Are embedded buildsystems still needed?

[ ] Yes
[ ] No
[ ] Maybe
This is like a BoF

Please interrupt when you have questions / remarks / etc!

Slides can be found at http://tinyurl.com/koenelce13
How I got suckered into embedded linux
Early 2000s - PDAs

Small amount of RAM: 32MiB or 64MiB
Tiny flash: 16MiB or 32MiB
Might have MMC or CF slots
Which groups need a buildsystem?

- **Users:** No
  - They use the firmware image
  - Maybe use package feeds

- **Developers:** Yes
  - No SDK available
  - No on-target toolchain available
  - No working external toolchain available

- **Distro developers:** Yes
  - Familiar/OpenZaurus/OpenSimpad/etc completely built with OE
Buildsystems

● iPAQ cluster at handhelds.org:
  ○ DUAL PCMCIA sleeve for networking and harddisk
  ○ ssh access on request
  ○ unmaintained after ~2002
  ○ doesn’t actually run any handhelds.org distro

● Buildroot
  ○ doesn’t scale for lots of different targets
  ○ Package management virtually non-existent

● OpenEmbedded
  ○ “Can you send me your working config?”
Everyone happy?

- Close cooperation between app developers (GPE/Opie) and distro people
- Close cooperation between distro people and buildsystem people
- In a lot of cases one person does all 3 of those things.

Very tight integration with very little distro specific ‘enhancements’.
Late 2000s - Development boards
Late 2000s - Development boards

Reasonable amount of ram (>=128MB)
SD card storage
Ethernet!!!
Which groups need a buildsystem?

- **Users**: No
  - They use the SD card image
  - Use package feeds
- **Developers**: Maybe
  - Flaky SDK available
  - Flaky on-target toolchain available
  - Flaky external toolchain available
- **Distro developers**: Yes
  - Angstrom completely built with OE
Buildsystems

- OpenEmbedded
  - Angstrom config works, >90% of the distro configs don’t work
- Gentoo-prefix
  - works very well
  - virtually unknown
- Other systems
  - lack ARM EABI support
  - lack cortex-A8 support
  - focussed on native builds
Everyone happy?

- No cooperation between app developers (GNOME/KDE/XFCE) and distro people
- Cooperation between distro people and buildsystem people
- Users expect RHEL type stability with gentoo style optimizations and debians wealth of prebuilt packages.

Everyone is very unhappy about the software, but OMG BLINKING LEDs!!!”
Early 2010s - Arduino and r-pi

Beaglebone + BeBoPr cape
Sanguino derivative
Early 2010s - Arduino and r-pi

Users bitbang everything with an arduino :(}
Which groups need a buildsystem?

● Users: No
  ○ They use the SD card image
  ○ They use python/nodejs/etc with PIP/npm/CPAN
  ○ Copy/paste instructions from blogs
  ○ Arduino IDE

● Developers: No
  ○ On-target toolchain available
  ○ They use python/nodejs/etc with PIP/npm/CPAN

● Distro developers: Maybe
  ○ Angstrom completely built with OE
  ○ Every other distro does ethical\textsuperscript{native} builds
Quotes

- “I disabled USB in the kernel to make it boot faster. Users than want USB can easily reconfigure and rebuild the kernel because it’s using the yocto kernel tooling”
- “We don’t support X11 because we’re embedded and not bloated” - Buildsystem team in 2006
- “We support X11!!!” - Same team in 2011
Quotes

● “DT is external to the kernel, so I don’t really want to push the DT for my board upstream”
● “Should I switch from using OE to using Yocto?”
● “OE is a single script that only supports one thing” - Wolfgang Denx a few years earlier
AVR32

Hardware is not suited for native builds
Aarch64

No hardware available