

TechNote

Tech Blog

Ubuntu 16.04, Kernel Compile on default setting

By technote | December 20, 2016

2 Comments

Ubuntu 16.04 was released on April 26th.

In fact, the version of Ubuntu in Linux kernel compile does not really matter, but in Ubuntu 16.04, I have a Linux kernel compile that I have written.

Linux Kernel Compile on Ubuntu 16.04



April 2016		
24	April 7th	KernelFreeze, NonLanguagePackTranslationDeadline
25	April 14th	FinalFreeze, ReleaseCandidate, LanguagePackTranslationDeadline
26	April 21st	FinalRelease Ubuntu 16.04
27	April 28th	

If you want to conclude, you can only refer to the last part.

Linux kernel compile on Ubuntu 16.04

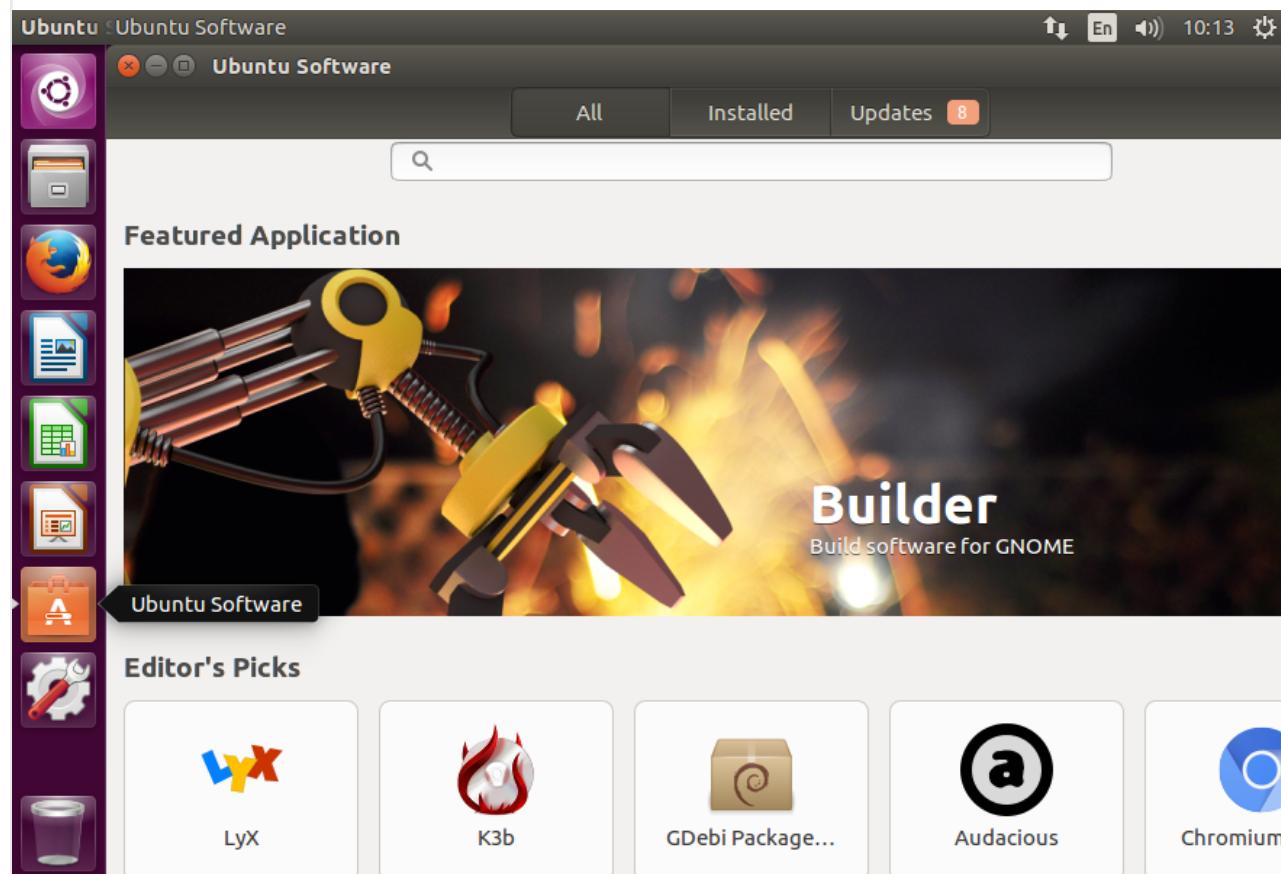
For reference, Ubuntu 16.04 used in build was just after downloading and installing iso from Ubuntu.com, and there was no package installed differently.

I will compile the kernel with the same configuration as the Ubuntu 16.04 I am currently using, and then modify only what I want. So, first of all, it is the purpose of this article to apply and build the configuration of the currently running Kernel.

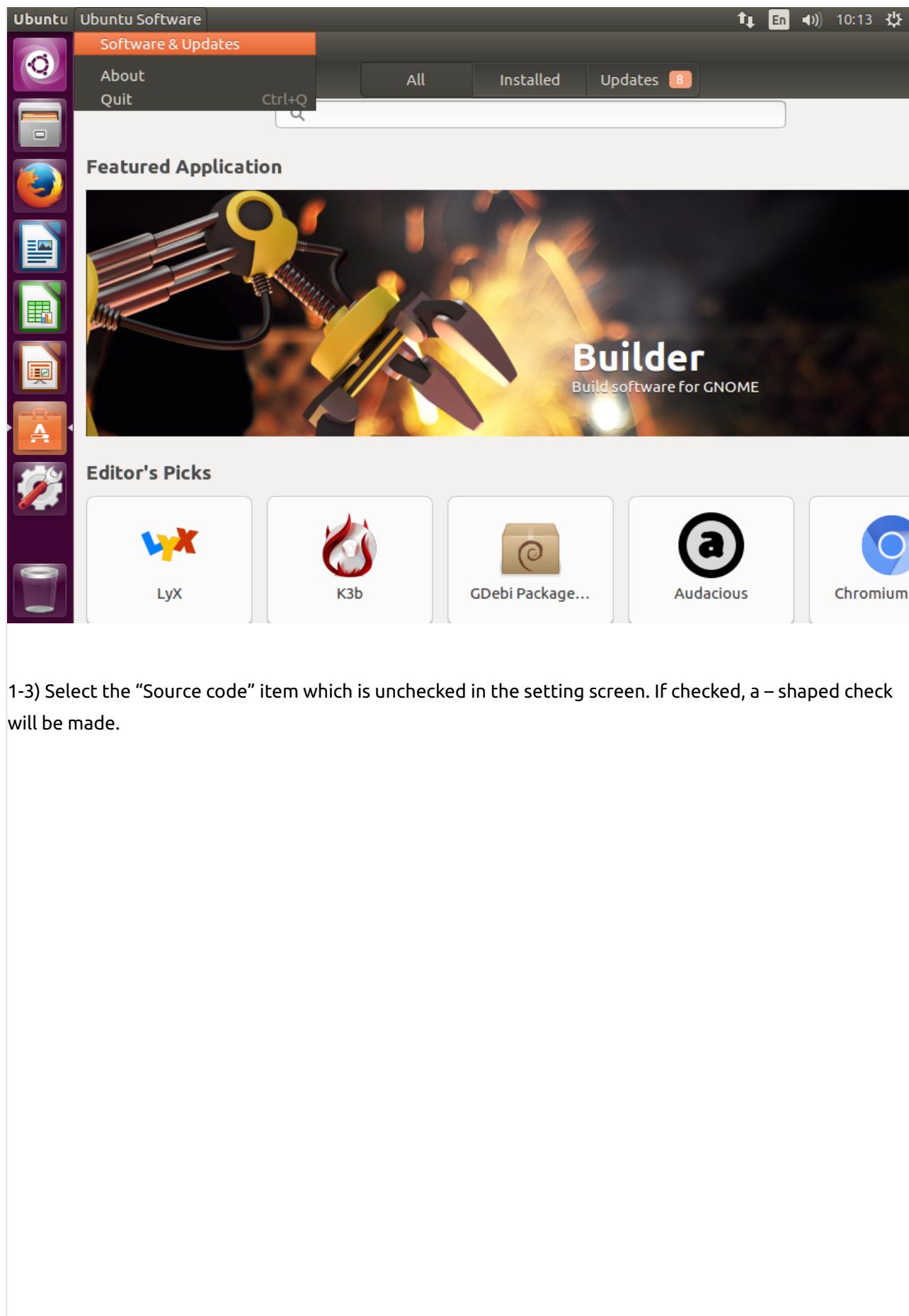
1. Change Package List setting to secure kernel source of Ubuntu 16.04

The kernel source code is also available from kernel.org, but due to some changes for Ubuntu 16.04, the so-called vanilla kernel code will not be downloaded and will be downloaded from the package server. By default, the package server settings are not downloaded and you need to change the configuration so that you can receive the source code.

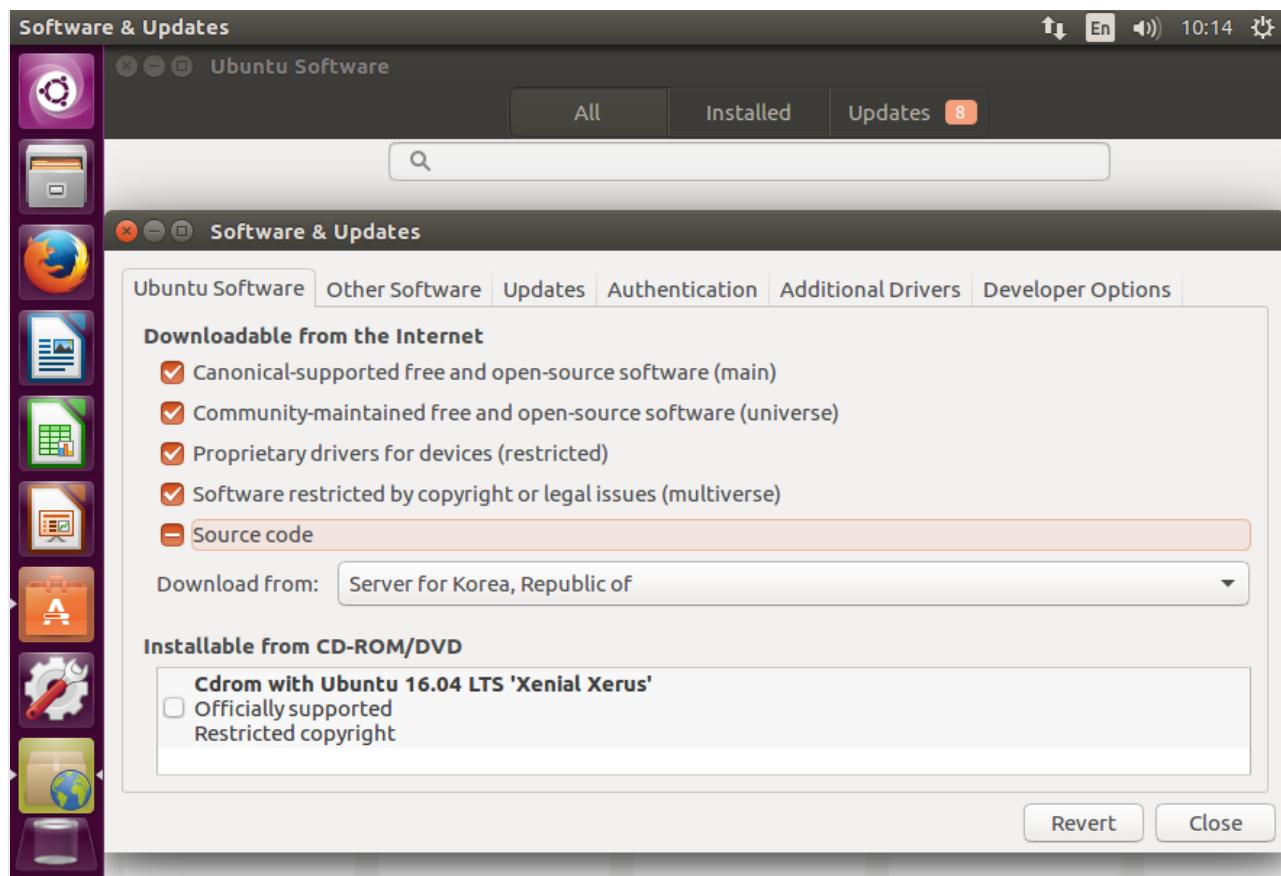
1-1) Run Ubuntu Software from the left ICON menu.



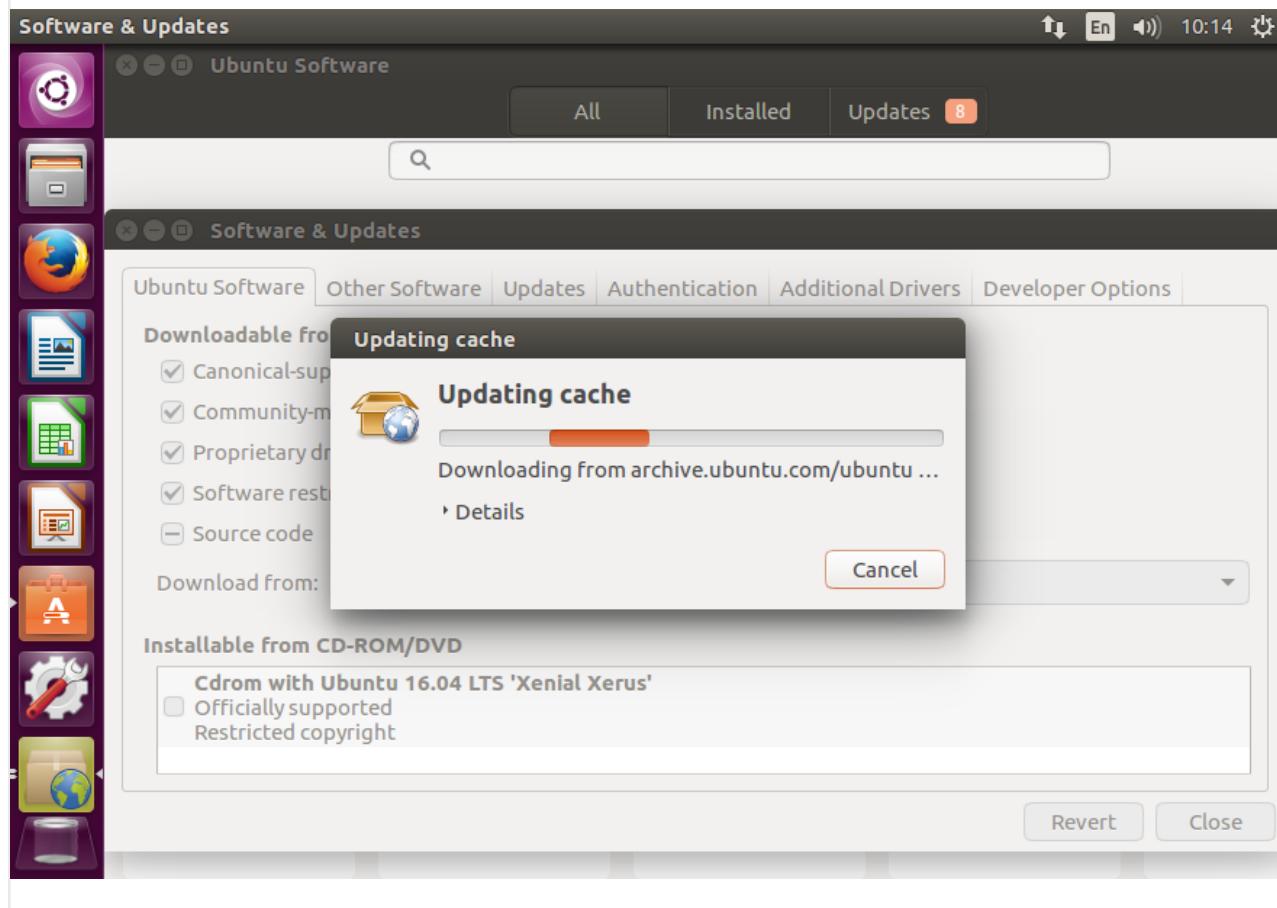
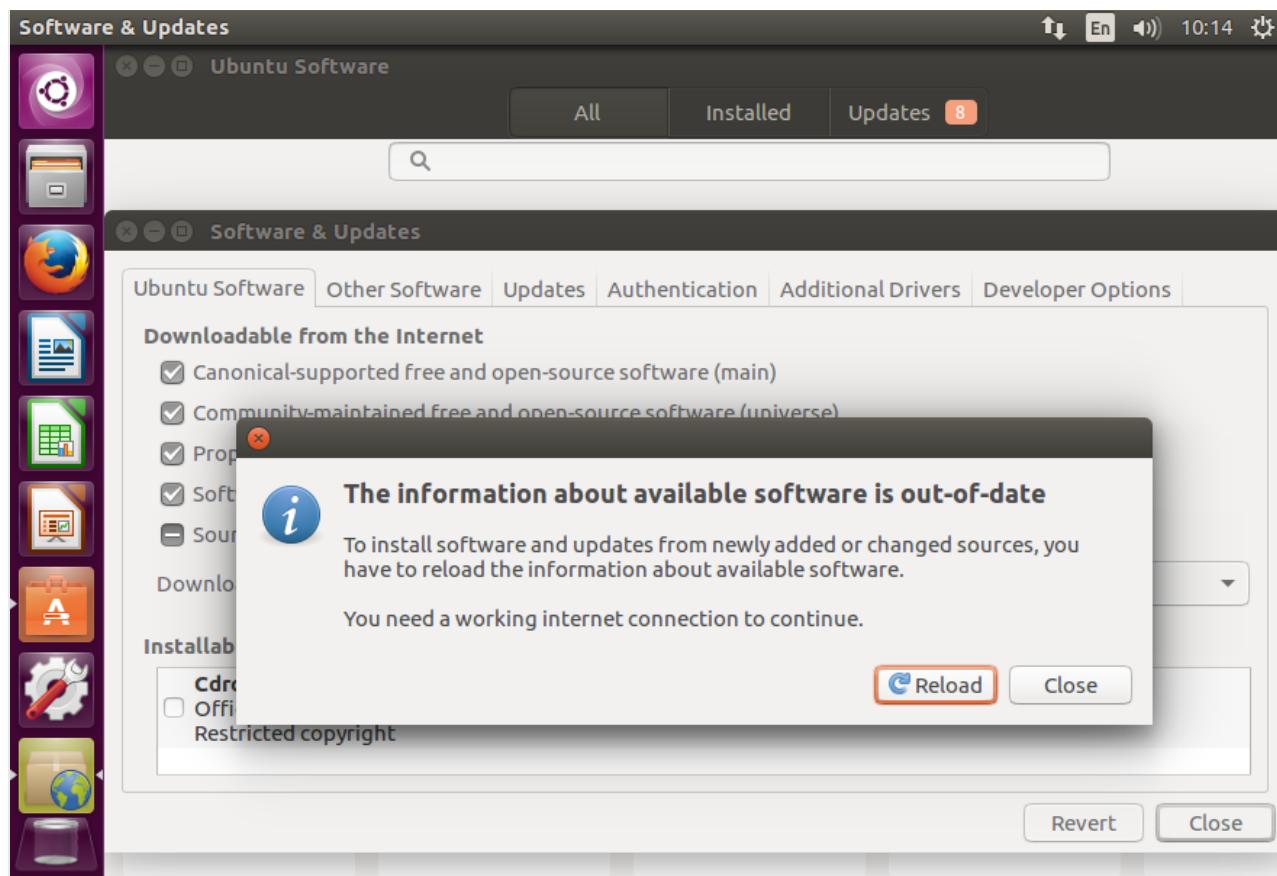
1-2) After execution, select Software & Updates from the top menu to display the setting screen.



1-3) Select the “Source code” item which is unchecked in the setting screen. If checked, a – shaped check will be made.



1-4) If you select it, the package list will be changed, so you will get a popup prompting you to update it.

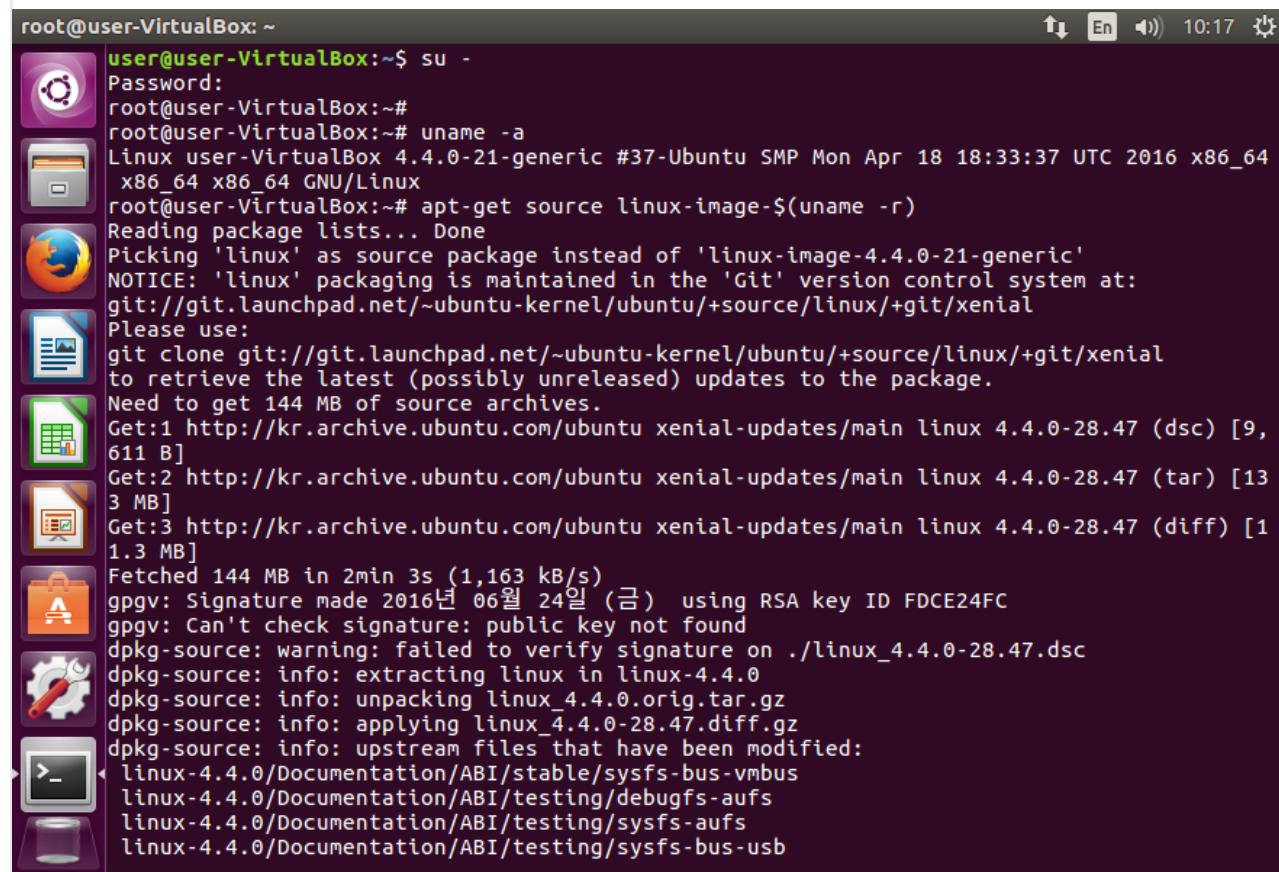


2. Ubuntu 16.04 Linux Kernel Source Code Download

If you update the Package Server List as above, the Kernel Source Code will now also be available for download via the apt-get command.

```
# apt-get source linux-image-$ (uname -r)
```

If you execute the above command, you will see ` uname -r` as the current version, and download the version of Kernel Source Code directly below the directory where you executed the command.

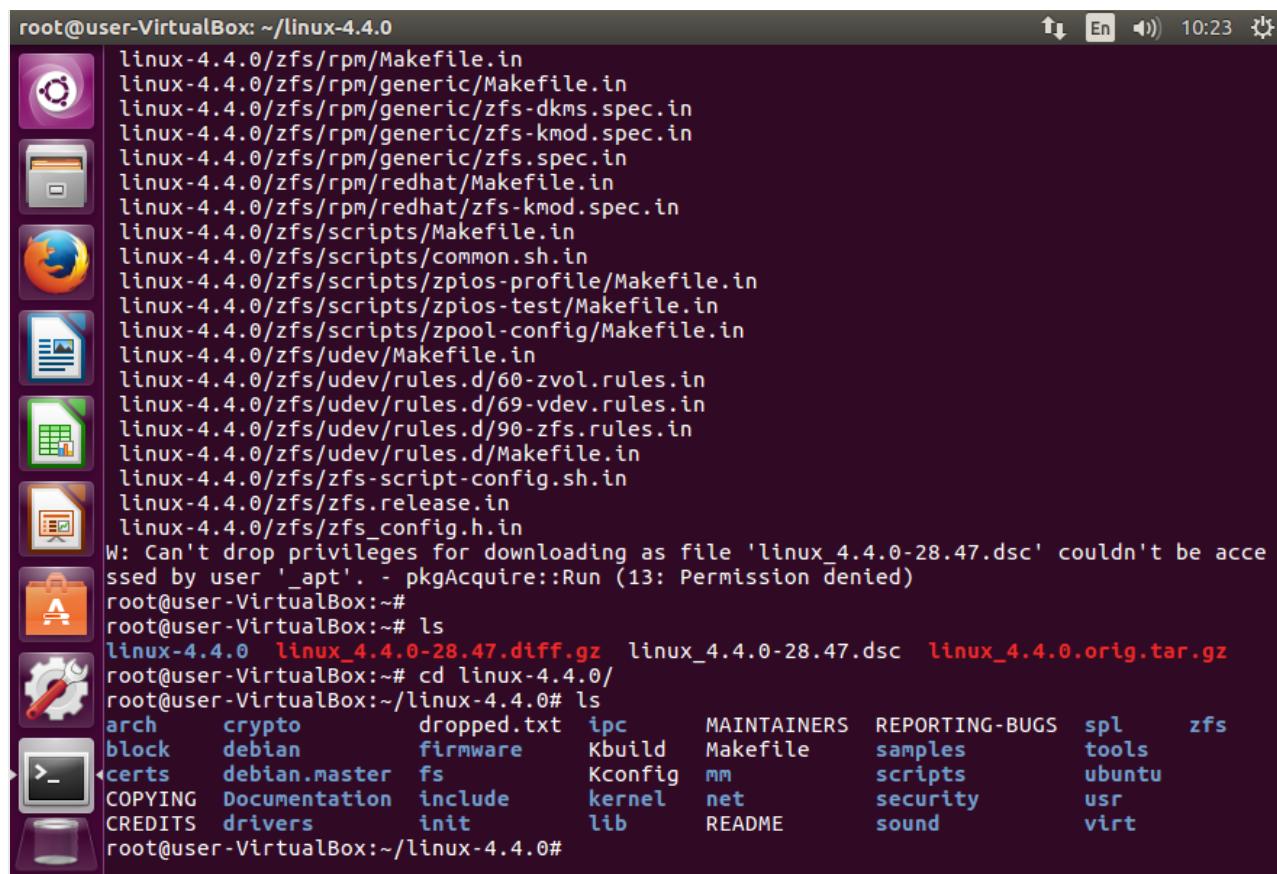


```
root@user-VirtualBox: ~
user@user-VirtualBox:~$ su -
Password:
root@user-VirtualBox:~# uname -a
Linux user-VirtualBox 4.4.0-21-generic #37-Ubuntu SMP Mon Apr 18 18:33:37 UTC 2016 x86_64
x86_64 x86_64 GNU/Linux
root@user-VirtualBox:~# apt-get source linux-image-$ (uname -r)
Reading package lists... Done
Picking 'linux' as source package instead of 'linux-image-4.4.0-21-generic'
NOTICE: 'linux' packaging is maintained in the 'Git' version control system at:
git://git.launchpad.net/~ubuntu-kernel/ubuntu/+source/linux/+git/xenial
Please use:
git clone git://git.launchpad.net/~ubuntu-kernel/ubuntu/+source/linux/+git/xenial
to retrieve the latest (possibly unreleased) updates to the package.
Need to get 144 MB of source archives.
Get:1 http://kr.archive.ubuntu.com/ubuntu xenial-updates/main linux 4.4.0-28.47 (dsc) [9,
611 B]
Get:2 http://kr.archive.ubuntu.com/ubuntu xenial-updates/main linux 4.4.0-28.47 (tar) [13
3 MB]
Get:3 http://kr.archive.ubuntu.com/ubuntu xenial-updates/main linux 4.4.0-28.47 (diff) [1
1.3 MB]
Fetched 144 MB in 2min 3s (1,163 kB/s)
gpgv: Signature made 2016년 06월 24일 (금) using RSA key ID FDCE24FC
gpgv: Can't check signature: public key not found
dpkg-source: warning: failed to verify signature on ./linux_4.4.0-28.47.dsc
dpkg-source: info: extracting linux in linux-4.4.0
dpkg-source: info: unpacking linux_4.4.0.orig.tar.gz
dpkg-source: info: applying linux_4.4.0-28.47.diff.gz
dpkg-source: info: upstream files that have been modified:
  linux-4.4.0/Documentation/ABI/stable/sysfs-bus-vmbus
  linux-4.4.0/Documentation/ABI/testing/debugfs-aufs
  linux-4.4.0/Documentation/ABI/testing/sysfs-aufs
  linux-4.4.0/Documentation/ABI/testing/sysfs-bus-usb
```

```
root@user-VirtualBox: ~
linux-4.4.0/zfs/module/zfs/zpl_ctldir.c
linux-4.4.0/zfs/module/zfs/zpl_export.c
linux-4.4.0/zfs/module/zfs/zpl_file.c
linux-4.4.0/zfs/module/zfs/zpl_inode.c
linux-4.4.0/zfs/module/zfs/zpl_super.c
linux-4.4.0/zfs/module/zfs/zpl_xattr.c
linux-4.4.0/zfs/module/zfs/zrlock.c
linux-4.4.0/zfs/module/zfs/zvol.c
linux-4.4.0/zfs/module/zpios/Makefile.in
linux-4.4.0/zfs/module/zpios/pios.c
linux-4.4.0/zfs/rpm/Makefile.in
linux-4.4.0/zfs/rpm/generic/Makefile.in
linux-4.4.0/zfs/rpm/generic/zfs-dkms.spec.in
linux-4.4.0/zfs/rpm/generic/zfs-kmod.spec.in
linux-4.4.0/zfs/rpm/generic/zfs.spec.in
linux-4.4.0/zfs/rpm/redhat/Makefile.in
linux-4.4.0/zfs/rpm/redhat/zfs-kmod.spec.in
linux-4.4.0/zfs/scripts/Makefile.in
linux-4.4.0/zfs/scripts/common.sh.in
linux-4.4.0/zfs/scripts/zpios-profile/Makefile.in
linux-4.4.0/zfs/scripts/zpios-test/Makefile.in
linux-4.4.0/zfs/scripts/zpool-config/Makefile.in
linux-4.4.0/zfs/udev/Makefile.in
linux-4.4.0/zfs/udev/rules.d/60-zvol.rules.in
linux-4.4.0/zfs/udev/rules.d/69-vdev.rules.in
linux-4.4.0/zfs/udev/rules.d/90-zfs.rules.in
linux-4.4.0/zfs/udev/rules.d/Makefile.in
linux-4.4.0/zfs/zfs-script-config.sh.in
linux-4.4.0/zfs/zfs.release.in
linux-4.4.0/zfs/zfs_config.h.in
W: Can't drop privileges for downloading as file 'linux_4.4.0-28.47.dsc' couldn't be accessed by user '_apt'. - pkgAcquire::Run (13: Permission denied)
root@user-VirtualBox:~#
```

Integrity (?) Checking routines may show errors, but in practice there is no problem at build time and it does not seem to have a big meaning.

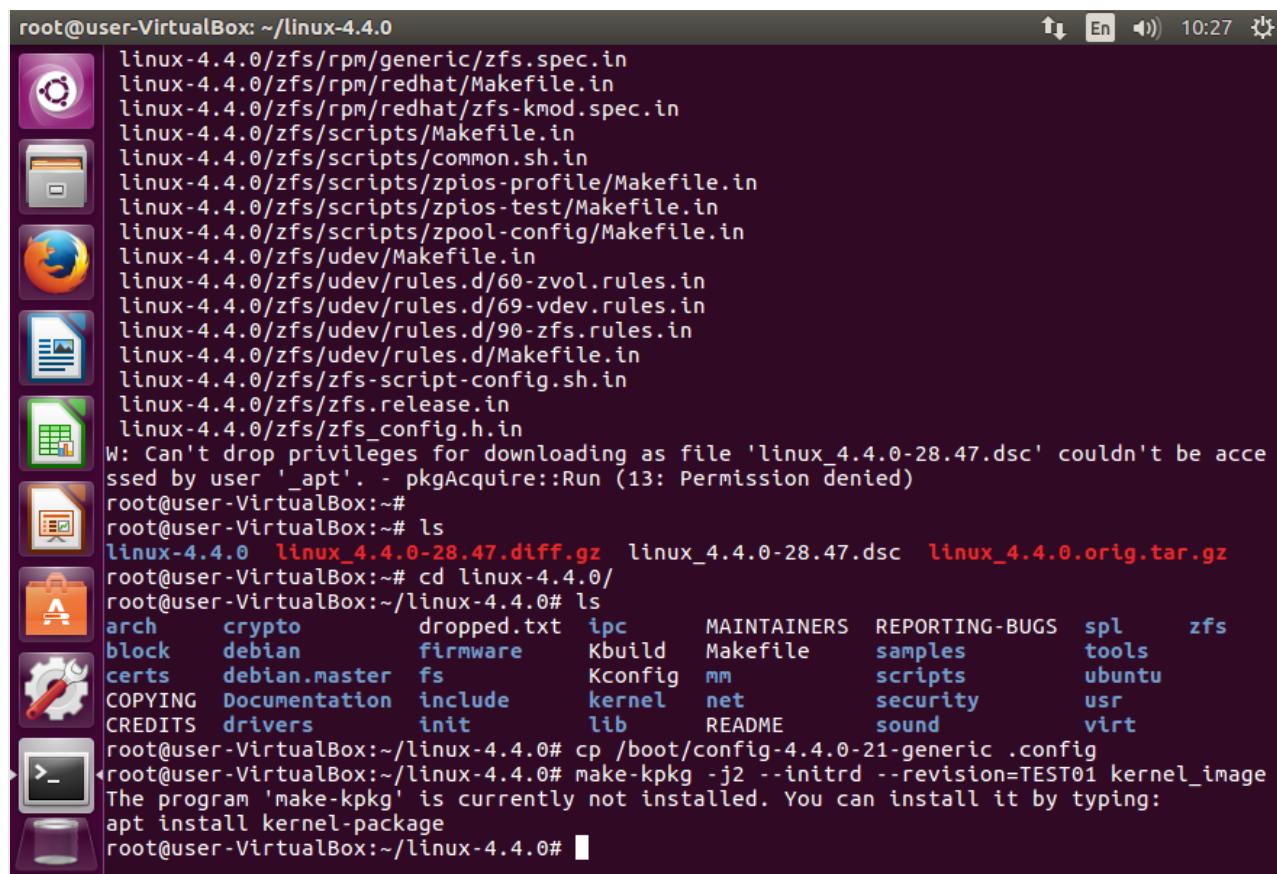
You can see that the directory linux-4.4.0 is created under the current directory as shown below.



```
root@user-VirtualBox: ~/linux-4.4.0
linux-4.4.0/zfs/rpm/Makefile.in
linux-4.4.0/zfs/rpm/generic/Makefile.in
linux-4.4.0/zfs/rpm/generic/zfs-dkms.spec.in
linux-4.4.0/zfs/rpm/generic/zfs-kmod.spec.in
linux-4.4.0/zfs/rpm/generic/zfs.spec.in
linux-4.4.0/zfs/rpm/redhat/Makefile.in
linux-4.4.0/zfs/rpm/redhat/zfs-kmod.spec.in
linux-4.4.0/zfs/scripts/Makefile.in
linux-4.4.0/zfs/scripts/common.sh.in
linux-4.4.0/zfs/scripts/zpios-profile/Makefile.in
linux-4.4.0/zfs/scripts/zpios-test/Makefile.in
linux-4.4.0/zfs/scripts/zpool-config/Makefile.in
linux-4.4.0/zfs/udev/Makefile.in
linux-4.4.0/zfs/udev/rules.d/60-zvol.rules.in
linux-4.4.0/zfs/udev/rules.d/69-vdev.rules.in
linux-4.4.0/zfs/udev/rules.d/90-zfs.rules.in
linux-4.4.0/zfs/udev/rules.d/Makefile.in
linux-4.4.0/zfs/zfs-script-config.sh.in
linux-4.4.0/zfs/zfs.release.in
linux-4.4.0/zfs/zfs_config.h.in
W: Can't drop privileges for downloading as file 'linux_4.4.0-28.47.dsc' couldn't be accessed by user '_apt'. - pkgAcquire::Run (13: Permission denied)
root@user-VirtualBox:~#
root@user-VirtualBox:~# ls
linux-4.4.0 linux_4.4.0-28.47.diff.gz linux_4.4.0-28.47.dsc linux_4.4.0.orig.tar.gz
root@user-VirtualBox:~# cd linux-4.4.0/
root@user-VirtualBox:~/linux-4.4.0# ls
arch      crypto      dropped.txt  ipc      MAINTAINERS  REPORTING-BUGS  spl      zfs
block     debian      firmware    Kbuild  Makefile    samples       tools
certs     debian.master  fs        Kconfig  mm          scripts      ubuntu
COPYING   Documentation  include   kernel   net         security      usr
CREDITS   drivers      init      lib      README     sound       virt
root@user-VirtualBox:~/linux-4.4.0#
```

3. Copy and apply the configuration of the currently running kernel and run make-kpkg, which compiles the kernel. The copy was successful, but make-kpkg does not work because it is not installed.

~/linux-4.4.0 # cp /boot/config-4.4.0-21-generic .config



root@user-VirtualBox: ~/linux-4.4.0

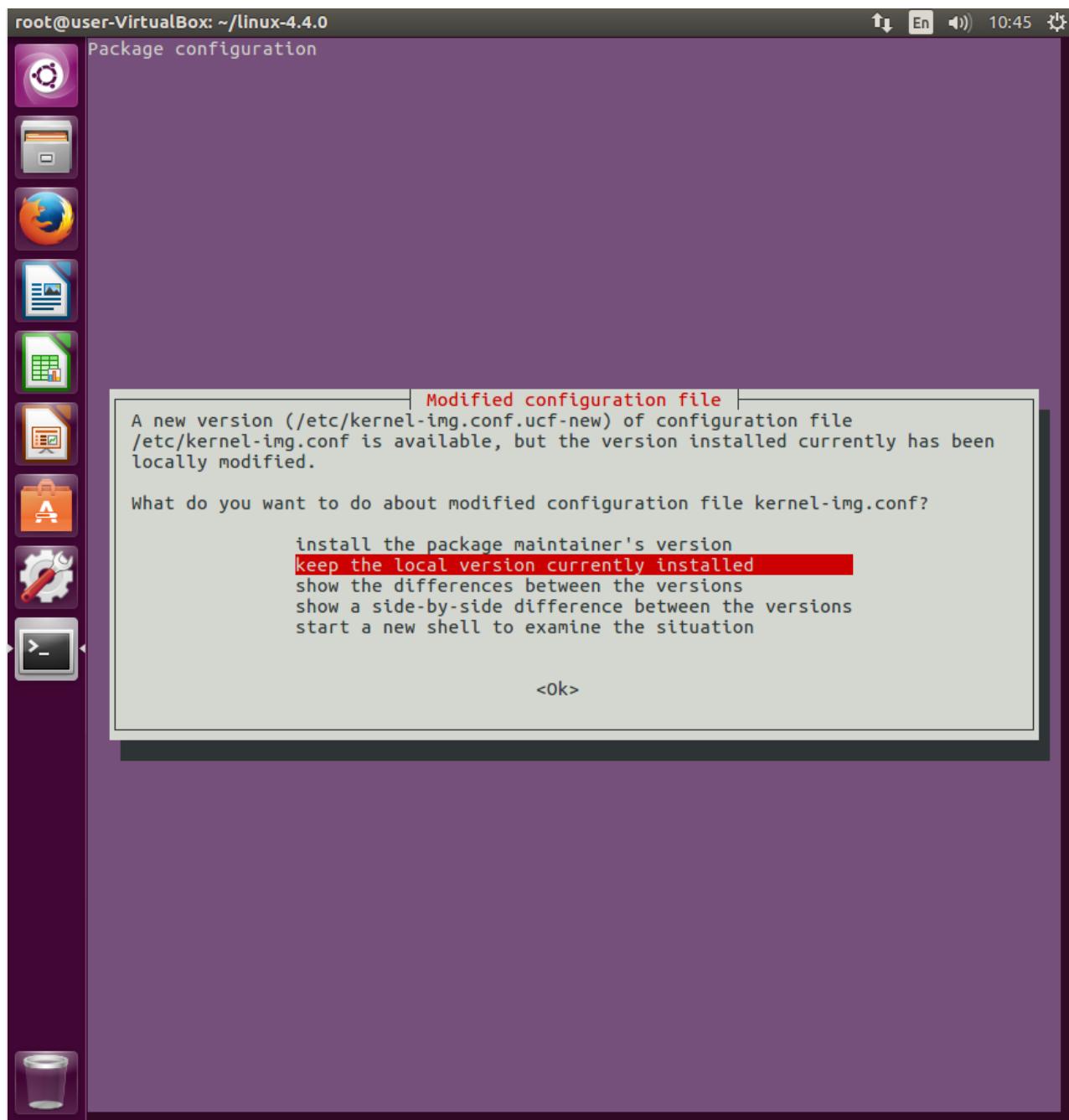
```
linux-4.4.0/zfs/rpm/generic/zfs.spec.in
linux-4.4.0/zfs/rpm/redhat/Makefile.in
linux-4.4.0/zfs/rpm/redhat/zfs-kmod.spec.in
linux-4.4.0/zfs/scripts/Makefile.in
linux-4.4.0/zfs/scripts/common.sh.in
linux-4.4.0/zfs/scripts/zpios-profile/Makefile.in
linux-4.4.0/zfs/scripts/zpios-test/Makefile.in
linux-4.4.0/zfs/scripts/zpool-config/Makefile.in
linux-4.4.0/zfs/udev/Makefile.in
linux-4.4.0/zfs/udev/rules.d/60-zvol.rules.in
linux-4.4.0/zfs/udev/rules.d/69-vdev.rules.in
linux-4.4.0/zfs/udev/rules.d/90-zfs.rules.in
linux-4.4.0/zfs/udev/rules.d/Makefile.in
linux-4.4.0/zfs/zfs-script-config.sh.in
linux-4.4.0/zfs/zfs.release.in
linux-4.4.0/zfs/zfs_config.h.in
W: Can't drop privileges for downloading as file 'linux_4.4.0-28.47.dsc' couldn't be accessed by user '_apt'. - pkgAcquire::Run (13: Permission denied)
root@user-VirtualBox:~#
root@user-VirtualBox:~# ls
linux-4.4.0 linux_4.4.0-28.47.diff.gz linux_4.4.0-28.47.dsc linux_4.4.0.orig.tar.gz
root@user-VirtualBox:~# cd linux-4.4.0/
root@user-VirtualBox:~/linux-4.4.0# ls
arch crypto dropped.txt ipc MAINTAINERS REPORTING-BUGS spl zfs
block debian firmware Kbuild Makefile samples tools
certs debian.master fs Kconfig mm scripts ubuntu
COPYING Documentation include kernel net security usr
CREDITS drivers init lib README sound virt
root@user-VirtualBox:~/linux-4.4.0# cp /boot/config-4.4.0-21-generic .config
root@user-VirtualBox:~/linux-4.4.0# make-kpkg -j2 --initrd --revision=TEST01 kernel_image
The program 'make-kpkg' is currently not installed. You can install it by typing:
apt install kernel-package
root@user-VirtualBox:~/linux-4.4.0#
```

4. Use apt-get to install the kernel-package that contains the make-kpkg command. Since there is no make-kpkg, the statement to install kernel-package is impressive.

apt-get install kernel-package

```
root@user-VirtualBox: ~/linux-4.4.0
root@user-VirtualBox:~/linux-4.4.0# apt-get install kernel-package
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  dblatex docbook-dsssl docbook-utils docbook-xml docbook-xsl fonts-lato fonts-lmodern
  fonts-texgyre jadetex javascript-common kernel-common libfile-homedir-perl
  libfile-which-perl libjs-jquery libmail-sendmail-perl libosp5 libostyle1c2
  libpotrace0 libptexenc1 libruby2.3 libsgmls-perl libsp1c2 libsynctex1
  libsys-hostname-long-perl libtexlua52 libtexluajit2 libxml2-utils libzzip-0-13
  lmodern lynx lynx-common openjade po-debconf preview-latex-style prosper ps2eps
  python-apt rake ruby ruby-did-you-mean ruby-minitest ruby-net-telnet
  ruby-power-assert ruby-test-unit ruby2.3 rubygems-integration sgml-data sgmlspl sp
  tex-common tex-gyre texlive texlive-base texlive-bibtex extra texlive-binaries
  texlive-extra-utils texlive-font-utils texlive-fonts-recommended
  texlive-fonts-recommended-doc texlive-generic-recommended texlive-latex-base
  texlive-latex-base-doc texlive-latex-extra texlive-latex-extra-doc
  texlive-latex-recommended texlive-latex-recommended-doc texlive-luatex
  texlive-math-extra texlive-pictures texlive-pictures-doc texlive-pstricks
  texlive-pstricks-doc tipa xmlto xsltproc
Suggested packages:
  docbook inkscape latex-cjk-all opensp texlive-lang-all texlive-lang-cyrillic
  texlive-xetex transfig xindy docbook-dsssl-doc docbook-defguide dbtoepub
  docbook-xsl-doc-html | docbook-xsl-doc-pdf | docbook-xsl-doc-text | docbook-xsl-doc
  docbook-xsl-saxon fop libsxaxon-java libxalan2-java libxslthl-java xalan apache2
  | lighttpd | httpd linux-source libncurses-dev sgmls-doc libmail-box-perl
  python-apt-dbg python-apt-doc ri ruby-dev bundler perlsgml w3-recs debhelper perl-tk
  dvipng dvidv fragmaster purifyeps lacheck chktex latexmk latexdiff psutils
  python-pygments libspreadsheets-parseexcel-perl libtcltk-ruby dot2tex prerex w3m
  | lynx-cur | links xmltex
Recommended packages:
  uboot-mkimage
The following NEW packages will be installed:
  dblatex docbook-dsssl docbook-utils docbook-xml docbook-xsl fonts-lato fonts-lmodern
  fonts-texgyre jadetex javascript-common kernel-common kernel-package
  libfile-homedir-perl libfile-which-perl libjs-jquery libmail-sendmail-perl libosp5
  libostyle1c2 libpotrace0 libptexenc1 libruby2.3 libsgmls-perl libsp1c2 libsynctex1
  libsys-hostname-long-perl libtexlua52 libtexluajit2 libxml2-utils libzzip-0-13
  lmodern lynx lynx-common openjade po-debconf preview-latex-style prosper ps2eps
  python-apt rake ruby ruby-did-you-mean ruby-minitest ruby-net-telnet
  ruby-power-assert ruby-test-unit ruby2.3 rubygems-integration sgml-data sgmlspl sp
  tex-common tex-gyre texlive texlive-base texlive-bibtex extra texlive-binaries
  texlive-extra-utils texlive-font-utils texlive-fonts-recommended
  texlive-fonts-recommended-doc texlive-generic-recommended texlive-latex-base
  texlive-latex-base-doc texlive-latex-extra texlive-latex-extra-doc
  texlive-latex-recommended texlive-latex-recommended-doc texlive-luatex
  texlive-math-extra texlive-pictures texlive-pictures-doc texlive-pstricks
  texlive-pstricks-doc tipa xmlto xsltproc
0 upgraded, 76 newly installed, 0 to remove and 264 not upgraded.
Need to get 819 MB of archives.
After this operation, 1,345 MB of additional disk space will be used.
Do you want to continue? [Y/n] ■
```

I tried to install only kernel-package, but I want to install all by pressing "Y" rather than dependencies.



During the installation, the window to select is displayed.

5. After the installation, I ran make-kpkg and it runs normally. The detailed command for make-kpkg used here is as follows.

```
# make-kpkg -j2 -initrd -append-to-version = -test-kernel kernel_image
```

-jN means the number of cpu at compile time, where 2 is cpu and -j2.

--append-to-version = - test-kernel means the name to be appended to the kernel name. After the change,

we added the name `--test-kernel` to check for normal change.

`kernel_image` is the output of the kernel image as a package that can be installed and installed by using the command. If you run it, proceed as follows.

```
root@user-VirtualBox: ~/linux-4.4.0#
alphanumerics and the characters ~ + .
If epochs are used, the colon : is also allowed
The current value is: TEST
Aborting.
root@user-VirtualBox:~/linux-4.4.0# make-kpkg -j2 --initrd --revision=test01 kernel_image
Error: The revision string may only contain
alphanumerics and the characters ~ + .
If epochs are used, the colon : is also allowed
The current value is: test01
Aborting.
root@user-VirtualBox:~/linux-4.4.0# make-kpkg -j2 --initrd --append-to-version=--test-kernel kernel_image
exec make_kpkg_version=13.018 -f /usr/share/kernel-package/ruleset/minimal.mk debian APPE
ND_TO_VERSION=--test-kernel INITRD=YES
===== making target debian/stamp/conf/minimal_debian [new prereqs: ]=====
This is kernel package version 13.018.
test -d debian || mkdir debian
test ! -e stamp-building || rm -f stamp-building
install -p -m 755 /usr/share/kernel-package/rules debian/rules
for file in ChangeLog Control Control.bin86 config templates.in rules; do
    \
        cp -f /usr/share/kernel-package/$file ./debian/;
\
done
cp: cannot stat '/usr/share/kernel-package/ChangeLog': No such file or directory
for dir in Config docs examples ruleset scripts pkg po; do
    \
        cp -af /usr/share/kernel-package/$dir ./debian/;
\
done
test -f debian/control || sed -e 's/=V/4.4.13--test-kernel/g' \
-e 's/=D/4.4.13--test-kernel-10.00.Custom/g' -e 's/=A/amd64/g' \
-e 's/=SA//g' \
-e 's/=I//g' \
-e 's/=CV/4.4/g' \
-e 's/=M/Unknown Kernel Package Maintainer <unknown@unconfigured.in/etc.kernel-pk
g.conf>/g' \
-e 's/=ST/linux/g' -e 's=/B/x86_64/g' \
-e 's=/R/initramfs-tools | linux-initramfs-tool,/g' /usr/share/kernel-
package/Control > debian/control
test -f debian/changelog || sed -e 's/=V/4.4.13--test-kernel/g' \
-e 's/=D/4.4.13--test-kernel-10.00.Custom/g' -e 's/=A/amd64/g' \
-e 's/=ST/linux/g' -e 's=/B/x86_64/g' \
-e 's/=M/Unknown Kernel Package Maintainer <unknown@unconfigured.in/etc.kerne
l-pkg.conf>/g' \
/usr/share/kernel-package/changelog > debian/changelog
chmod 0644 debian/control debian/changelog
test -d ./debian/stamp || mkdir debian/stamp
make -f debian/rules debian/stamp/conf/kernel-conf
make[1]: Entering directory '/root/linux-4.4.0'
```

6. It is necessary to install `libssl-dev` to stop the kernel while it is compiled and generate a fatal error.

[Error]

scripts/sign-file.c: 23: 30: fatal error: openssl / openssl.h: No such file or directory

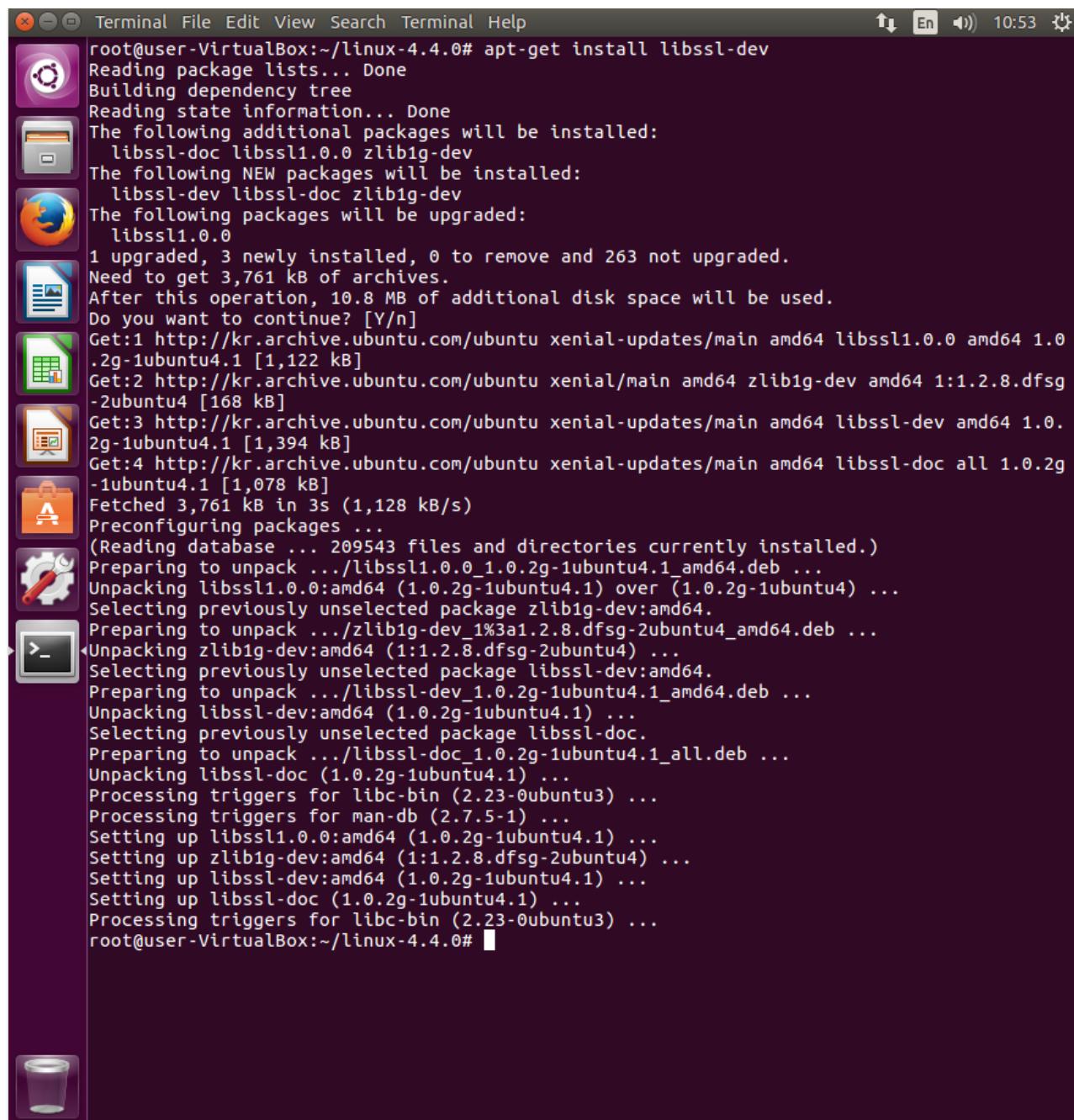
compilation terminated.

scripts/Makefile.host: 91: recipe for target 'scripts / sign-file' failed

[Command]

apt-get install libssl-dev

```
root@user-VirtualBox: ~/linux-4.4.0
test ! -f scripts/package/builddeb.kpkg-dist || mv -f scripts/package/builddeb.kpkg-dist
scripts/package/builddeb
test ! -f scripts/package/Makefile.kpkg-dist || mv -f scripts/package/Makefile.kpkg-dist
scripts/package/Makefile
/usr/bin/make -j2 EXTRAVERSION=--test-kernel ARCH=x86_64 \
              bzImage
make[1]: Entering directory '/root/linux-4.4.0'
scripts/kconfig/conf --silentoldconfig Kconfig
  CHK      include/config/kernel.release
  CHK      include/generated/uapi/linux/version.h
  CHK      include/generated/utsrelease.h
  HOSTCC  scripts/genksyms/genksyms.o
  CHK      include/generated/timeconst.h
  CHK      include/generated/bounds.h
  CHK      include/generated/asm-offsets.h
  CALL    scripts/checksyscalls.sh
  SHIPPED scripts/genksyms/parse.tab.c
  SHIPPED scripts/genksyms/lex.lex.c
  SHIPPED scripts/genksyms/keywords.hash.c
  SHIPPED scripts/genksyms/parse.tab.h
  HOSTCC  scripts/genksyms/parse.tab.o
  HOSTCC  scripts/genksyms/lex.lex.o
  HOSTLD  scripts/genksyms/genksyms
  CC      scripts/mod/empty.o
  HOSTCC  scripts/mod/mk_elfconfig
  CC      scripts/mod/devicetable-offsets.s
  MKELF   scripts/mod/elfconfig.h
  GEN     scripts/mod/devicetable-offsets.h
  HOSTCC  scripts/mod/sumversion.o
  HOSTCC  scripts/mod/modpost.o
  HOSTCC  scripts/mod/file2alias.o
  HOSTLD  scripts/mod/modpost
  HOSTCC  scripts/selinux/genheaders/genheaders
  HOSTCC  scripts/kallsyms
  HOSTCC  scripts/selinux/mdp/mdp
  HOSTCC  scripts/conmakehash
  HOSTCC  scripts/recordmcount
  HOSTCC  scripts/sortextable
  HOSTCC  scripts asn1_compiler
  HOSTCC  scripts/sign-file
scripts/sign-file.c:23:30: fatal error: openssl/opensslv.h: No such file or directory
compilation terminated.
scripts/Makefile.host:91: recipe for target 'scripts/sign-file' failed
make[2]: *** [scripts/sign-file] Error 1
make[2]: *** Waiting for unfinished jobs....
Makefile:555: recipe for target 'scripts' failed
make[1]: *** [scripts] Error 2
make[1]: Leaving directory '/root/linux-4.4.0'
debian/ruleset/targets/common.mk:295: recipe for target 'debian/stamp/build/kernel' failed
make: *** [debian/stamp/build/kernel] Error 2
root@user-VirtualBox:~/linux-4.4.0#
```



A screenshot of a Ubuntu desktop environment. On the left, there's a vertical dock with icons for Dash, Home, Applications, and a terminal. The main window is a terminal window titled 'Terminal' with the command 'root@user-VirtualBox:~/linux-4.4.0# apt-get install libssl-dev'. The terminal output shows the process of installing the libssl-dev package, including file downloads from kr.archive.ubuntu.com, unpacking, selecting previously unselected packages, and processing triggers. The terminal window has a dark background with light-colored text. The status bar at the top right shows 'En 10:53'.

```
root@user-VirtualBox:~/linux-4.4.0# apt-get install libssl-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libssl-doc libssl1.0.0 zlib1g-dev
The following NEW packages will be installed:
  libssl-dev libssl-doc zlib1g-dev
The following packages will be upgraded:
  libssl1.0.0
1 upgraded, 3 newly installed, 0 to remove and 263 not upgraded.
Need to get 3,761 kB of archives.
After this operation, 10.8 MB of additional disk space will be used.
Do you want to continue? [Y/n]
Get:1 http://kr.archive.ubuntu.com/ubuntu xenial-updates/main amd64 libssl1.0.0 amd64 1.0.2g-1ubuntu4.1 [1,122 kB]
Get:2 http://kr.archive.ubuntu.com/ubuntu xenial/main amd64 zlib1g-dev amd64 1:1.2.8.dfsg-2ubuntu4 [168 kB]
Get:3 http://kr.archive.ubuntu.com/ubuntu xenial-updates/main amd64 libssl-dev amd64 1.0.2g-1ubuntu4.1 [1,394 kB]
Get:4 http://kr.archive.ubuntu.com/ubuntu xenial-updates/main amd64 libssl-doc all 1.0.2g-1ubuntu4.1 [1,078 kB]
Fetched 3,761 kB in 3s (1,128 kB/s)
Preconfiguring packages ...
(Reading database ... 209543 files and directories currently installed.)
Preparing to unpack .../libssl1.0.0_1.0.2g-1ubuntu4.1_amd64.deb ...
Unpacking libssl1.0.0:amd64 (1.0.2g-1ubuntu4.1) over (1.0.2g-1ubuntu4) ...
Selecting previously unselected package zlib1g-dev:amd64.
Preparing to unpack .../zlib1g-dev_1%3a1.2.8.dfsg-2ubuntu4_amd64.deb ...
Unpacking zlib1g-dev:amd64 (1:1.2.8.dfsg-2ubuntu4) ...
Selecting previously unselected package libssl-dev:amd64.
Preparing to unpack .../libssl-dev_1.0.2g-1ubuntu4.1_amd64.deb ...
Unpacking libssl-dev:amd64 (1.0.2g-1ubuntu4.1) ...
Selecting previously unselected package libssl-doc.
Preparing to unpack .../libssl-doc_1.0.2g-1ubuntu4.1_all.deb ...
Unpacking libssl-doc (1.0.2g-1ubuntu4.1) ...
Processing triggers for libc-bin (2.23-0ubuntu3) ...
Processing triggers for man-db (2.7.5-1) ...
Setting up libssl1.0.0:amd64 (1.0.2g-1ubuntu4.1) ...
Setting up zlib1g-dev:amd64 (1:1.2.8.dfsg-2ubuntu4) ...
Setting up libssl-dev:amd64 (1.0.2g-1ubuntu4.1) ...
Setting up libssl-doc (1.0.2g-1ubuntu4.1) ...
Processing triggers for libc-bin (2.23-0ubuntu3) ...
root@user-VirtualBox:~/linux-4.4.0#
```

7. Even if the errors related to ssl are crossed, VBox related errors will occur next. The files under the ubuntu directory are assumed to be included only in the ubuntu kernel. This problem is caused by not finding the header file correctly.

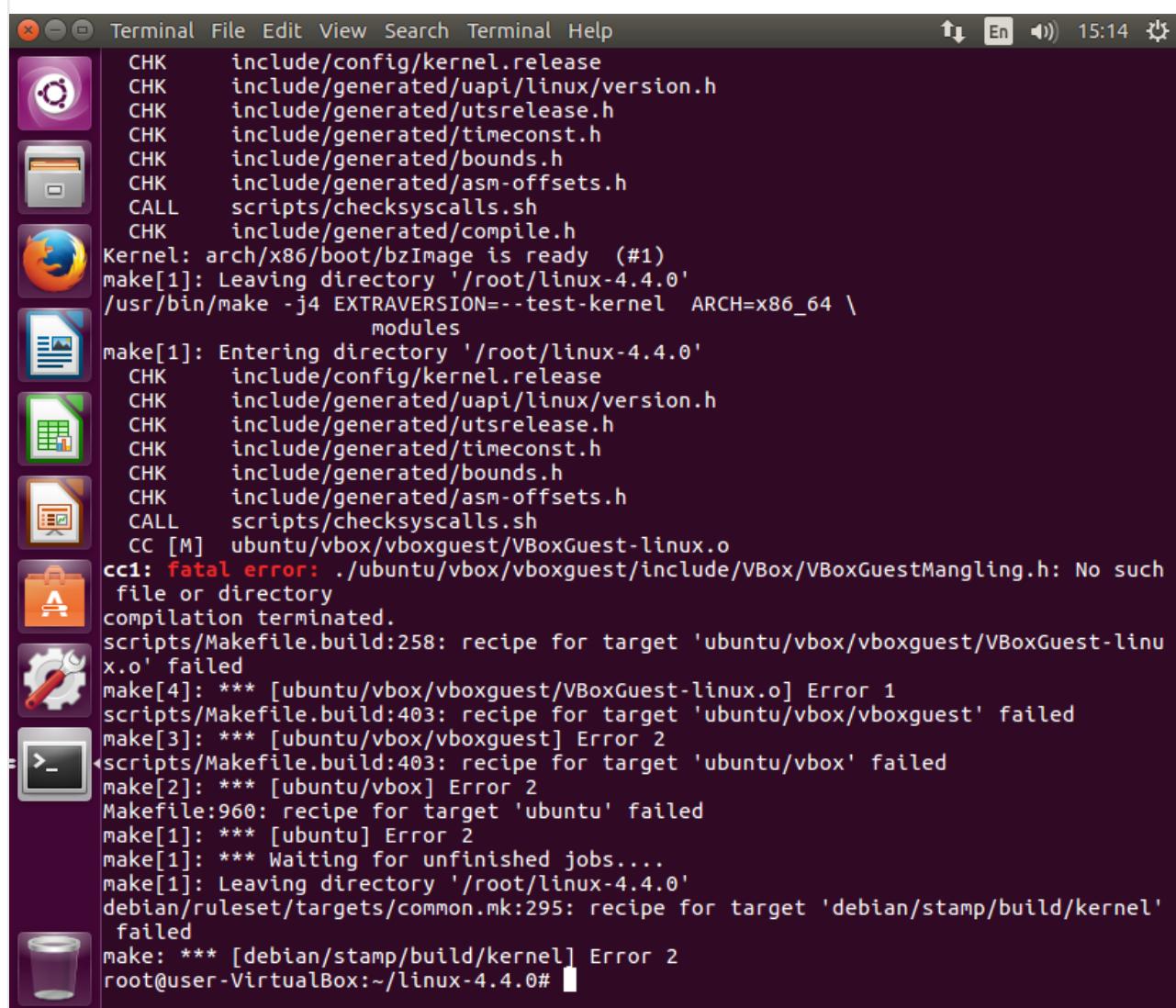
[Error]

```
cc1: fatal error: ./ubuntu/vbox/vboxguest/include/VBox/VBoxGuestMangling.h: No such file or directory
compilation terminated.
scripts / Makefile.build: 258: recipe for target 'ubuntu / vbox / vboxguest / VBoxGuest-linux.o' failed
```

[Command]

```
~/linux-4.4.0# cd ubuntu/vbox  
~/linux-4.4.0/ubuntu/vbox# ln -s ../include ./r0drv/include  
~/linux-4.4.0/ubuntu/vbox# ln -s ../include ./vboxsf/include  
~/linux-4.4.0/ubuntu/vbox# ln -s ../include ./vboxguest/include  
~/linux-4.4.0/ubuntu/vbox# ln -s ../include ./vboxvideo/include
```

Although the error occurred in vboxguest, it happens somewhere else, so you can create a symbolic link for r0drv, vboxsf, and vboxvideo in advance.



The screenshot shows a terminal window on a Linux desktop. The desktop icons include the Dash, Home, Applications, and Dash search. The terminal window has a dark background and displays the following command-line session:

```
Terminal File Edit View Search Terminal Help  
CHK include/config/kernel.release  
CHK include/generated/uapi/linux/version.h  
CHK include/generated/utsrelease.h  
CHK include/generated/timeconst.h  
CHK include/generated/bounds.h  
CHK include/generated/asm-offsets.h  
CALL scripts/checksyscalls.sh  
CHK include/generated/compile.h  
Kernel: arch/x86/boot/bzImage is ready (#1)  
make[1]: Leaving directory '/root/linux-4.4.0'  
/usr/bin/make -j4 EXTRAVERSION=--test-kernel ARCH=x86_64 \  
modules  
make[1]: Entering directory '/root/linux-4.4.0'  
CHK include/config/kernel.release  
CHK include/generated/uapi/linux/version.h  
CHK include/generated/utsrelease.h  
CHK include/generated/timeconst.h  
CHK include/generated/bounds.h  
CHK include/generated/asm-offsets.h  
CALL scripts/checksyscalls.sh  
CC [M] ubuntu/vbox/vboxguest/VBoxGuest-linux.o  
cc1: fatal error: ./ubuntu/vbox/vboxguest/include/VBox/VBoxGuestMangling.h: No such  
file or directory  
compilation terminated.  
scripts/Makefile.build:258: recipe for target 'ubuntu/vbox/vboxguest/VBoxGuest-linu  
x.o' failed  
make[4]: *** [ubuntu/vbox/vboxguest/VBoxGuest-linux.o] Error 1  
scripts/Makefile.build:403: recipe for target 'ubuntu/vbox/vboxguest' failed  
make[3]: *** [ubuntu/vbox/vboxguest] Error 2  
scripts/Makefile.build:403: recipe for target 'ubuntu/vbox' failed  
make[2]: *** [ubuntu/vbox] Error 2  
Makefile:960: recipe for target 'ubuntu' failed  
make[1]: *** [ubuntu] Error 2  
make[1]: *** Waiting for unfinished jobs....  
make[1]: Leaving directory '/root/linux-4.4.0'  
debian/ruleset/targets/common.mk:295: recipe for target 'debian/stamp/build/kernel'  
failed  
make: *** [debian/stamp/build/kernel] Error 2  
root@user-VirtualBox:~/linux-4.4.0#
```

```

root@user-VirtualBox: ~/linux-4.4.0/ubuntu/vbox
          modules
make[1]: Entering directory '/root/linux-4.4.0'
  CHK  include/config/kernel.release
  CHK  include/generated/uapi/linux/version.h
  CHK  include/generated/utsrelease.h
  CHK  include/generated/timeconst.h
  CHK  include/generated/bounds.h
  CHK  include/generated/asm-offsets.h
  CALL  scripts/checksyscalls.sh
  CC [M]  ubuntu/vbox/vboxguest/VBoxGuest-linux.o
cc1: fatal error: ./ubuntu/vbox/vboxguest/include/VBox/VBoxGuestMangling.h: No such
file or directory
compilation terminated.
scripts/Makefile.build:258: recipe for target 'ubuntu/vbox/vboxguest/VBoxGuest-linu
x.o' failed
make[4]: *** [ubuntu/vbox/vboxguest/VBoxGuest-linux.o] Error 1
scripts/Makefile.build:403: recipe for target 'ubuntu/vbox/vboxguest' failed
make[3]: *** [ubuntu/vbox/vboxguest] Error 2
scripts/Makefile.build:403: recipe for target 'ubuntu/vbox' failed
make[2]: *** [ubuntu/vbox] Error 2
Makefile:960: recipe for target 'ubuntu' failed
make[1]: *** [ubuntu] Error 2
make[1]: *** Waiting for unfinished jobs....
make[1]: Leaving directory '/root/linux-4.4.0'
debian/ruleset/targets/common.mk:295: recipe for target 'debian/stamp/build/kernel'
failed
make: *** [debian/stamp/build/kernel] Error 2
root@user-VirtualBox:~/linux-4.4.0# cd ubuntu/vbox/
root@user-VirtualBox:~/linux-4.4.0/ubuntu/vbox# ls
BOM      dkms.conf  Makefile      r0drv      vboxsf
built-in.o  include   modules.builtin  vboxguest  vboxvideo
root@user-VirtualBox:~/linux-4.4.0/ubuntu/vbox# ln -s ./include ./r0drv/include
root@user-VirtualBox:~/linux-4.4.0/ubuntu/vbox# ln -s ./include ./r0drv/include
root@user-VirtualBox:~/linux-4.4.0/ubuntu/vbox# ln -s ./include ./vboxsf/include
root@user-VirtualBox:~/linux-4.4.0/ubuntu/vbox# ln -s ./include ./vboxguest/include
root@user-VirtualBox:~/linux-4.4.0/ubuntu/vbox# ln -s ./include ./vboxvideo/include
root@user-VirtualBox:~/linux-4.4.0/ubuntu/vbox#

```

8. If you hang up all the symbolic links and run the kernel build command again, another error occurs.

Once again, you can fix it by hanging a symbolic link.

[Error]

make [4]: * No rule to make target 'ubuntu / vbox / vboxguest / vboxguest / r0drv / alloc-r0drv.o', needed by 'ubuntu / vbox / vboxguest / vboxguest.o'. Stop.**

[Command]

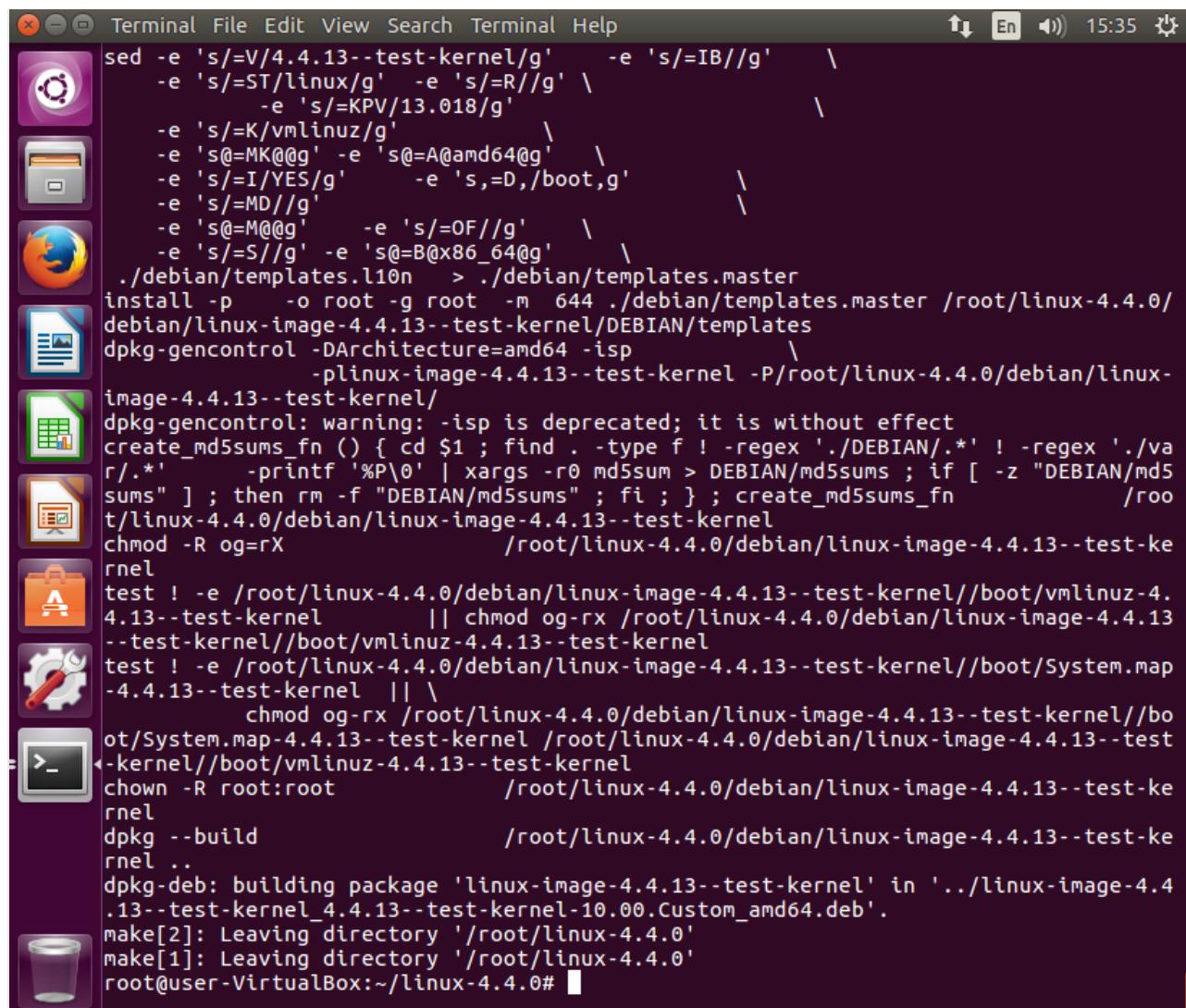
~/linux-4.4.0# cd ubuntu/vbox/vboxguest

~/linux-4.4.0/ubuntu/vbox/vboxguest# ln -s ..r0drv/

```
root@user-VirtualBox: ~/linux-4.4.0
CHK      include/generated/bounds.h
CHK      include/generated/asm-offsets.h
CALL    scripts/checksyscalls.sh
CHK      include/generated/compile.h
Kernel: arch/x86/boot/bzImage is ready  (#1)
make[1]: Leaving directory '/root/linux-4.4.0'
/usr/bin/make -j4 EXTRAVERSION=--test-kernel ARCH=x86_64 \
               modules
make[1]: Entering directory '/root/linux-4.4.0'
CHK      include/config/kernel.release
CHK      include/generated/uapi/linux/version.h
CHK      include/generated/utsrelease.h
CHK      include/generated/timeconst.h
CHK      include/generated/bounds.h
CHK      include/generated/asm-offsets.h
CALL    scripts/checksyscalls.sh
CC [M]  ubuntu/vbox/vboxguest/VBoxGuest-linux.o
CC [M]  ubuntu/vbox/vboxguest/VBoxGuest.o
CC [M]  ubuntu/vbox/vboxguest/GenericRequest.o
CC [M]  ubuntu/vbox/vboxguest/HGCMInternal.o
CC [M]  ubuntu/vbox/vboxguest/Init.o
CC [M]  ubuntu/vbox/vboxguest/PhysHeap.o
CC [M]  ubuntu/vbox/vboxguest/SysHlp.o
make[4]: *** No rule to make target 'ubuntu/vbox/vboxguest/r0drv/alloc-r0drv.o', ne
eeded by 'ubuntu/vbox/vboxguest/vboxguest.o'. Stop.
make[4]: *** Waiting for unfinished jobs....
CC [M]  ubuntu/vbox/vboxguest/VMMDev.o
scripts/Makefile.build:403: recipe for target 'ubuntu/vbox/vboxguest' failed
make[3]: *** [ubuntu/vbox/vboxguest] Error 2
scripts/Makefile.build:403: recipe for target 'ubuntu/vbox' failed
make[2]: *** [ubuntu/vbox] Error 2
Makefile:960: recipe for target 'ubuntu' failed
make[1]: *** [ubuntu] Error 2
make[1]: *** Waiting for unfinished jobs....
make[1]: Leaving directory '/root/linux-4.4.0'
debian/ruleset/targets/common.mk:295: recipe for target 'debian/stamp/build/kernel'
      failed
make: *** [debian/stamp/build/kernel] Error 2
root@user-VirtualBox:~/linux-4.4.0#
```

```
root@user-VirtualBox: ~/linux-4.4.0
make[1]: Leaving directory '/root/linux-4.4.0'
/usr/bin/make -j4 EXTRAVERSION=--test-kernel ARCH=x86_64 \
              modules
make[1]: Entering directory '/root/linux-4.4.0'
  CHK  include/config/kernel.release
  CHK  include/generated/uapi/linux/version.h
  CHK  include/generated/utsrelease.h
  CHK  include/generated/timeconst.h
  CHK  include/generated/bounds.h
  CHK  include/generated/asm-offsets.h
  CALL scripts/checksyscalls.sh
  CC [M] ubuntu/vbox/vboxguest/VBoxGuest-linux.o
  CC [M] ubuntu/vbox/vboxguest/VBoxGuest.o
  CC [M] ubuntu/vbox/vboxguest/GenericRequest.o
  CC [M] ubuntu/vbox/vboxguest/HGCMInternal.o
  CC [M] ubuntu/vbox/vboxguest/Init.o
  CC [M] ubuntu/vbox/vboxguest/PhysHeap.o
  CC [M] ubuntu/vbox/vboxguest/SysHlp.o
make[4]: *** No rule to make target 'ubuntu/vbox/vboxguest/r0drv/alloc-r0drv.o', ne
eded by 'ubuntu/vbox/vboxguest/vboxguest.o'. Stop.
make[4]: *** Waiting for unfinished jobs....
  CC [M] ubuntu/vbox/vboxguest/VMMDriver.o
scripts/Makefile.build:403: recipe for target 'ubuntu/vbox/vboxguest' failed
make[3]: *** [ubuntu/vbox/vboxguest] Error 2
scripts/Makefile.build:403: recipe for target 'ubuntu/vbox' failed
make[2]: *** [ubuntu/vbox] Error 2
Makefile:960: recipe for target 'ubuntu' failed
make[1]: *** [ubuntu] Error 2
make[1]: *** Waiting for unfinished jobs....
make[1]: Leaving directory '/root/linux-4.4.0'
debian/ruleset/targets/common.mk:295: recipe for target 'debian/stamp/build/kernel'
      failed
make: *** [debian/stamp/build/kernel] Error 2
root@user-VirtualBox:~/linux-4.4.0# cd ubuntu/vbox/vboxguest/
root@user-VirtualBox:~/linux-4.4.0/ubuntu/vbox/vboxguest# ln -s ..../r0drv/
root@user-VirtualBox:~/linux-4.4.0/ubuntu/vbox/vboxguest# cd -
/root/linux-4.4.0
root@user-VirtualBox:~/linux-4.4.0#
```

9. After catching the above error, Kernel Compile is completed as below.



The screenshot shows a terminal window in a Unity desktop environment. The terminal contains the following command-line output:

```

sed -e 's/=V/4.4.13--test-kernel/g'    -e 's/=IB//g'    \
-e 's/=ST/linux/g' -e 's/=R//g' \
-e 's/=K/vmlinuz/g' \
-e 's@=MK@@g' -e 's@=A@amd64@g' \
-e 's/=I/YES/g' -e 's,=D,/boot,g' \
-e 's/=MD//g' \
-e 's@=M@@g' -e 's/=OF//g' \
-e 's/=S//g' -e 's@=B@x86_64@g' \
./debian/templates.l10n > ./debian/templates.master
install -p -o root -g root -m 644 ./debian/templates.master /root/linux-4.4.0/
debian/linux-image-4.4.13--test-kernel/DEBIAN/templates
dpkg-gencontrol -DArchitecture=amd64 -isp \
-plinux-image-4.4.13--test-kernel -P/root/linux-4.4.0/debian/linux-
image-4.4.13--test-kernel/
dpkg-gencontrol: warning: -isp is deprecated; it is without effect
create_md5sums_fn () { cd $1 ; find . -type f ! -regex './DEBIAN/.*' ! -regex './va
r/.*' -printf '%P\0' | xargs -r0 md5sum > DEBIAN/md5sums ; if [ -z "DEBIAN/md5
sums" ] ; then rm -f "DEBIAN/md5sums" ; fi ; } ; create_md5sums_fn /roo
t/linux-4.4.0/debian/linux-image-4.4.13--test-kernel
chmod -R og=rX /root/linux-4.4.0/debian/linux-image-4.4.13--test-ke
rnel
test ! -e /root/linux-4.4.0/debian/linux-image-4.4.13--test-kernel//boot/vmlinuz-4.
4.13--test-kernel || chmod og=rX /root/linux-4.4.0/debian/linux-image-4.4.13
--test-kernel//boot/vmlinuz-4.4.13--test-kernel
test ! -e /root/linux-4.4.0/debian/linux-image-4.4.13--test-kernel//boot/System.map
-4.4.13--test-kernel || \
        chmod og=rX /root/linux-4.4.0/debian/linux-image-4.4.13--test-kernel//bo
ot/System.map-4.4.13--test-kernel /root/linux-4.4.0/debian/linux-image-4.4.13--test
-kernel//boot/vmlinuz-4.4.13--test-kernel
chown -R root:root /root/linux-4.4.0/debian/linux-image-4.4.13--test-ke
rnel
dpkg --build /root/linux-4.4.0/debian/linux-image-4.4.13--test-ke
rnel ..
dpkg-deb: building package 'linux-image-4.4.13--test-kernel' in '../linux-image-4.4
.13--test-kernel_4.4.13--test-kernel-10.00.Custom_amd64.deb'.
make[2]: Leaving directory '/root/linux-4.4.0'
make[1]: Leaving directory '/root/linux-4.4.0'
root@user-VirtualBox:~/linux-4.4.0# 
```

10. If you move to the upper directory by cd .., you can see that the kernel image deb package is created with the following name.

linux-image-4.4.13 – test-kernel_4.4.13 – test-kernel-10.00.Custom_amd64.deb

It seems that the kernel image package I built is correct. One strange thing is that the directory name of the source code is 4.4.0, and the build result is 4.4.13. I looked into it more and changed the version in the diff file downloaded with the kernel source.

-SUBLEVEL = 0

+ SUBLEVEL = 13

```
root@user-VirtualBox: ~/tmp
F: Documentation/hwmon/w83793
F: drivers/hwmon/w83793.c

W83795 HARDWARE MONITORING DRIVER
M: Jean Delvare <jdelvare@suse.com>
-L: lm-sensors@lm-sensors.org
+L: linux-hwmon@vger.kernel.org
S: Maintained
F: drivers/hwmon/w83795.c

--- linux-4.4.0.orig/Makefile
+++ linux-4.4.0/Makefile
@@ -1,6 +1,6 @@
VERSION = 4
PATCHLEVEL = 4
-SUBLEVEL = 0
+SUBLEVEL = 13
EXTRAVERSION =
NAME = Blurry Fish Butt

@@ -364,8 +364,14 @@
LDFLAGS_MODULE =
CFLAGS_KERNEL =
AFLAGS_KERNEL =
-CFLAGS_GCOV = -fprofile-arcs -ftest-coverage
+CFLAGS_GCOV = -fprofile-arcs -ftest-coverage -fno-tree-loop-im
+# Prefer linux-backports-modules
+ifneq ($(KBUILD_SRC),)
+ifneq ($(shell if test -e $(KBUILD_OUTPUT)/ubuntu-build; then echo yes; fi),yes)
+UBUNTUINCLUDE := -I/usr/src/linux-headers-lbm-$(KERNELRELEASE)
```

In fact, I understand that the following command to download the source code is to download the same kernel source code by checking the kernel version (`uname -r`) of the current system. (You can do it again.)

```
# apt-get source linux-image-$(uname -r)
```

First, since we built the kernel with the same configuration, booting the kernel is as follows.

11. Install it with the following command.

```
# dpkg -i linux-image-4.4.13-test-kernel_4.4.13-test-kernel-10.00-Custom_amd64.deb
```

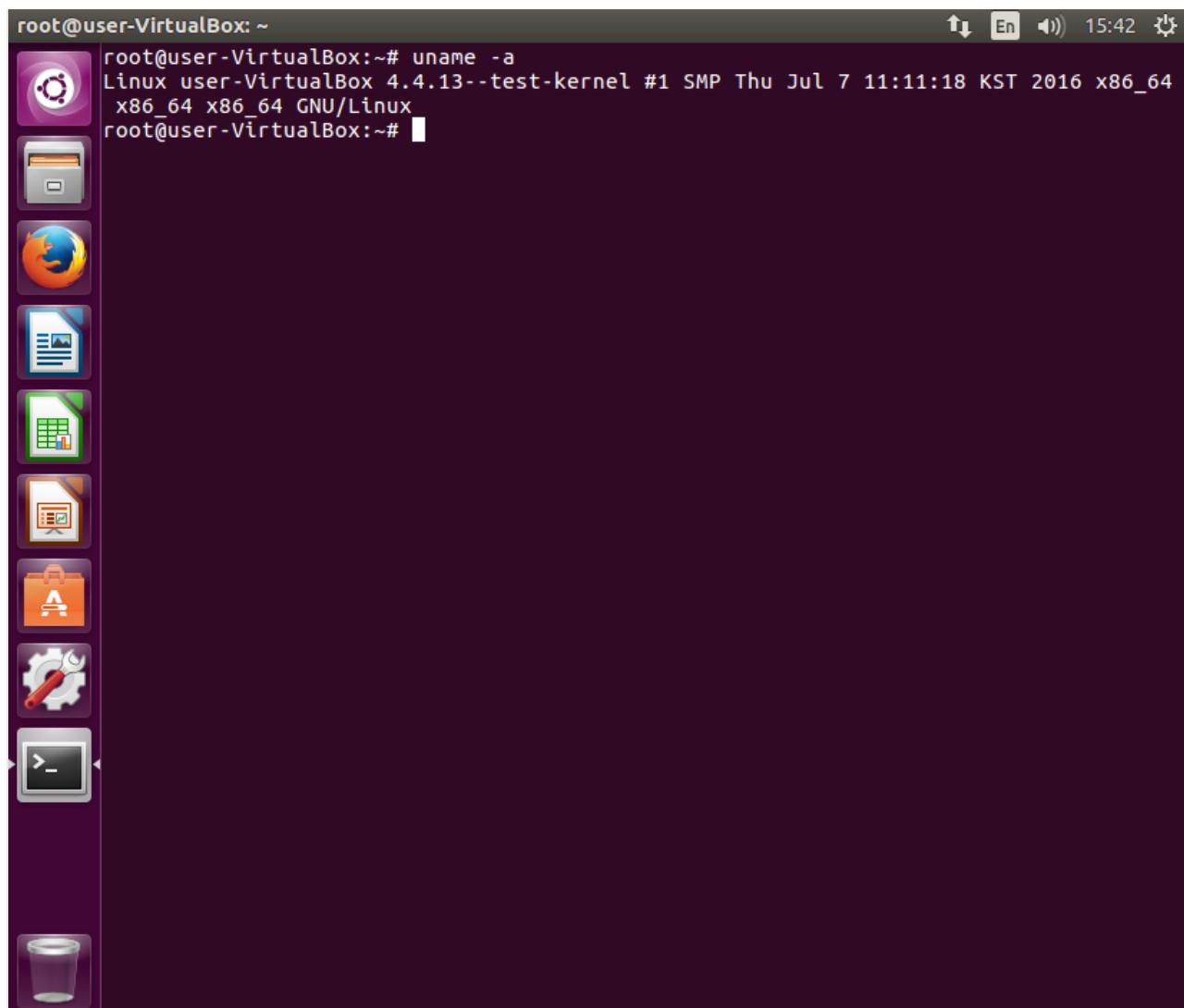
```
root@user-VirtualBox: ~
linux_4.4.0-28.47.dsc
linux-image-4.4.13--test-kernel_4.4.13--test-kernel-10.00.Custom_amd64.deb
root@user-VirtualBox:~# dpkg -i linux-image-4.4.13--test-kernel_4.4.13--test-kernel-10.00.Custom_amd64.deb
Selecting previously unselected package linux-image-4.4.13--test-kernel.
(Reading database ... 212000 files and directories currently installed.)
Preparing to unpack linux-image-4.4.13--test-kernel_4.4.13--test-kernel-10.00.Custom_amd64.deb ...
Done.
Unpacking linux-image-4.4.13--test-kernel (4.4.13--test-kernel-10.00.Custom) ...
Setting up linux-image-4.4.13--test-kernel (4.4.13--test-kernel-10.00.Custom) ...
Running depmod.
Examining /etc/kernel/postinst.d.
run-parts: executing /etc/kernel/postinst.d/apt-auto-removal 4.4.13--test-kernel /boot/vmlinuz-4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/dkms 4.4.13--test-kernel /boot/vmlinuz-4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 4.4.13--test-kernel /boot/vmlinuz-4.4.13--test-kernel
update-initramfs: Generating /boot/initrd.img-4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/pm-utils 4.4.13--test-kernel /boot/vmlinuz-4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/unattended-upgrades 4.4.13--test-kernel /boot/vmlinuz-4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/update-notifier 4.4.13--test-kernel /boot/vmlinuz-4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 4.4.13--test-kernel /boot/vmlinuz-4.4.13--test-kernel
Generating grub configuration file ...
Warning: Setting GRUB_TIMEOUT to a non-zero value when GRUB_HIDDEN_TIMEOUT is set is no longer supported.
Found linux image: /boot/vmlinuz-4.4.13--test-kernel
Found initrd image: /boot/initrd.img-4.4.13--test-kernel
Found linux image: /boot/vmlinuz-4.4.0-21-generic
Found initrd image: /boot/initrd.img-4.4.0-21-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
root@user-VirtualBox:~#
```

It does not mean that the kernel is installed. If you try uname -a, you can see that the old one still applies. A reboot is required for the new kernel to be applied.

```
root@user-VirtualBox: ~
 10.00.Custom_amd64.deb
Selecting previously unselected package linux-image-4.4.13--test-kernel.
(Reading database ... 212000 files and directories currently installed.)
Preparing to unpack linux-image-4.4.13--test-kernel_4.4.13--test-kernel-10.00.Custo
m_amd64.deb ...
Done.
Unpacking linux-image-4.4.13--test-kernel (4.4.13--test-kernel-10.00.Custom) ...
Setting up linux-image-4.4.13--test-kernel (4.4.13--test-kernel-10.00.Custom) ...
Running depmod.
Examining /etc/kernel/postinst.d.
run-parts: executing /etc/kernel/postinst.d/apt-auto-removal 4.4.13--test-kernel /b
oot/vmlinuz-4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/dkms 4.4.13--test-kernel /boot/vmlinuz-
4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 4.4.13--test-kernel /bo
ot/vmlinuz-4.4.13--test-kernel
update-initramfs: Generating /boot/initrd.img-4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/pm-utils 4.4.13--test-kernel /boot/vmlinu
z-4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/unattended-upgrades 4.4.13--test-kernel
/boot/vmlinuz-4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/update-notifier 4.4.13--test-kernel /bo
ot/vmlinuz-4.4.13--test-kernel
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 4.4.13--test-kernel /bo
ot/vmlinuz-4.4.13--test-kernel
Generating grub configuration file ...
Warning: Setting GRUB_TIMEOUT to a non-zero value when GRUB_HIDDEN_TIMEOUT is set i
s no longer supported.
Found linux image: /boot/vmlinuz-4.4.13--test-kernel
Found initrd image: /boot/initrd.img-4.4.13--test-kernel
Found linux image: /boot/vmlinuz-4.4.0-21-generic
Found initrd image: /boot/initrd.img-4.4.0-21-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
root@user-VirtualBox:~# uname -a
Linux user-VirtualBox 4.4.0-21-generic #37-Ubuntu SMP Mon Apr 18 18:33:37 UTC 2016
x86_64 x86_64 x86_64 GNU/Linux
root@user-VirtualBox:~#
```

12. After rebooting, the following changes are made.

-test-kernel is checked in the kernel version name.



Kernel configuration changes

This is the only way to build with the default configuration, and this time I want to change kernel defconfig to create a different kernel from the existing configuration.

1. To change kernel configuration, execute the following command.

```
# make menuconfig
```

2. But an error occurs.

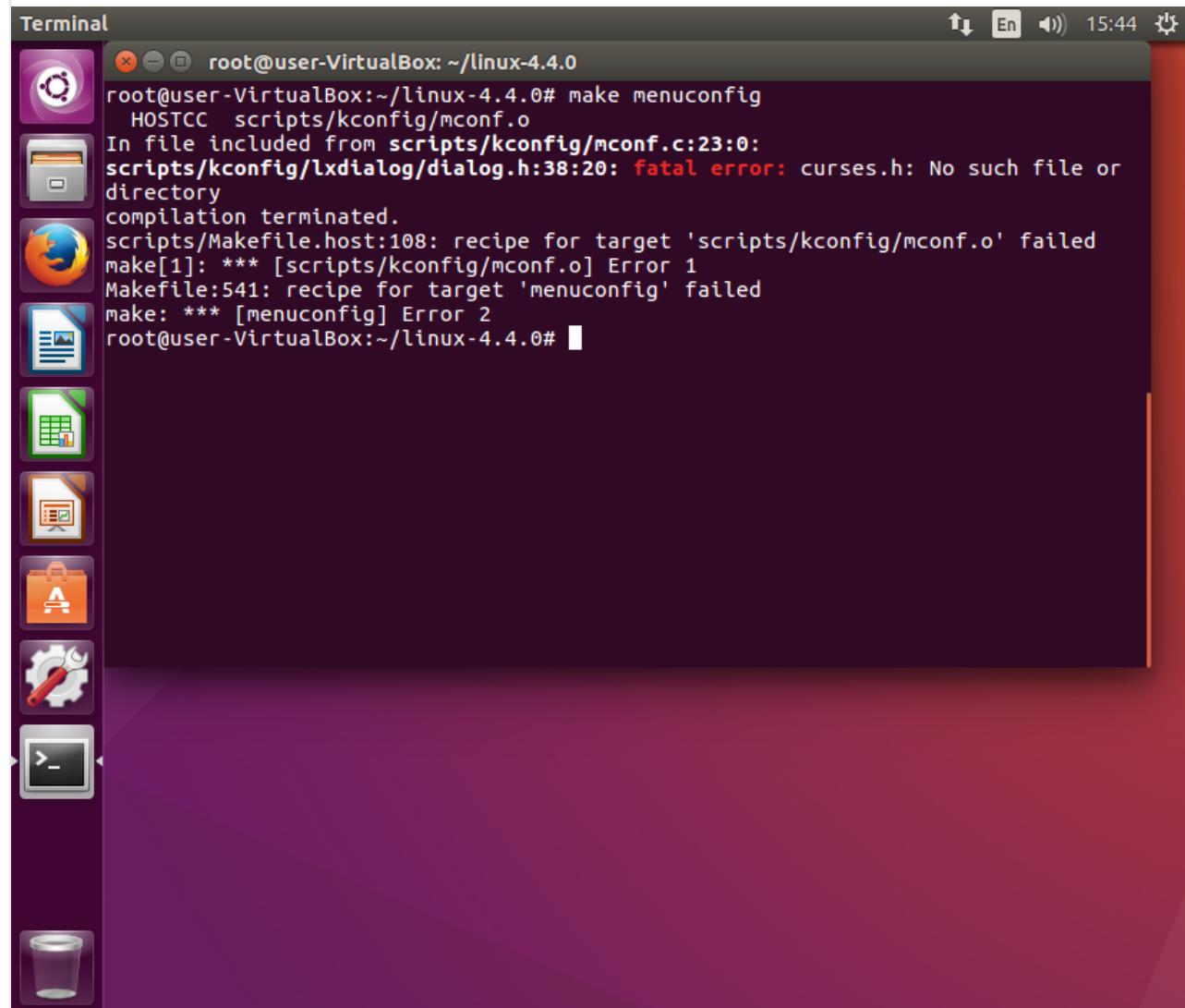
[Error]

```
scripts / kconfig / lxdialog / dialog.h: 38: 20: fatal error: curses.h: no such file or directory  
compilation terminated.
```

scripts / Makefile.host: 108: recipe for target 'scripts / kconfig / mconf.o' failed

[Command]

apt-get install libncurses5-dev

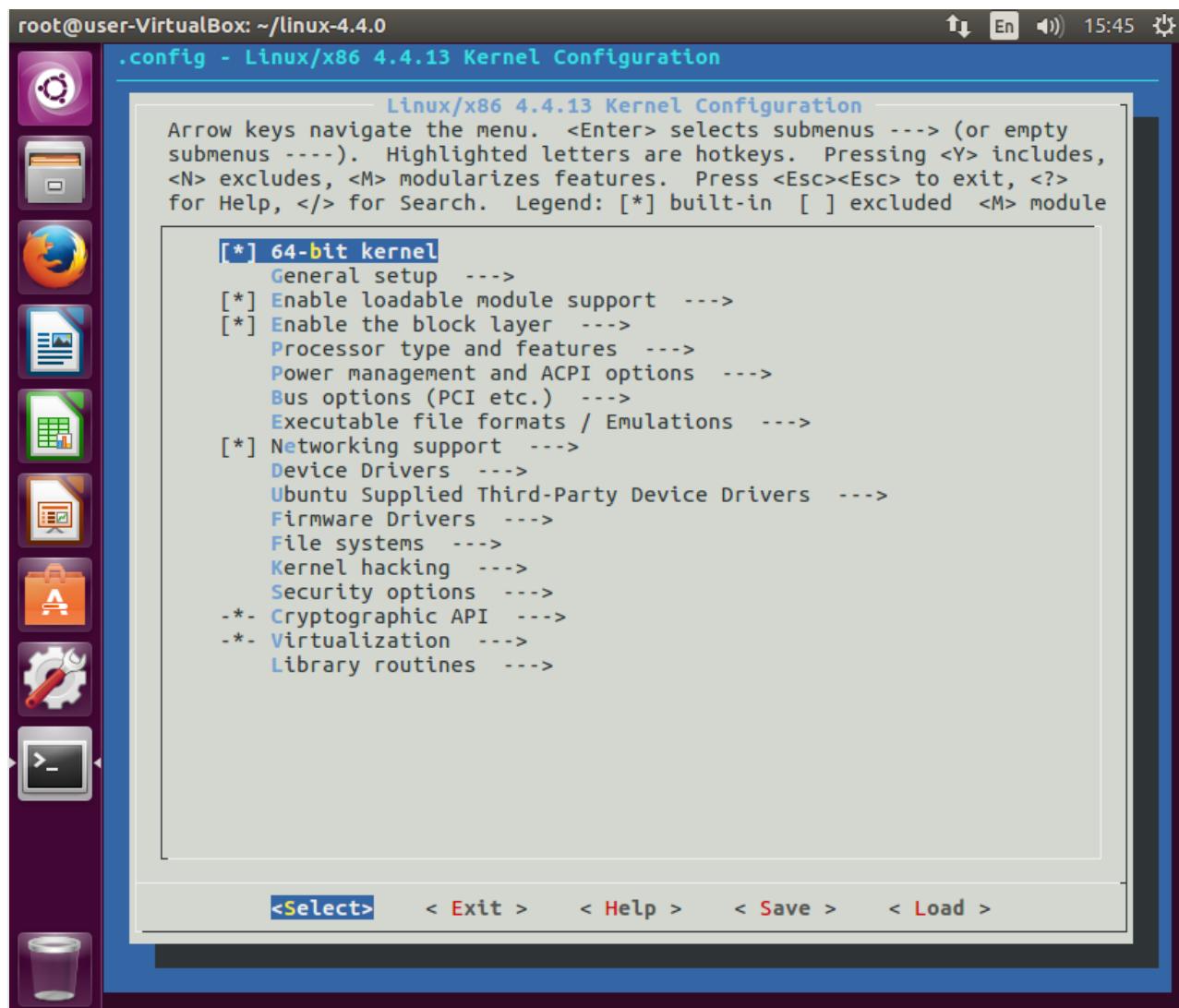


The image shows a screenshot of an Ubuntu 16.04 desktop environment. A terminal window is open in the foreground, displaying a command-line session. The session starts with the user running 'make menuconfig' in their home directory (~/linux-4.4.0). This command fails because it cannot find the 'curses.h' header file, which is required by 'lxdialog/dialog.h'. The terminal window has a dark purple background and contains white text. The title bar of the terminal says 'Terminal'. The desktop background is also purple. On the left side of the screen, there is a vertical dock containing icons for various applications like Dash, Home, Dash to Dock, and a trash can.

```
root@user-VirtualBox:~/linux-4.4.0# make menuconfig
HOSTCC scripts/kconfig/mconf.o
In file included from scripts/kconfig/mconf.c:23:0:
scripts/kconfig/lxdialog/dialog.h:38:20: fatal error: curses.h: No such file or
directory
compilation terminated.
scripts/Makefile.host:108: recipe for target 'scripts/kconfig/mconf.o' failed
make[1]: *** [scripts/kconfig/mconf.o] Error 1
Makefile:541: recipe for target 'menuconfig' failed
make: *** [menuconfig] Error 2
root@user-VirtualBox:~/linux-4.4.0#
```

```
root@user-VirtualBox: ~/linux-4.4.0
HOSTCC scripts/kconfig/mconf.o
In file included from scripts/kconfig/mconf.c:23:0:
scripts/kconfig/lxdialog/dialog.h:38:20: fatal error: curses.h: No such file or directory
compilation terminated.
scripts/Makefile.host:108: recipe for target 'scripts/kconfig/mconf.o' failed
make[1]: *** [scripts/kconfig/mconf.o] Error 1
Makefile:541: recipe for target 'menuconfig' failed
make: *** [menuconfig] Error 2
root@user-VirtualBox:~/linux-4.4.0# apt-get install libncurses5-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libtinfo-dev
Suggested packages:
  ncurses-doc
The following NEW packages will be installed:
  libncurses5-dev libtinfo-dev
0 upgraded, 2 newly installed, 0 to remove and 263 not upgraded.
Need to get 252 kB of archives.
After this operation, 1,461 kB of additional disk space will be used.
Do you want to continue? [Y/n]
Get:1 http://kr.archive.ubuntu.com/ubuntu xenial/main amd64 libtinfo-dev amd64 6.0+20160213-1ubuntu1 [77.4 kB]
Get:2 http://kr.archive.ubuntu.com/ubuntu xenial/main amd64 libncurses5-dev amd64 6.0+20160213-1ubuntu1 [175 kB]
Fetched 252 kB in 0s (1,800 kB/s)
Selecting previously unselected package libtinfo-dev:amd64.
(Reading database ... 217595 files and directories currently installed.)
Preparing to unpack .../libtinfo-dev_6.0+20160213-1ubuntu1_amd64.deb ...
Unpacking libtinfo-dev:amd64 (6.0+20160213-1ubuntu1) ...
Selecting previously unselected package libncurses5-dev:amd64.
Preparing to unpack .../libncurses5-dev_6.0+20160213-1ubuntu1_amd64.deb ...
Unpacking libncurses5-dev:amd64 (6.0+20160213-1ubuntu1) ...
Processing triggers for man-db (2.7.5-1) ...
Setting up libtinfo-dev:amd64 (6.0+20160213-1ubuntu1) ...
Setting up libncurses5-dev:amd64 (6.0+20160213-1ubuntu1) ...
root@user-VirtualBox:~/linux-4.4.0#
```

3. Now, when you run make menuconfig, you will be able to modify kernel defconfig normally. You can check here and proceed with the builds as described above.



Ubuntu kernel compile summary

1. Change the Package List setting to secure the kernel source of Ubuntu 16.04 in Ubuntu Software
2. Copy existing settings

```
~/linux-4.4.0# cp /boot/config-4.4.0-21-generic .config
```

3. Install package for kernel compile

```
# apt-get install kernel-package
```

```
# apt-get install libssl-dev
```

```
# apt-get install libncurses5-dev
```

4. Create a broken symbolic link in the Ubuntu kernel code

```
~/linux-4.4.0/ubuntu/vbox# ln -s ../include ./r0drv/include
```

```
~/linux-4.4.0/ubuntu/vbox# ln -s ../include ./vboxsf/include
```

```
~/linux-4.4.0/ubuntu/vbox# ln -s ../include ./vboxguest/include
```

```
~/linux-4.4.0/ubuntu/vbox# ln -s ../include ./vboxvideo/include
```

```
~/linux-4.4.0/ubuntu/vbox/vboxguest# ln -s ../r0drv/
```

5. Create kernel image package with make-kpkg

```
# make-kpkg -j2 -initrd -append-to-version = -test-kernel kernel_image
```

6. Install the generated package

```
# dpkg -i linux-image-4.4.13 -test-kernel_4.4.13 -test-kernel-10.00-Custom_amd64.deb
```

7. Reboot

In fact, the average user does not have much to do with Linux, and even if you use Linux, you will not have to do kernel compile unless you are a kernel developer. In Linux, unlike Windows, it is better to understand that only the kernel can compile and use the kernel.

8. Kernel module build

```
# make -C $ (pwd) M = $ (pwd) / net / wireless modules
```

Category: Linux Tags: kernel build , kernel compile , kernel module , linux , module build , module compile , ubuntu 16.04

2 thoughts on “Ubuntu 16.04, Kernel Compile on default setting”



Margaretta
May 20, 2017

Time to face the music armed with this great iniftmaroon.



wenlin.wu
September 5, 2017

this help fix the vbox compile error, thanks a lot

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