Keeping it Green: Integrated QA with the Yocto Project

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ELCE 2013 • Edinburgh • 24 Oct 2013
Yocto Project

- Extend and improve the core of OpenEmbedded (OE-Core)
- Develop additional tools around it
- Releases on a 6 month cadence
- Help make building an embedded Linux OS easier
Why automated testing?

- Confidence that changes haven't introduced regressions
- Humans don't need to do what a machine could be doing
- Avoid everyone re-inventing the wheel
- Developers can run tests on their own machines
Runtime testing (1.5+)

- **New framework for 1.5**
  - Replaces old shell-based “imagetest” framework
  - Python-based (unittest)
  - Tests run on the build host, run commands on target over SSH
  - QEMU targets only (for now)
Runtime testing (1.5+)

• Easy to run
  • Automatically after building an image
  • Explicitly
• Choose which tests to run
• Minimal intrusion into CI server setup
  • (and doesn't require one)
Runtime testing (1.5+)

- Easy to extend
  - Written in Python
  - Unimportant details abstracted away
  - Extensible with standard layer mechanism
Running tests

• To enable running tests automatically after building any image:
  • In local.conf:
    TEST_IMAGE = "1"

• To run manually:
  • In local.conf:
    INHERIT += "testimage"
  • Each time:
    $ bitbake -c testimage <imagename>
Finding tests

- Core tests located in meta/lib/oeqa/runtime
- Additional layers can add their own
  - Add python modules in lib/oeqa/runtime under the layer
  - Should not use same names as modules in OE-Core
- Specify tests to run by setting TEST_SUITES variable
Example test cases

meta/lib/oeqa/dmesg.py
meta/lib/oeqa/df.py
meta/lib/oeqa/smart.py
Other automated testing features
ptest

- Run tests from upstream software package
- Provides packaging and installation of test suites
- Runner script for the target *(run-ptest)*
- Idea is to coalesce test output to the same format
Autobuilder

- Continuous Integration server
- Based on Buildbot
- Configured to run builds & tests out of the box
bitbake-selftest

- Simple test script for bitbake itself
- Helps avoid regressions when working on bitbake
- Quick to run
Other scripts

- **test-reexec**
  - Tests re-execution of tasks
- **test-dependencies.sh**
  - Finds “floating” auto-detected dependencies
Future plans
Future (1.6+) - Runtime tests

- Runtime tests on real hardware
  - Simple – one or two machines, directly attached
  - Advanced – number of machines attached to test server (“test rack”)
    - “push model” vs “pull model”

- ptest integration
  - Report collection / analysis

- Additional runtime tests
- GUI tests
Future (1.6+)

- Non-runtime tests
  - “oe-selftest”
  - Converting current manual test cases into automated tests
Social effects

- Improve communication between development & QA
- Opportunities for QA to become more directly involved
Summary

- New testing framework
- More testing-related improvements to come
- Focus on quality
- Send us feedback
- Get involved!
Thank you for your participation!

www.yoctoproject.org