

Cross Building

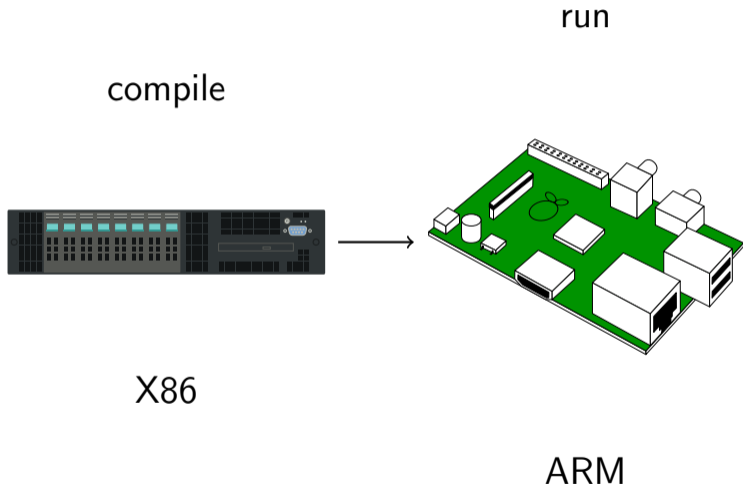
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About Helmut Grohne

- ▶ Contributing to Debian since 2005
- ▶ Debian Developer since 2013
- ▶ Bootstrapping Debian since 2014
- ▶ Member of the Technical Committee since 2022
- ▶ Working with Freexian since 2022

What is cross building?



Why is cross building useful?

- ▶ Use fast machines to build for slow machines
- ▶ Architecture cross bootstrap
- ▶ Compilers exhaust address space

What is build/host/target?

Debian and GNU terminology:

- ▶ build architecture: Where the build is performed
- ▶ host architecture: Where the artifacts are run
- ▶ target architecture: What the compiler we are building produces code for
 - ▶ target is almost never right.

How to cross build a package?

- ▶ `sbuild --host=$ARCH ...`
- ▶ `pbuilder build --host-arch $ARCH ...`
- ▶ `dpkg-buildpackage --host-arch $ARCH ...`

When does cross building work?

- ▶ Satisfiable cross Build-Depends: 60%
- ▶ Cross buildable: 50%
- ▶ Check [https://crossqa.debian.net/src/\\$PACKAGE](https://crossqa.debian.net/src/$PACKAGE)

often	sometimes	rarely
autotools	GObject	Clang / LLVM
CMake	Perl extensions	Go
dh_auto_*	Python extensions	Haskell
meson	Qt ecosystem	help2man
pkg-config		OCaml
Rust crates		R
		xmkmf / imake

When to use cross building?

- + Speed up builds e.g. Linux kernel
- Unstable rebuilds the world for PAC/BTI
- + During a 64bit-time transition to bootstrap
- Avoid when you can easily build natively
- + Adding a new architecture to Debian

How to fix cross building?

Satisfiability issues

- ▶ Drop unused Build-Depends
- ▶ Try to move Build-Depends to Build-Depends-Indep
 - ▶ Split documentation into a -doc package
- ▶ Annotate Build-Depends used for testing `<!nocheck>`
- ▶ Python extension → B-D: `libpython3-dev, python3-dev:any`
- ▶ Stop using `libtool-bin, libtoolize` instead
- ▶ Check multiarch hints on tracker.debian.org

How to fix cross building?

Build failures

- ▶ Use `dh_auto_*`
- ▶ Perl extension → `Build-Depends: perl-xs-dev`
- ▶ Avoid `AC_RUN_IFELSE` → alternatives `AC_CHECK_SIZEOF`, `AC_CHECK_DECL`, `AC_COMPUTE_INT`, `AC_LINK_IFELSE`
- ▶ Use `$(PKG_CONFIG)` or `PKG_CHECK_MODULES` instead of `pkg-config`
- ▶ `include /usr/share/dpkg/buildtools.mk` in `debian/rules`
- ▶ Disable `gtk-doc` in arch-only builds

How to fix cross building?

Generic advice

- ▶ Apply FTCBFS patches from the BTS
- ▶ Use `codesearch.debian.net` to examine similar packages
- ▶ Request help
 - ▶ `debian-cross@lists.debian.org`
 - ▶ `#debian-bootstrap` on `irc.oftc.net`

Discussion

Your questions