Autotools

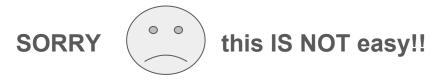
GNU SW suite for portable builds

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?



Autotools do help though ...

What does the user see

```
$ wget <a href="http://ftp.qnu.org/qnu/m4/m4-1.4.18.tar.qz">http://ftp.qnu.org/qnu/m4/m4-1.4.18.tar.qz</a>
$ tar xvzf m4-1.4.18.tar.gz
$ cd m4-1.4.18
$ Is
$ ./configure --help
$ ./configure --prefix=$HOME/usr
$ make -j4 # V=1
$ make check
$ make install
$ Is $HOME/usr
$ export PATH=${HOME}/usr:${PATH}
$ which m4
```

What did "configure" do for us

- Check for availability of tools and compilers
 - o gcc, gawk, make ...
- Check that the tools have the features needed
 - o "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/