob_plain/HEAD:/lxc-debian-mirror.yaml

- Sample LXC Nexus job
  - https://git.linaro.org/lava-team/refactoring.git/blob_plain/HEAD:/nexus9-simple.yaml

- Sample LXC HiKey job
  - https://git.linaro.org/lava-team/refactoring.git/blob_plain/HEAD:/hi6220-hikey.yaml

- Sample LXC job run
  - https://staging.validation.linaro.org/scheduler/job/154667

- Sample LXC Nexus job run
  - https://staging.validation.linaro.org/scheduler/job/151868
Limitations

- **Architecture support**
  - Depends on underlying kernel architecture
  - For armel, armhf, etc. dispatcher should run on these architectures

- **Each distro has its own template**
  - The distro templates does not have common options
  - Difficult to have generic support for all distros
  - Download template
    - Tries to unify the options
Thank You

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For further information: www.linaro.org
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