Autotools
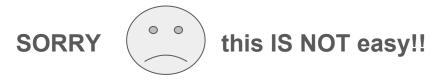
GNU SW suite for portable builds

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`

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/