Software construction tools for KDE

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Outline

Introduction

- About the author
  - Software Engineer, School of the Mines of Nantes, graduated in 2004
  - Main area of interest:
    - KDissert, a mind-mapping tool for document creation
    - BKsys, a replacement for the KDE build system
- Acknowledgements
  - The Kdissert users
  - The BKsys early adopters (Rosegarden, kio-locate, ..)
  - The Akademy team

Introduction KDE application writing

- Tools required
  - make -f Makefile.cvs; configure; make; make install
  - Autoconf, Aclocal, Autoheader, Automake, Libtool, GNU/Make

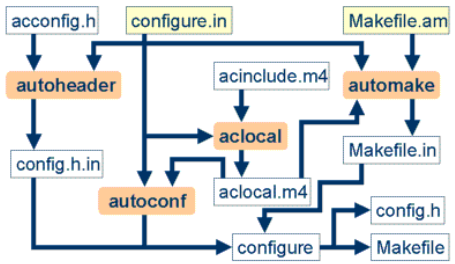

Figure: Organization of the tools

- Installation: copy files at specific locations and change permissions

Rules are joined in cascade

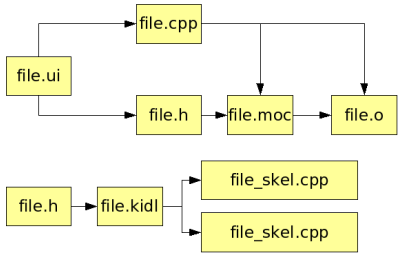

Figure: Source code compilation

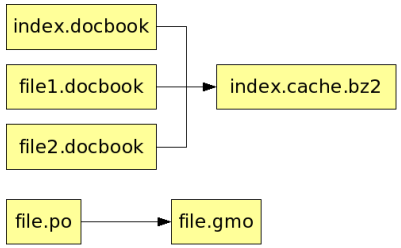

Figure: Documentation compilation

Shortcomings of the current build system

- Technical features
  - Size of the scripts, tools needed for the compilation and overall speed
  - Addition of new compilation rules is uneasy
- User-friendliness
  - Reliability of the builds
  - Hard to make mistakes, easy to spot them

Main families

- Make based: GNU/Make, NMake - unreliable, complicated and unportable
  - reliability and usability
  - portability and maintainability
- Makefile generators: QMake, Autotools, CMake - use macros as a language
  - still questionable reliability
  - more commands are required for compiling
  - errors are harder to debug
- Script-based: Unsermake, SCons, Cons - slow and memory-consuming
  - Powerful languages (python, perl) are used
  - No separation between data and logic
  - Less adapted for incremental builds (but better at distributed ones)

KDE4 expected changes

- Changes are difficult to enforce
  - The codebase prevents a quick transition
  - The developers are not willing to change their tools
- State of the main candidates
  - Unsermake is meant to provide a smooth transition to developers hence the preferred solution for KDE4
  - QMake does not have the necessary features but CMake was proved to work and scale
  - BKsys provides a complete replacement for the KDE3 build system

A full-featured replacement for building KDE applications

- Target audience
  - New projects
  - Casual programmers
- SCons-based
  - Scons can be included: 57kb
  - The admin/ directory weights only about 150kb
- Build KDE and other kinds of programs: Wxwidgets, Qt4, ..
- Main features: small, fast, reliable, and separation of the build dir

Organization of the framework

- Tell the tool what to build
  - Build things from sources
  - Install files in locations
  - Give explicit dependencies
- Give rules for building
  - Tells the tool how to produce the files
  - Scan files for implicit dependencies
- Detect the system configuration
  - Find headers, libraries and configuration checks
  - Make components reusable among projects

Project setup

- Declaring targets
  - The scripting interface
    - Really complicated builds are possible
    - Brute-force parsing is made difficult
  - Pmanager, the GUI for BKsys
    - Easy to parse and to create check tools
    - Gui is provided for user-friendliness, Kdevelop integration is easy
- Adding new rules and configurations
  - Modules are python files
  - Add configuration checks

Further improvements

- Overcome the autotools incompatibilities to facilitate the migration
  - The command-line handling is slightly different
  - Wrappers are provided
- More detection modules are needed
  - Creation of a library of modules
  - More configuration helpers
- Finish the GUI
  - Add and remove targets and sources
  - Use of drag and drop

Conclusion

- BKsys targets a particular kind of application development
- It needs a stronger userbase to evolve faster

Questions ?

References

- Build systems reviews
  - Article on build systems:
    `http://freshmeat.net/articles/view/1715/`
  - Another review:
    `http://www.a-a-p.org/tools_build.html`
- Software construction tools
  - CMake page `http://www.cmake.org/`
  - SCons, the foundation of BKsys
    `http://www.scons.org/`
  - BKsys page
    `http://freehackers.org/~tnagy/bksys.html`

References (2)

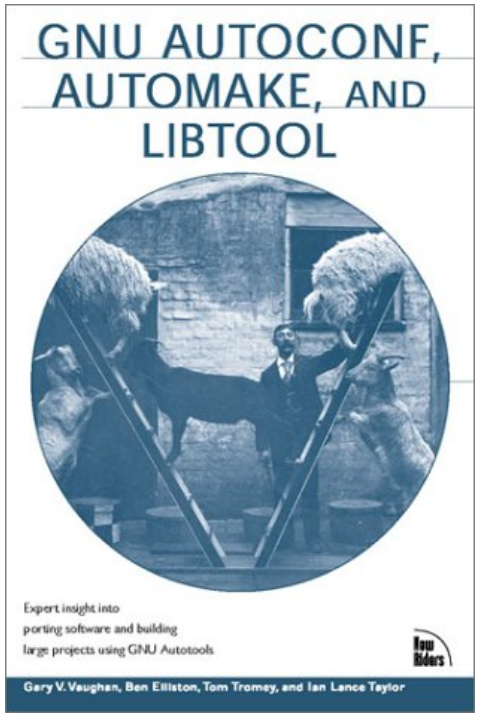

Figure: A book on Autotools