OpenStack on AArch64
upstream, production, interop
Software Defined Infrastructure & Systems Engineering
Linaro
Agenda

- What is OpenStack
- Building OpenStack for Debian/CentOS
- OpenStack Upstream Improvements
- The Developer Cloud
- Interoperability OpenStack
What is OpenStack - Cloud Software

Services
- Compute: Nova
- Bare-Metal: Ironic
- Identity: Keystone
- Dashboard: Horizon
- Networking: Neutron
- Image Service: Glance
- Deployment: Ansible
- Orchestration: Heat
- Object, Block: ceph
  - OSD, RBD

ARM Server
Building OpenStack for Debian/CentOS

- OpenStack Packaging for AArch64 (LEG 188)
- Linaro overlay RP 16.06 - Mitaka
  - OpenStack packages available:
- Newton OpenStack (planned for RP 16.12)
  - Ceph: http://repo.linaro.org/ubuntu/leg-ceph
  - Preparing OpenStack components for deploying (LEG 196)

- Images for AArch64 OpenStack
  - Upstream Fedora, CentOS and CoreOS new images coming soon
Nova

- Feature enablement on AArch64 in progress
  - Basic functionality validated and working
  - Hotplug not working due to virtio-mmio issue

- Nova Tempest test report:
  - [https://collaborate.linaro.org/display/SDI/Nova+Tempest+Test+Report](https://collaborate.linaro.org/display/SDI/Nova+Tempest+Test+Report)

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<table>
<thead>
<tr>
<th>Nova Features Validated and Enabled on AArch64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Launch instance</td>
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<tr>
<td>Shutdown instance</td>
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<tr>
<td>Guest instance status</td>
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<tr>
<td>Image storage support</td>
</tr>
<tr>
<td>Live migration of instance across hosts</td>
</tr>
<tr>
<td>Attach/Detach volume</td>
</tr>
</tbody>
</table>
Neutron

- Feature enablement on AArch64 in progress
  - Core services agents validated
  - OpenDaylight plugin validated
  - OVS+DPDK in progress

- Neutron Tempest Test Report:
  - [https://collaborate.linaro.org/display/SDI/Neutron+Tempest+Test+Report](https://collaborate.linaro.org/display/SDI/Neutron+Tempest+Test+Report)
Ceph - Storage

- Block storage (RBD) and Object storage (OSD) have been validated on AArch64
  - Verified by Ceph Unit Tests and by running on the Developer Cloud

- Ceph RBD integration with OpenStack is finished on AArch64
  - Use Ceph as Cinder backend to provide volume service

- Ceph OSD integration with OpenStack is ongoing on AArch64
  - Most features are verified

- Ceph performance testing is ongoing on AArch64
  - Ceph cluster performance on AArch64 compared with X86
## Patches for AArch64

<table>
<thead>
<tr>
<th>Patches</th>
<th>Projects</th>
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<tbody>
<tr>
<td>Set SCSI as the default disk controller on AArch64</td>
<td>Nova</td>
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<tr>
<td>Add support for libvirt virtio-mmio address type</td>
<td>Nova</td>
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<tr>
<td>Fix Nova unit tests on AArch64</td>
<td>Nova</td>
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<tr>
<td>Fix deletion failure of NVRAM enabled VM</td>
<td>Nova</td>
</tr>
<tr>
<td>Pick the first available disk as configure drive</td>
<td>Nova</td>
</tr>
<tr>
<td>Set cpu-mode to host-passthrough on AArch64</td>
<td>DevStack</td>
</tr>
<tr>
<td>Set virtio-scsi as the default CDROM bus for AArch64</td>
<td>DevStack</td>
</tr>
<tr>
<td>Support multi arch deployment</td>
<td>Ironic</td>
</tr>
<tr>
<td>Fix console device name for AArch64</td>
<td>Ironic</td>
</tr>
<tr>
<td>Optimize Ceph hash algorithm</td>
<td>Ceph</td>
</tr>
<tr>
<td>More ...</td>
<td>Network-ODL, OSLO, ...</td>
</tr>
</tbody>
</table>
Test Setup

- DevStack is used for Nova and other OpenStack components development.
- Most use cases can be deployed by running all OpenStack services in one host.
- Multiple nodes deployment is also required to simulate real life cases.
Linaro Developer Cloud v1.0

- Based on OpenStack Liberty
- Deployed by hand on Debian
- Cloud physically located in Austin, US
- No access to the API or Horizon interface for users
- Basic networking functional
- VMs managed by Linaro
- User management manual
Linaro Developer Cloud v2.0 - Software

- Based on OpenStack Newton
- Includes Linaro’s upstream AArch64 patches
- Deployed with **Ansible** on Debian, repeatable and automated
  - Based on venvs generated including Linaro’s patches
- Cloud physically located in Cambridge, UK
- API access enabled
- Horizon access for users enabled
- Networking with OVS functional
- Users able to manage their own VMs
Linaro Developer Cloud v2.0 - Hardware

- 10 overdrive revA
- 2 overdrive revB
- 1 D02
- more coming soon...
Next Steps - Developer Cloud

- Automating user management
- Fix Bug 2462 - https://bugs.linaro.org/show_bug.cgi?id=2462
- Test Interoperability
- Run full upstream test suite (tempest)
- Finish documenting deployment guidelines

Production ready!
The Reference Architecture

- Set of venvs with all dependencies for predictable deployment
Interoperability OpenStack

- Interop Working Group (was: Defcore Committee)
  - OpenStack interoperable == making clouds “compatible with each other”
- RefStack project
  - https://refstack.openstack.org/#/guidelines
References

● OpenStack Architecture
  ○ https://www.openstack.org/software/
  ○ http://docs.openstack.org/.../get_started_conceptual_architecture.html
  ○ https://git.linaro.org/infrastructure/developer-cloud.git

● Ceph
  ○ http://docs.ceph.com/docs/master/radosgw/
  ○ http://docs.ceph.com/docs/master/rbd/rbd/

● RefStack and Interop
  ○ https://refstack.openstack.org/#/guidelines
  ○ https://wiki.openstack.org/wiki/Governance/DefCoreCommittee

● SDI Documentation
  ○ https://collaborate.linaro.org/display/SDI/Documentation
Thank You

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LAS16 keynotes and videos on: connect.linaro.org