Embedded building tools BOF

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Corrections, suggestions, contributions
and translations are welcome!

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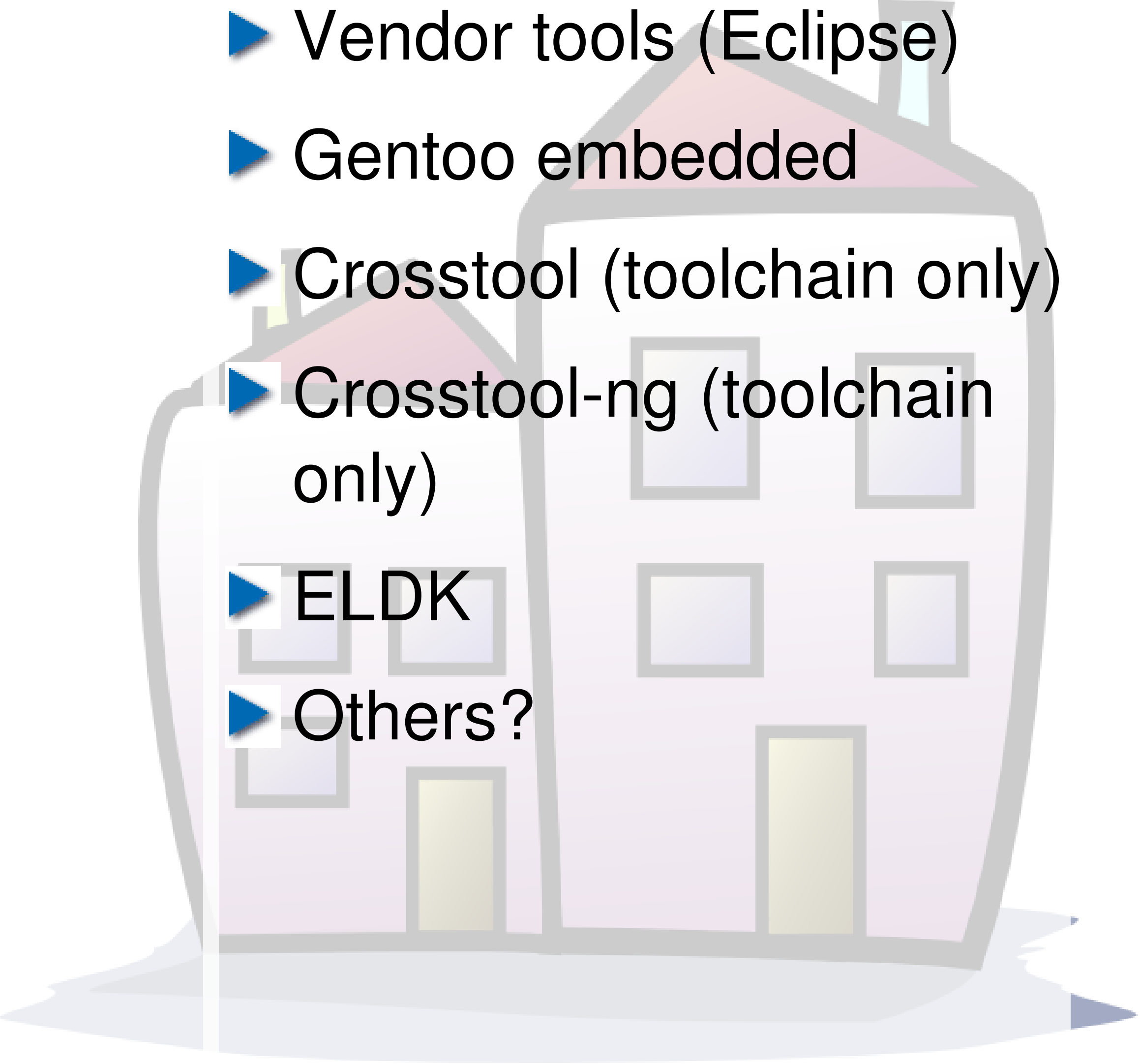
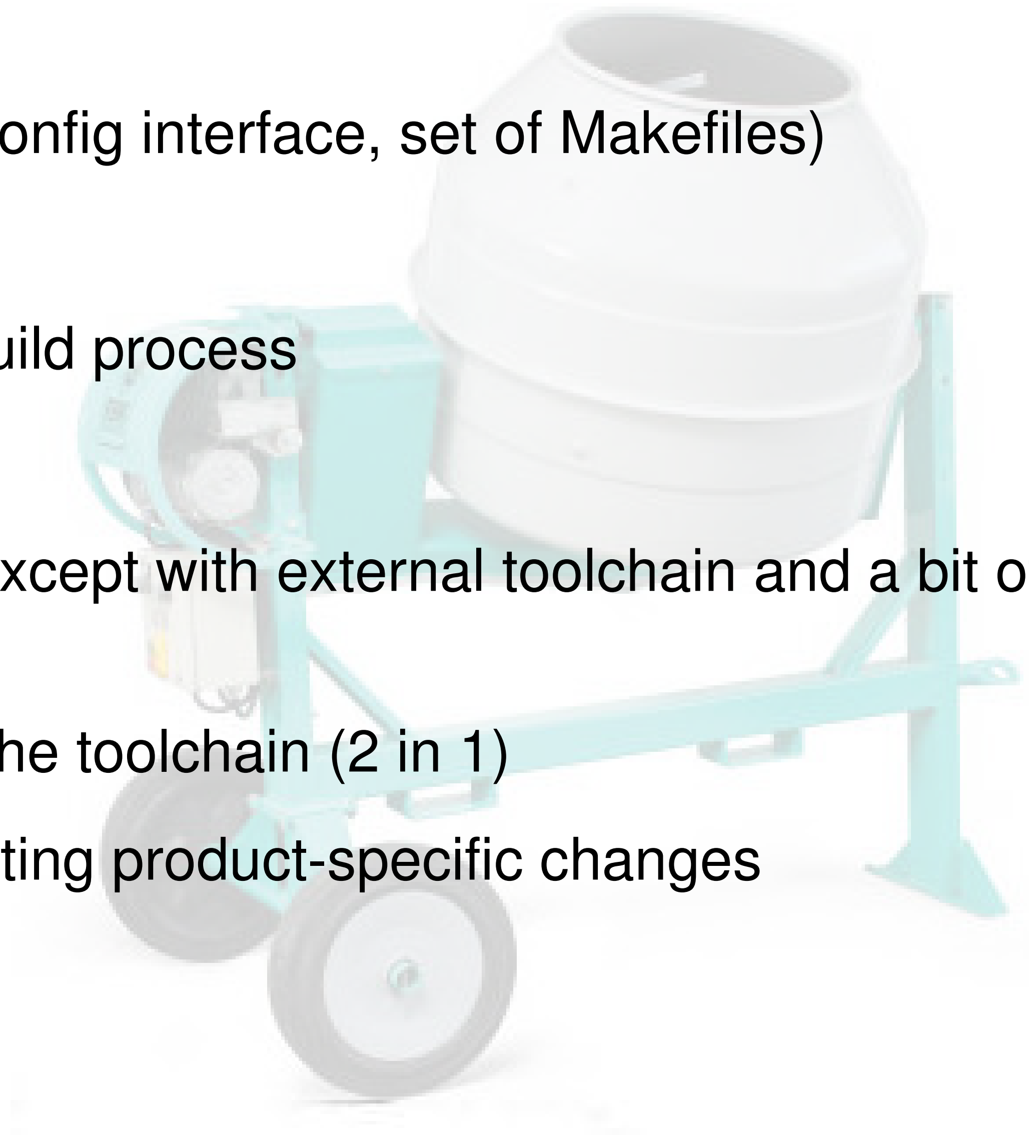
Which tools to build your system?

- OpenEmbedded
- Buildroot
- Scratchbox
- PTXdist
- LTIB
- Home made tools
- Firmware Linux



- Vendor tools (Eclipse)
- Gentoo embedded
- Crosstool (toolchain only)
- Crosstool-ng (toolchain only)
- ELDK
- Others?

Buildroot



Pros

- Supports uClibc
- Simple design (kernel config interface, set of Makefiles)
- Efficient
- Reproducibility of the build process

Cons

- Doesn't support glibc, except with external toolchain and a bit of tuning
- Takes care of building the toolchain (2 in 1)
- No clean way of separating product-specific changes
- No packages

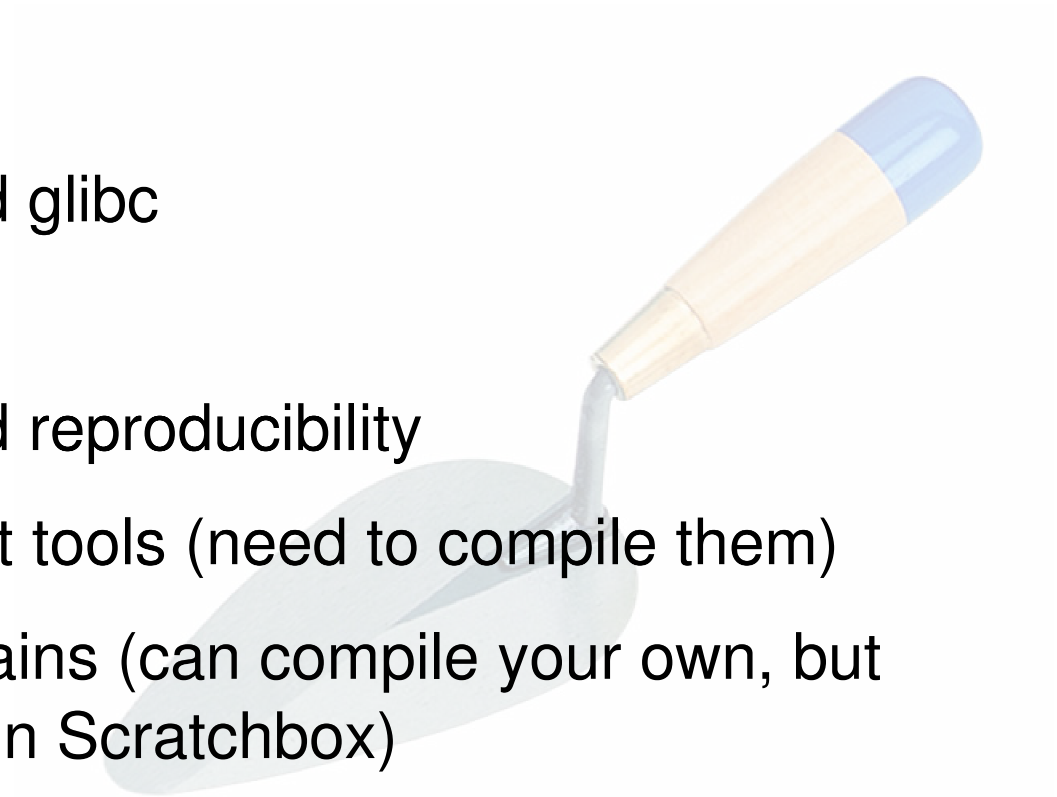
Scratchbox

Pros

- Transparent cross-compilation
- Transparent execution
- Supports both uClibc and glibc

Cons

- No infrastructure for build reproducibility
- Complex to add new host tools (need to compile them)
- Only uses its own toolchains (can compile your own, but complicated to integrate in Scratchbox)
- No recipes, no tool patches shared with the community.



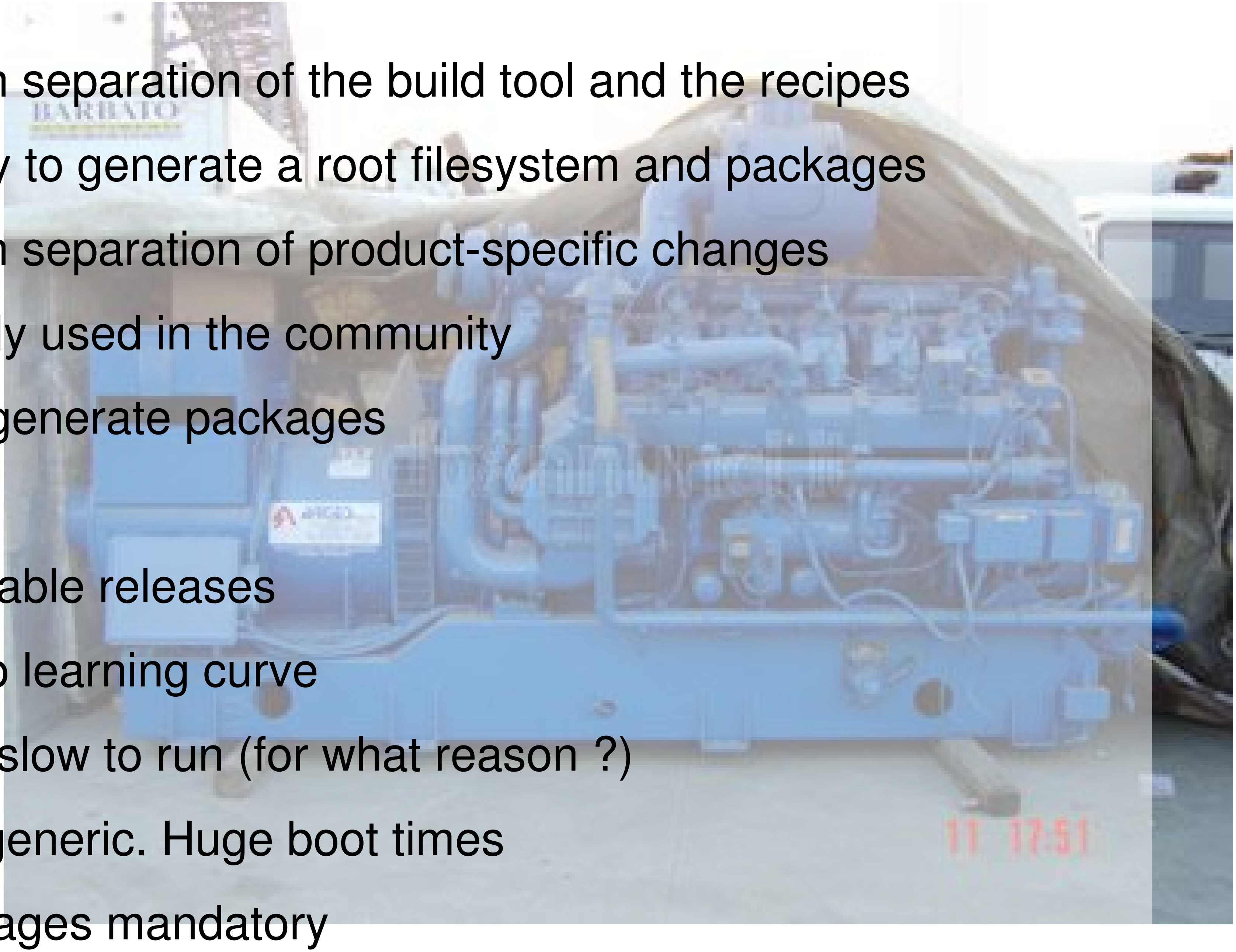
OpenEmbedded

Pros

- Clean separation of the build tool and the recipes
- Ability to generate a root filesystem and packages
- Clean separation of product-specific changes
- Widely used in the community
- Can generate packages

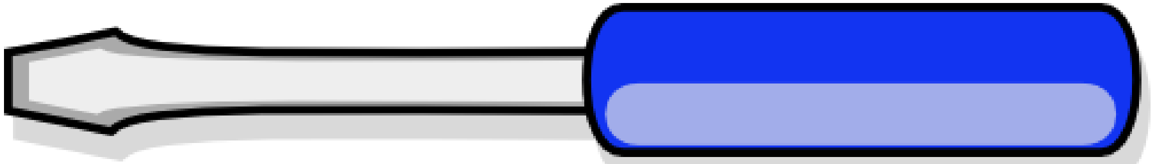
Cons

- No stable releases
- Steep learning curve
- Very slow to run (for what reason ?)
- Too generic. Huge boot times
- Packages mandatory

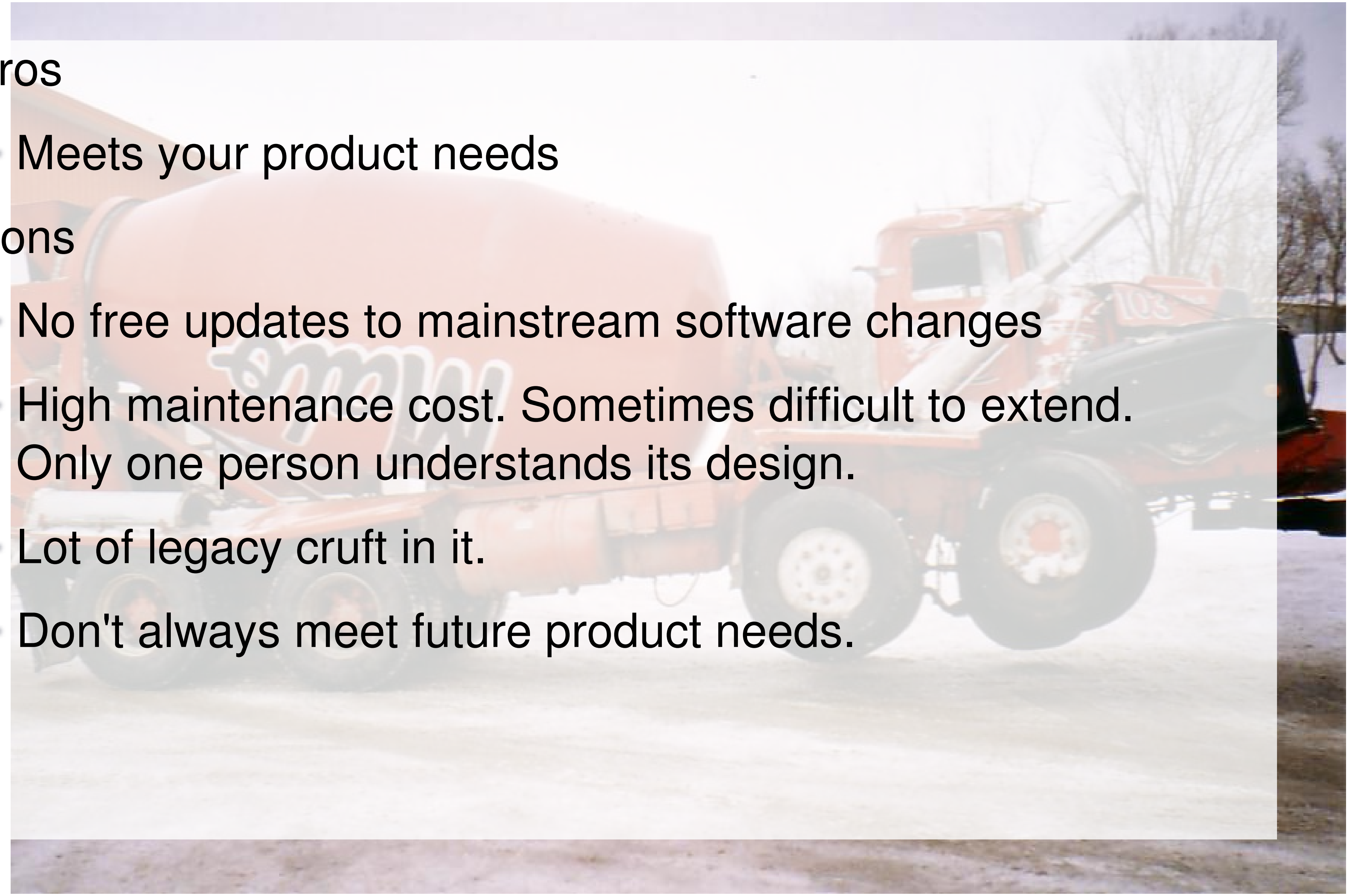


Firmware Linux

- By Rob Landley
- Not using cross-compiling,
  but only native compiling thanks to Qemu
- Similar approach than Scratchbox, but less tricks.
- How mature is it ?



Home made tools



Pros

- Meets your product needs

Cons

- No free updates to mainstream software changes
- High maintenance cost. Sometimes difficult to extend. Only one person understands its design.
- Lot of legacy cruft in it.
- Don't always meet future product needs.

LTIB

Pros

- Clean separation of build system and packages
- Supports both uClibc and glibc
- Easy to extend to support new boards
- Accepts standard toolchains

Cons

- Only used on Freescale boards?
- Size of community?

The other ones ?

- PTXdist
  - Very similar to Buildroot
  - Relies on a separate tool for building the toolchain, but seems limited to glibc
- Emdebian
- Vendor tools
  - Great features
  - But difficult to evaluate without a subscription.

Tools compared

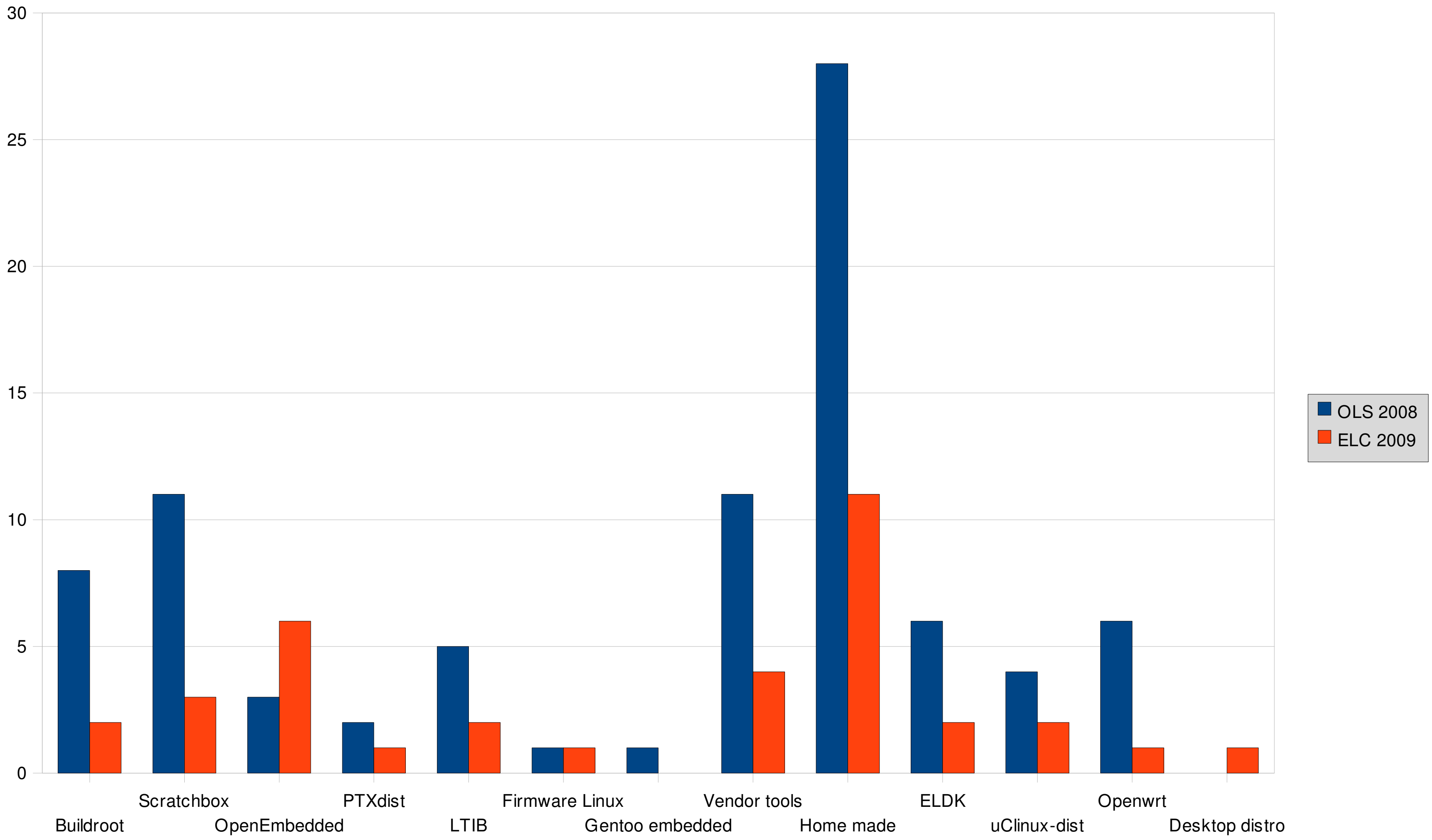
	License	Small systems	glibc (G) uClibc (U)	Reproducibility / Leverage	Popularity	Actively maintained
Buildroot	Free	Yes	G	Good	Good	Yes
Scratchbox	Free	Yes	G + U	Poor	Low	Yes
OpenEmbedded	Free	No	G + U	Good	Very good	Definitely
LTIB	Free	Yes	G + U	Good	Low	Yes
PTXdist	Free	Yes	G	Good	Low	Yes
Gentoo embedded	Free	No?	G (U?)	?	Low?	Yes
Firmware Linux	Free	Yes	?	Poor	Low	Rob never sleeps
Vendor tools	Closed	?	G + U	Good	N/A	Yes
Home made	Closed	?	?	?	N/A	?

Building the toolchain

- Buildroot
  - Mixed with root filesystem construction, not really nice
  - Only uClibc supported
- Crosstool
  - Not really nice configuration through shell scripts
  - Only glibc supported
- Crosstool-ng
  - Much better configuration interface
  - Supports both uClibc and glibc
  - Hasn't attracted a lot of community attention (yet ?)

Tool survey

- Number of users per tool in the BOF



Questions

- Why is the community so fragmented ?
  - Because it is not possible to create a universal tool that would match the needs of everybody ?
  - Is it a problem ?
  - NIH syndrom ?
- What are the missing features ?
- What are your complaints about the existing tools ?
  - Complexity ?
  - Lack of flexibility ?
  - Don't see the need ?