

Umeå University
Department of Applied Physics and Electronics

Linux as Development Environment 7.5 ECTS
5EL142 HT-16

Assignment 13 - Debian Package Handling

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1 Introduction

This lab was about creating Debian packages from the application written for lab 6 and lab 11 respectively.

Litterature study on various web resources showed that there are basically two different approaches: Starting with a tar.gz source archieve of the so called 'upstream software' to be packaged for debian, or create directly a binary package. The former will ultimately also result in a binary package. It's the more generic way where the source is first compiled for the respective platform. As the lab instructions and forum entries suggested that both is viable, it was decided to produce directly binary packages.

2 Method

2.1 Basics

First a suitable binary has to be obtained or created. For normal programs, the requirements are not very specific. Here it was however attempted to also build a proper shared library package. For this, the binary had to be rebuild according to the specifications (e.g. using -soname flag)[2].

Then, the directory tree has to be set up and the binary file(s) copied into it. Further, the required configuration files have to be created and copied into the directory tree.

Then the package can be build.

Finally, the result should be checked using the debian package linter 'lintian'. Usually, the file modes have to be adjusted. It was found that the last two steps, 'building' and 'linting' were iterated until a satisfactory result was obtained.

2.2 Tools

For producing a binary deb package, almost no tools besides a text editor were needed:

1. gcc build system to first produce the binaries
2. dpkg-deb --build: to create the actual package
3. fakeroot: used with dpkg-deb, to create the package as root user
4. lintian: linter tool to check quality of the deb package

For building source packages, a number of other tools that help to set up the initial directory tree and template files would be available.

3 Detailed Description

3.1 libelectro1

First the the libraries where rebuild using the -soname flag [3].

```
gcc -fPIC -c -Wall libresistance.c
gcc -fPIC -c -Wall libpower.c
gcc -fPIC -c -Wall libcomponent.c
gcc -shared -Wl,-soname,libelectro.so.1 \
    -o libelectro.so.1.0.1 libresistance.o libpower.o libcomponent.o -lc
```

2(4)

This resulted in a shared library: `libelectro.so-1.0.1`. A symbolic link `libelectro.so.1` was also created:

```
ln -s libelectro.so-1.0.1 libelectro.so.1
```

Then a new directory tree was build:

```
mkdir -p ./debian/usr/lib
mkdir -p ./debian/DEBIAN
```

The library and the symbolic link where copied into `./debian/usr/lib`. Then in `./debian/DEBIAN` three new files where created: `control`, `triggers` and `shlibs`.

The control file was edited as follows [1]:

```
Package: libelectrol
Version: 1.0-1
Section: libs
Priority: optional
Architecture: amd64
Depends: libc6 (>= 2.2.1)
Maintainer: L. Gerber <lorenz.gerber@provement.se>
Description: library with functions to calculate
             e12 replacement resistance values.
```

The triggers file contains only one line to trigger `ldconfig` [2]:

```
activate-noawait ldconfig
```

The `shlibs` file contains the following line [2, 8.6.4.2.]:

```
libelectro 1 libelectrol
```

Then the binary package is created:

```
fakeroot dpkg-deb --build libelectro-1.0/
mv libelectro-1.0.deb libelectro.so-1.0-1_amd64.deb
```

And finally the quality of the produced package is checked using:

```
lintian libelectro.so-1.0-1_amd64.deb
```

This resulted in the follwing output:

```
E: libelectrol: unstripped-binary-or-object usr/lib/libelectro.so.1.0.1
E: libelectrol: debian-changelog-file-missing
E: libelectrol: no-copyright-file
```

The following copyright file was added in `libelectro-1.0/usr/share/doc/libelectrol/`:

```
Format: https://www.debian.org/doc/packaging-manuals/copyright-format/1.0/
Upstream-Name: electrotest
Source: https://github.com/lorenzgerber/electrotest
```

```
Files: *
```

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.
On Debian systems, the full text of the GNU General Public License version 2 can be found in the file
'/usr/share/common-licenses/GPL-2'.

The changelog file had to be gzipped with the parameters `-n -9`. Lintian is very peculiar about the format of the changelog file. The 'ITM close bug' issue still shown in 'lintian' can not be mended as it is a mechanism used when a package is developed to be included in the debian distribution: Lintian recognizes that the changelog only contains one entry, hence it assumes a new package. New packages have to be announced by filing a bug-report in the ITM system. Then the bug number has to be mentioned in the first entry to automatically close it. The following is the example text for the changelog file to be situated in `usr/share/doc/electrolib1/`:

```
libelectrol (1.0-1) UNRELEASED; urgency=low
```

```
* Initial release.
```

```
Not intended to be included in Debian, hence closes no initial bug.
```

```
-- Lorenz Gerber <lorenz.gerber@provement.se>  Fri, 18 Aug 2017 8:08:00 +0000
```

Now 'lintian' indicates that the package is clean. It can now be installed using:

```
sudo dpkg -i libelectro.so-1.0-1_amd64.deb
```

and uninstalled using:

```
sudo dpkg -r libelectrol
```

References

- [1] Debian Policy Manual, control files and their fields. <https://www.debian.org/doc/debian-policy/ch-controlfields.html>, 2017. accessed: 2017-08-17.

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- [2] Debian Policy Manual, shared libraries. <https://www.debian.org/doc/debian-policy/ch-sharedlibs.html>, 2017. accessed: 2017-08-17.
- [3] The Linux Documentation Project, shared libraries. <https://tldp.org/HOWTO/Program-Library-HOWTO/shared-libraries.html>, 2017. accessed: 2017-08-17.