

Automated testing of GNU Radio builds

Philip Balister
philip@opendsdr.com

Open SDR

September 22, 2021

1 Introduction

2 Testing

3 Summary

What is the problem?

- GNU Radio runs on many different processors
- 32 and 64 bit architectures
- Dependencies can impact QA tests
- QA tests designed to run at build time
- But cross built tests can't run on build machine

Build Process

- OpenEmbedded (Yocto Project technical partner)
 - Build custom Linux distributions
 - Supports QEMU
 - SBOM (Software Bill of Materials) support in development
- Key principle, keep applications separate from machine and distribution
- Fetches sources, compiles, create packages (ipk, rpm, deb)
- Images are assembled from packages

Package QA testing

- QA tests are typical run at build time
- Care is taken to use newly built libraries
- If you are cross compiling, this doesn't work
- This can be worked around
- OpenEmbedded supports the concept of packaging test code

Packaging test code

```
do_install_ptest() {
    mkdir -p ${D}${PTEST_PATH}
    cd ${B}
    find . -name "qa*sh" -exec cp --parents \
        {} ${D}${PTEST_PATH} \;
    find . -name "CTestTestfile.cmake" -exec
        cp --parents {} ${D}${PTEST_PATH} \;

    cd ${S}
    find . -name "qa*py" -exec cp --parents \
        {} ${D}${PTEST_PATH} \;
}
```

Running the test code

```
#!/bin/sh
```

```
ctest CTestTestfile.cmake
```

Collecting and displaying results

- Results are collected in a text file
- Results file is committed to git repository
- We use the diff to track changes in test results!
- But, we have to postprocess results to eliminate noise.

Results

```
57/207 Test #57: qa_rms ..... Passed
      Start 58: qa_rotator_cc
- 58/207 Test #58: qa_rotator_cc ..... Passed
+ 58/207 Test #58: qa_rotator_cc .....***Failed
      Start 59: qa_sample_and_hold
59/207 Test #59: qa_sample_and_hold . Passed
```

Links

- <https://www.openembedded.org>
- <https://www.yoctoproject.org>
- <https://github.com/balister/meta-sdr>
- <https://github.com/balister/gnuradio-ptest>