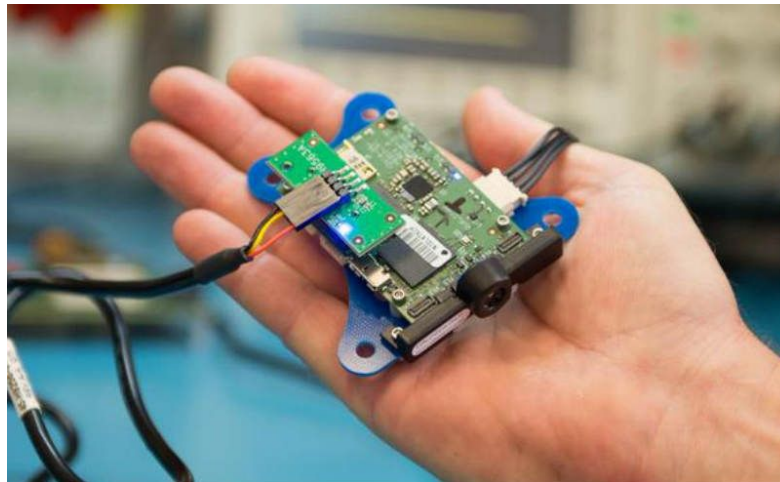# Using Openembedded with Snapdragon Flight

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Background

- Snapdragon Flight™ board is available from Intrinsyc
- Based on Qualcomm® APQ8074
- Uses 3.4 kernel (Android) and Linux userspace
- Uses Android boot partition and LK bootloader
- Flight stack runs on Hexagon™ DSP RTOS (QuRT)

Openembeddedebian?

- Debian based rootfs and kernel built using OE (QRLinux)
- Uses OE version from 2013
- QRLinux is available on codeaurora.org
- Depends on proprietary layers for some functionality
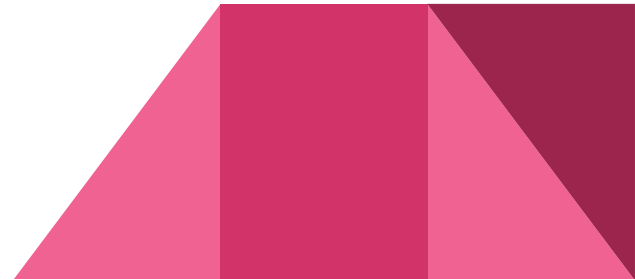
Getting the Open Source Layers for QRLinux

- Fetch the source:
  - repo init -u git://codeaurora.org/quic/le/le/manifest -b release \   -m LNX.LER.1.0-68046-8x74.0.xml
  - repo sync -c --no-tags
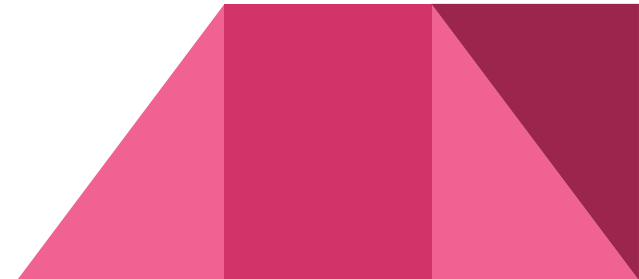- Rootfs will not build without proprietary components
- Kernel will build
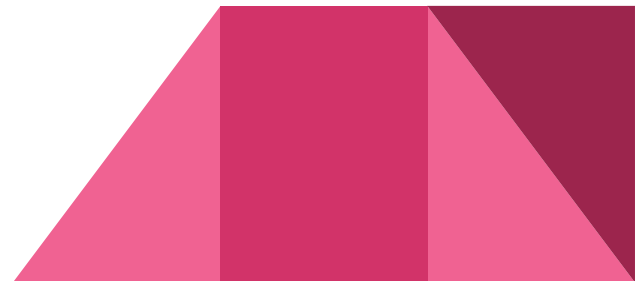
New Direction

Openembedded Rebase

Goals

- Use supported version of Openembedded (Jethro)
- Leverage meta-qcom layer at yoctoproject
- Port qrlinux packages to standard OE
- Enable builds on newer Ubuntu versions (14.04-15.10)
- Leverage Linaro RBP, meta-qcom

Hexagon SDK Dependencies

- Hexagon-clang requires GLIBCXX_3.4.18

  - Ubuntu 12.04 needs updated libstdc++.so.6

- Uses gcc 4.8 armv7hf cross compiler (i386)

  - Prebuilt Hexagon SDK ARM libs

- Also works on Ubuntu 14.04

- Hexagon SDK Linux installer requires X11
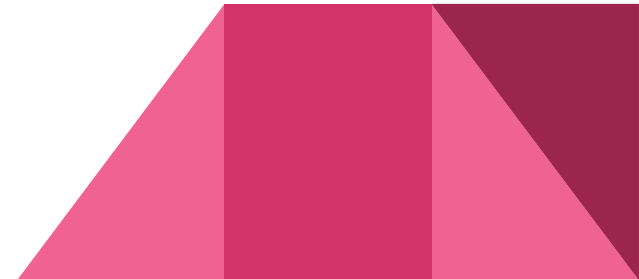
Constraints

- ARM binaries must be compatible with g++ 4.8
- 3.4 kernel can't be built with gcc 5.X
- Old versions of OE don't work on Ubuntu 15.10
  - Native tools don't build (ncurses)
  - Ubuntu 15.10 uses gcc 5.2
- Issues with linaro-gcc-4.8-2013 (i386) on Jethro
- Use linaro-4.8 for Hexagon SDK compatibility
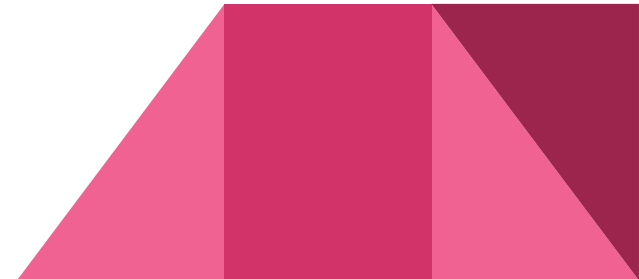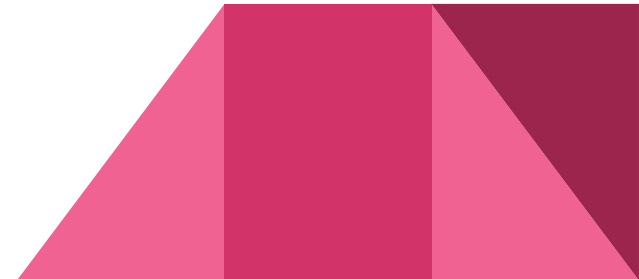- Jethro uses glibc instead of eglibc (binary compatible)
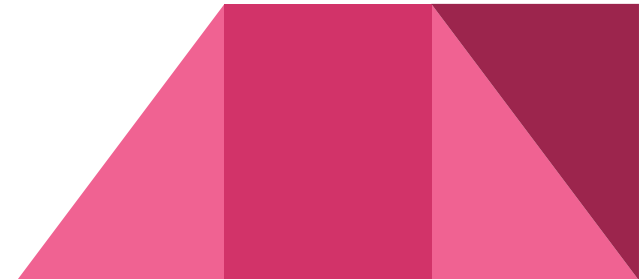
What's the Status?

Setting up Build Env

- Install Ubuntu 14.04
- Install OE package deps:
  - sudo apt-get install gawk wget git-core diffstat unzip texinfo gcc-multilib build-essential chrpath socat lib32z1

Set up the OE Layers

- Install layers

  - mkdir oe-atlflight && cd oe-atlflight

  - repo init -u https://github.com/mcharleb/oe-eagle-manifest.git \
    -b jethro -m default.xml

  - repo sync -c --no-tags

Manifest

```xml
<?xml version="1.0" encoding="UTF-8"?>
<manifest>
 <default revision="jethro" sync-j="4"/>
 <remote fetch="https://github.com" name="github"/>
 <remote fetch="http://git.linaro.org" name="linaro"/>
 <project remote="linaro" name="openembedded/meta-linaro" path="sources/meta-linaro"/>
 <project remote="linaro" name="openembedded/meta-backports" path="sources/meta-backports"/>
 <project remote="github" name="openembedded/openembedded-core" path="sources/openembedded-core"/>
 <project remote="github" name="openembedded/meta-openembedded" path="sources/meta-openembedded"/>
 <project remote="github" name="openembedded/bitbake" path="sources/bitbake" revision="1.28"/>
 <project remote="github" name="96boards/meta-96boards" path="sources/meta-96boards" revision="master"/>
 <project remote="github" name="96boards/meta-rpb" path="sources/meta-rpb" revision="master"/>
 <project remote="github" name="mcharleb/meta-atlflight" path="sources/meta-atlflight"/>
 <project remote="github" name="ndechesne/meta-qcom" path="sources/meta-qcom">
    <linkfile dest="setup-environment" src="../../.repo/manifests/setup-environment"/>
 </project>
</manifest>
```
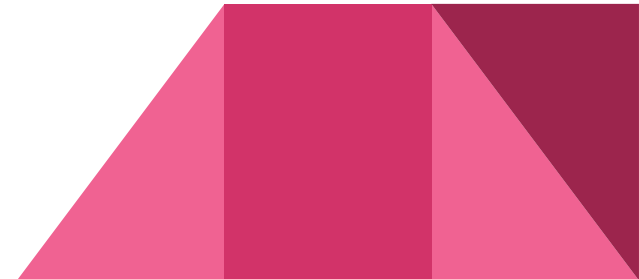
Building PX4

New meta-atlflight layer:
- Uses linaro-4.8
- Compatible with Jethro release
- Built as part of atlflight-image
  - PX4-firmware-eagle_2016.01.bb

Building the Rootfs

- Make rootfs image (including PX4)
  - MACHINE=eagle DISTRO=atlflight . setup-environment
  - bitbake atlflight-image

Kernel Future Direction

- Need to deconstruct qrlinux kernel recipe
- Must use 3.4 CAF Android kernel for required features
    - fastRPC, etc
    - Must work on Ubuntu 15.10 (linaro-4.8), and 14.04
- Would like to use recent upstream kernel
    - Boots on Sony APQ8074 devices
    - Not all features supported upstream

Building the Kernel (today)

- QRLinux is still used to build the kernel

  export MANIFEST_URI=git://codeaurora.org/quic/le/le/manifest

  repo init -u $(MANIFEST_URI) -b release -m LNX.LER.1.0-68046-8x74.0.xml

  repo sync -c --no-tags

  export WS=$(pwd)

  pushd oe-core 1>/dev/null

  source build/conf/set_bb_env.sh

  bitbake linux-qr-eagle8074

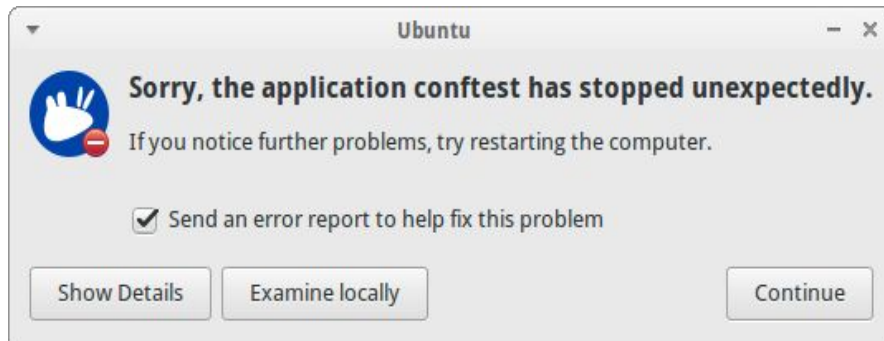- Does NOT work on Ubuntu 15.10 (gcc 5
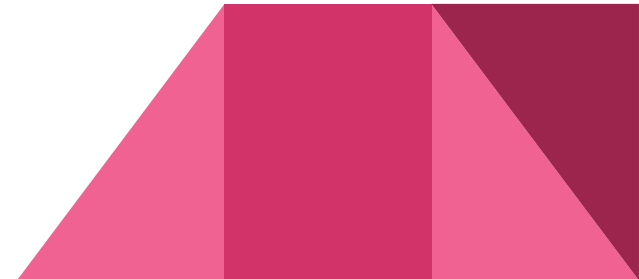- Does not work with Jethro

ToDos

Kernel ToDo

- Package kernel for Android boot partition
  - Re-use easy-410c-oe work
- Many conftest crashes when building the kernel

Rootfs ToDo

- Port qrlinux packages
- Package proprietary files in OE layer
- Add Hexagon SDK libraries to rootfs

Thank You

Questions?