Autotools

GNU SW suite for portable builds

What is it all about

The portability problem

- HW differences
- OS differences
- Compiler (version) differences
- Run-time library differences
- 3rd party library (version) differences

How to make it easy to let your SW portable to different environments?

SORRY  **this IS NOT easy!!**

Autotools do help though ...

What does the user see

$ wget http://ftp.gnu.org/gnu/m4/m4-1.4.18.tar.gz
$ tar xvzf m4-1.4.18.tar.gz
$ cd m4-1.4.18
$ ls
$ ./configure --help
$ ./configure --prefix=$HOME/usr
$ make -j4 # V=1
$ make check
$ make install
$ ls $HOME/usr
$ export PATH=${HOME}/usr:${PATH}
$ which m4

What did “configure” do for us

- Check for availability of tools and compilers
  - gcc, gawk, make …
- Check that the tools have the features needed
  - “checking whether make supports nested variables... yes”
- Checking for headers and libraries
- Checking whether headers and libraries contain required/useful functions
  - “checking for pipe2... no”
  - configure actually
    - Created a test program
    - Compiled
    - Ran
    - Checked results
- Last but not least : provided instructions about configuration options

The autotools suite

- Autoconf https://www.gnu.org/software/autoconf/
- Automake https://www.gnu.org/software/automake/
- Libtool https://www.gnu.org/software/libtool/
- Pkg-config https://www.freedesktop.org/wiki/Software/pkg-config/

How to add a configure script to your program

1. Using autoconf
   1.1. Prepare sources and the Makefile.in
   1.2. Run `autoscan`
   1.3. Rename configure.scan to configure.ac
   1.4. Run `autoconf`
   1.5. ./configure
   1.6. Make
   https://bugs.debian.org/cgi-bin/bugreport.cgi?bug=140837
2. Using config.h
   2.1. Run autoheader
3. Using autoconf + automake
   3.1. Create “Makefile.am” by hand
   3.2. Run `automake`

Libtool

“GNU libtool is a generic library support script. Libtool hides the complexity of using shared libraries behind a consistent, portable interface.”

1) create code for library
2) add libtool to configure.ac
3) autoreconf --install
4) set up library sources in Makefile.am

Online resources

- Autoconf https://www.gnu.org/software/autoconf/
- Automake https://www.gnu.org/software/automake/
- Libtool https://www.gnu.org/software/libtool/
- Pkg-config https://www.freedesktop.org/wiki/Software/pkg-config/
- Autotools Mythbuster https://autotools.io/index.html

Alternatives to autotools

- CMake https://cmake.org/
- GYP https://gyp.gsrc.io/
- Qmake http://doc.qt.io/qt-5/qmake-manual.html
- Meson http://mesonbuild.com/