

# Download and compile the latest linux kernel

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## Target

1. Download the latest linux kernel
2. config the latest linux kernel
3. compile the latest linux kernel
4. boot ubuntu with the latest linux kernel

## preparations

install related software package

```
sudo apt-get update  
sudo apt-get upgrade
```

```
sudo apt-get install build-essential
```

```
sudo apt-get install wget
```

```
sudo apt-get install pkg-config  
sudo apt-get install libgtk2.0-dev  
sudo apt-get install libcanberra-gtk-module  
sudo apt-get install glade  
sudo apt-get install libglade2-dev
```

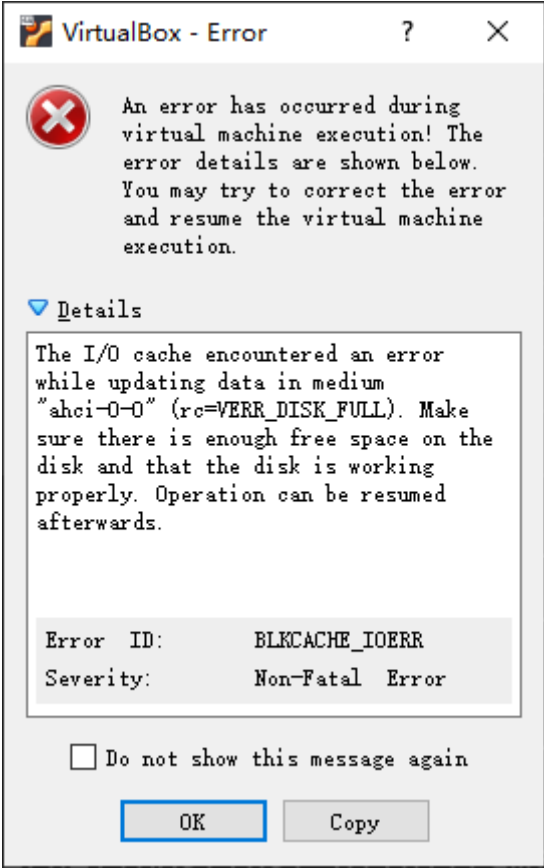
```
sudo apt-get install flex bison  
sudo apt-get install libssl-dev  
sudo apt-get install libelf-dev  
sudo apt-get install libncurses-dev
```

view the current linux kernel version

```
$ uname -r  
6.2.0-34-generic  
$
```

check the unused disk and ensure sufficient disk free space of "/"

```
$ df -BG
文件系统      1G的块  已用  可用  已用%  挂载点
tmpfs          1G    1G    1G    1% /run
/dev/sda3      59G   29G   28G   52% /
tmpfs          4G    0G    4G    0% /dev/shm
tmpfs          1G    1G    1G    1% /run/lock
tmpfs          4G    0G    4G    0% /run/qemu
/dev/sda2      1G    1G    1G    2% /boot/efi
tmpfs          1G    1G    1G    1% /run/user/1000
$
```



很有可能没有磁盘空间啊：建议预留30GB空闲空间

How to do

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the latest linux kernel

Linux Stable Kernel: 5.6.7 (2023.10.11)

1. Download the latest linux kernel from [www.kernel.org](http://www.kernel.org)

- [linux kernel 6.5.7](#)

```
cd ~  
pwd
```

```
wget -c https://cdn.kernel.org/pub/linux/kernel/v6.x/linux-6.5.7.tar.xz
```

```
tar xvJf linux-6.5.7.tar.xz
```

```
sudo ln -s `pwd`/linux-6.5.7 /usr/src/linux
```

## 2. config the latest linux kernel

```
cd /usr/src/linux  
cp /boot/config-`uname -r` .config
```

```
make oldconfig
```

此步骤需要一定的时间进行选择，一般选择N或n即可。

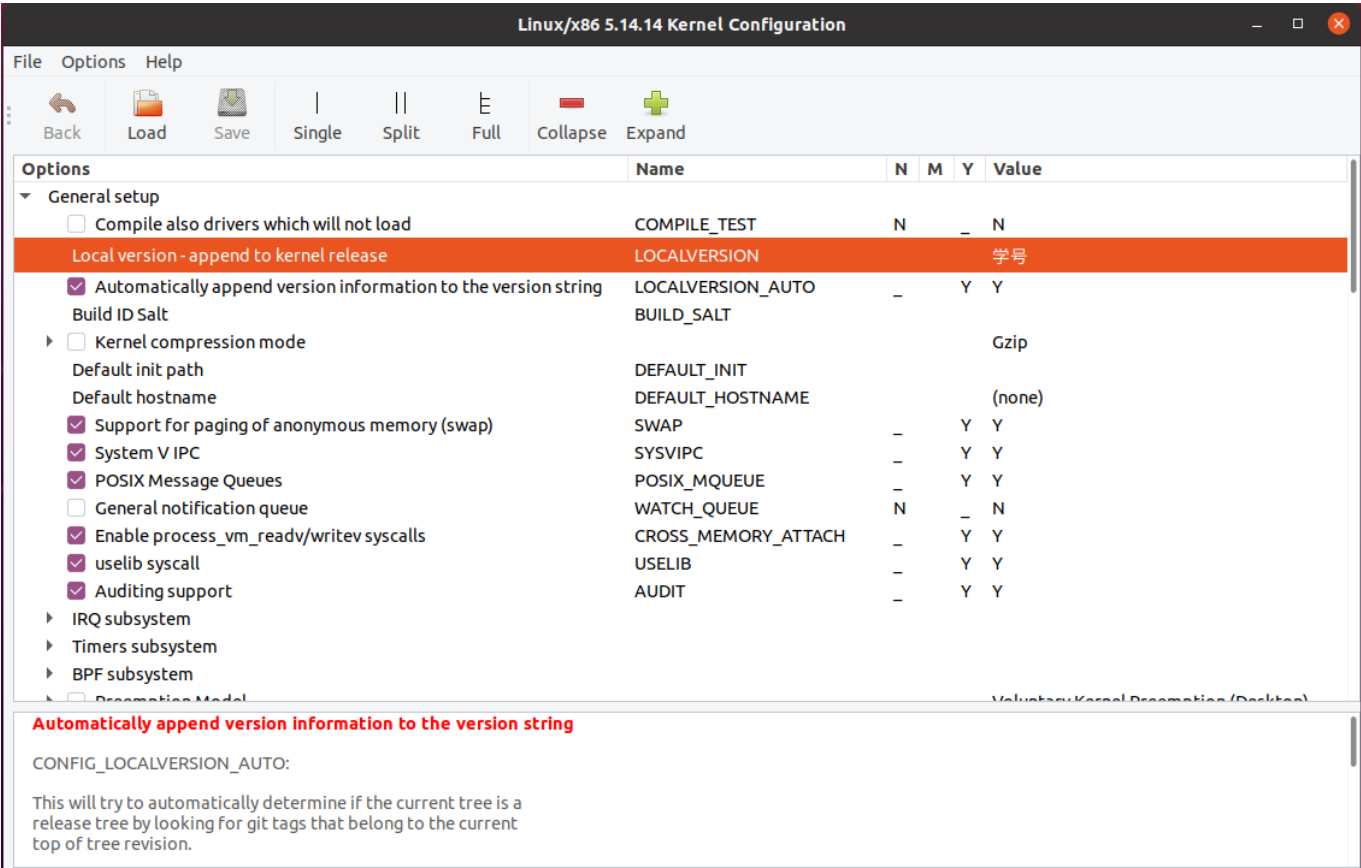
```
or: some wrong for the next command in linux-6.5.7  
yes " " | make oldconfig
```

```
make gconfig
```

## 3. customized config

### 3.1. add local version

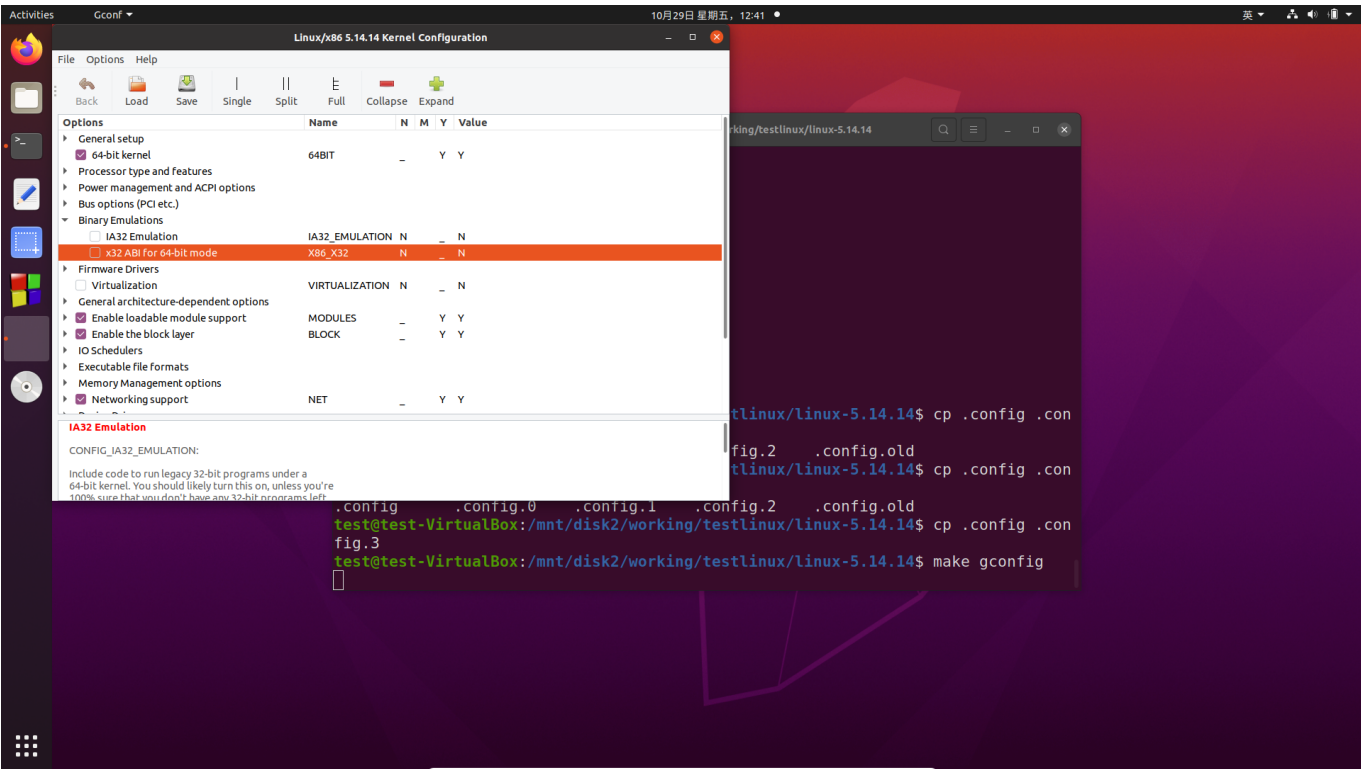
add your ID as local version 务必在新内核中嵌入你的学号！！



3.2. some errors

3.2.1 arch/x86/Makefile:148: CONFIG\_X86\_X32 enabled but no binutils support

solution:disable the Binary Emulations



3.2.2 No rule to make target 'debian/canonical-certs.pem', needed by 'certs/x509\_certificate\_list'

solution: set CONFIG\_SYSTEM\_TRUSTED\_KEYS=""

in cryptoXXX item of config

```
# Certificates for signature checking
#
CONFIG_MODULE_SIG_KEY="certs/signing_key.pem"
CONFIG_MODULE_SIG_KEY_TYPE_RSA=y
# CONFIG_MODULE_SIG_KEY_TYPE_ECDSA is not set
CONFIG_SYSTEM_TRUSTED_KEYRING=y

#CONFIG_SYSTEM_TRUSTED_KEYS="debian/canonical-certs.pem"
CONFIG_SYSTEM_TRUSTED_KEYS=""

CONFIG_SYSTEM_EXTRA_CERTIFICATE=y
CONFIG_SYSTEM_EXTRA_CERTIFICATE_SIZE=4096
CONFIG_SECONDARY_TRUSTED_KEYRING=y
CONFIG_SYSTEM_BLACKLIST_KEYRING=y
CONFIG_SYSTEM_BLACKLIST_HASH_LIST=""
CONFIG_SYSTEM_REVOCATION_LIST=y

#CONFIG_SYSTEM_REVOCATION_KEYS="debian/canonical-revoked-certs.pem"
CONFIG_SYSTEM_REVOCATION_KEYS=""
# CONFIG_SYSTEM_BLACKLIST_AUTH_UPDATE is not set
# end of Certificates for signature checking
```

#### (optional)4. clean the previous compilings

If you want to recompile , please execute the following command to clean the previous work:

```
make clean
```

#### 5. compile the latest linux kernel (long wait)

compile the latest linux kernel

```
make -j4
```

此步骤需要执行很长时间，也有可能会出错。为了确认确实正常编译成功了，可再执行一遍make，这次会很快完成。

```
$ make
CALL      scripts/checksyscalls.sh
DESCEND   objtool
INSTALL   libsubcmd_headers
CHK       kernel/kheaders_data.tar.xz
```

```
Kernel: arch/x86/boot/bzImage is ready  (#3)
$
```

install the latest linux kernel

```
sudo make modules_install
sudo make install
```

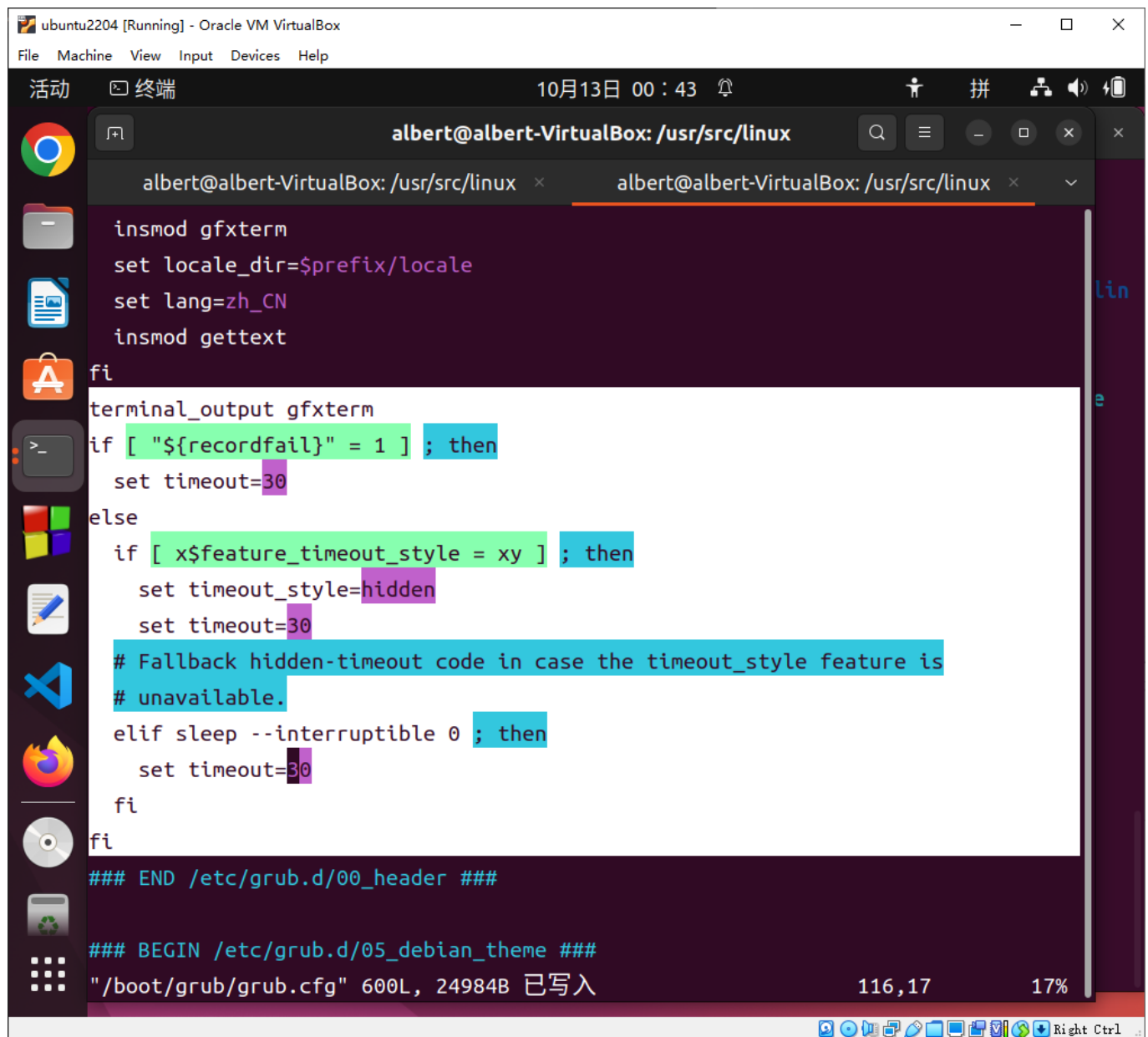
Successfully compiled:

```
/usr/src/linux$ sudo make install
INSTALL /boot
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 6.5.7AL20231012
/boot/vmlinuz-6.5.7AL20231012
update-initramfs: Generating /boot/initrd.img-6.5.7AL20231012
run-parts: executing /etc/kernel/postinst.d/unattended-upgrades 6.5.7AL20231012
/boot/vmlinuz-6.5.7AL20231012
run-parts: executing /etc/kernel/postinst.d/update-notifier 6.5.7AL20231012
/boot/vmlinuz-6.5.7AL20231012
run-parts: executing /etc/kernel/postinst.d/vboxadd 6.5.7AL20231012 /boot/vmlinuz-
6.5.7AL20231012
run-parts: executing /etc/kernel/postinst.d/xx-update-initrd-links 6.5.7AL20231012
/boot/vmlinuz-6.5.7AL20231012
I: /boot/initrd.img is now a symlink to initrd.img-6.5.7AL20231012
run-parts: executing /etc/kernel/postinst.d/zz-shim 6.5.7AL20231012 /boot/vmlinuz-
6.5.7AL20231012
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 6.5.7AL20231012
/boot/vmlinuz-6.5.7AL20231012
Sourcing file `/etc/default/grub'
Sourcing file `/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-6.5.7AL20231012
Found initrd image: /boot/initrd.img-6.5.7AL20231012
Found linux image: /boot/vmlinuz-6.2.0-34-generic
Found initrd image: /boot/initrd.img-6.2.0-34-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
done
/usr/src/linux$
```

6.(optional) modify the grub.cfg

```
sudo vi /boot/grub/grub.cfg
```

```
set timeout=30
```



```
ubuntu2204 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

活动 终端 10月13日 00:43

albert@albert-VirtualBox: /usr/src/linux
albert@albert-VirtualBox: /usr/src/linux

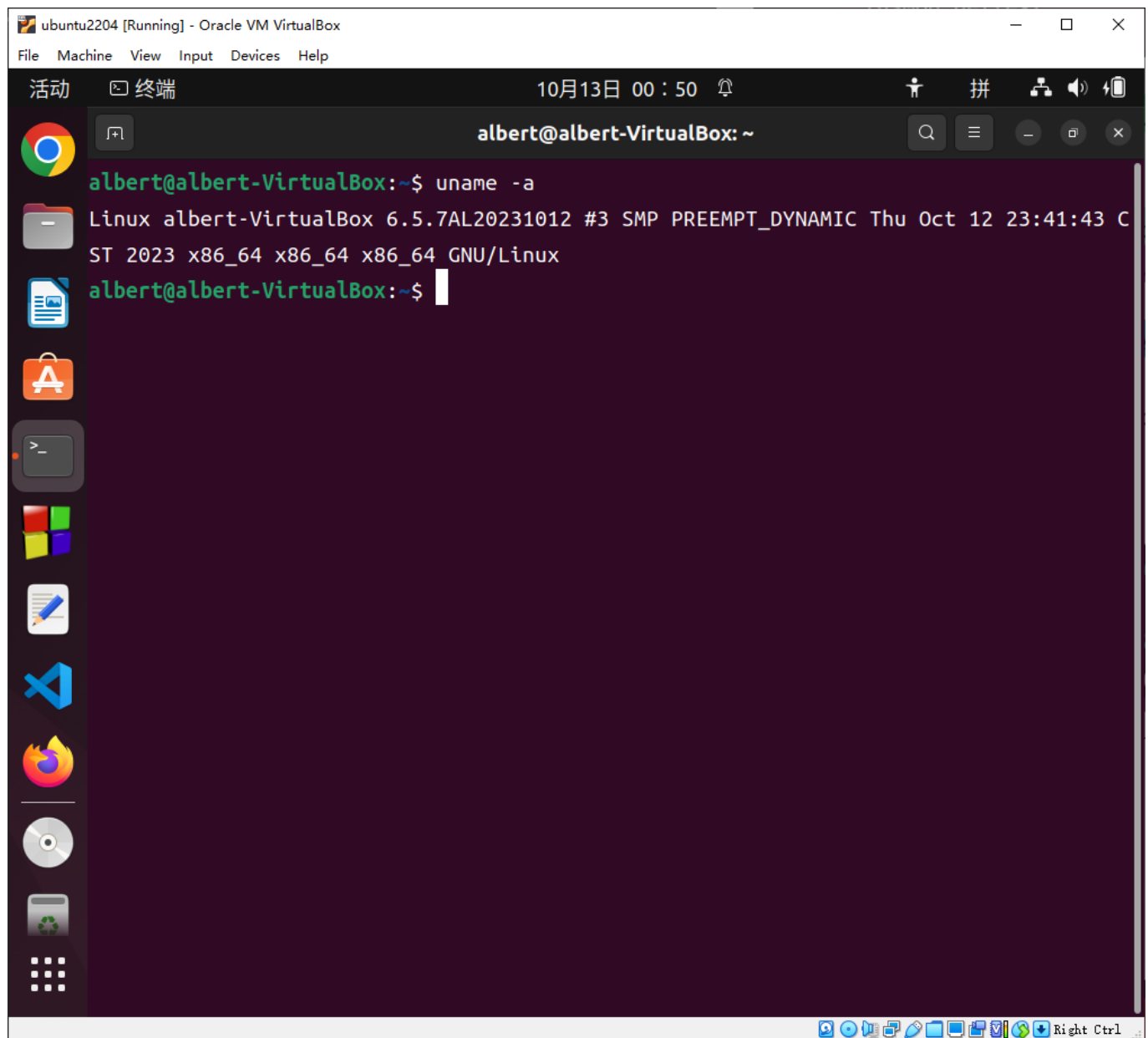
insmod gfxterm
set locale_dir=$prefix/locale
set lang=zh_CN
insmod gettext
fi
terminal_output gfxterm
if [ "${recordfail}" = 1 ] ; then
    set timeout=30
else
    if [ x$feature_timeout_style = xy ] ; then
        set timeout_style=hidden
        set timeout=30
        # Fallback hidden-timeout code in case the timeout_style feature is
        # unavailable.
    elif sleep --interruptible 0 ; then
        set timeout=30
    fi
fi
### END /etc/grub.d/00_header ###

### BEGIN /etc/grub.d/05_debian_theme ###
"/boot/grub/grub.cfg" 600L, 24984B 已写入 116,17 17%
```

## 7. boot ubuntu with the latest linux kernel

```
sudo reboot
```

```
uname -a
```



The screenshot shows a terminal window titled "ubuntu2204 [Running] - Oracle VM VirtualBox". The window has a menu bar with "File", "Machine", "View", "Input", "Devices", and "Help". Below the menu bar is a status bar showing "活动" (Activity), "终端" (Terminal), the date and time "10月13日 00:50", and system icons. The terminal itself has a title bar "albert@albert-VirtualBox: ~" and a search bar. The command prompt is "albert@albert-VirtualBox:~\$". The command "uname -a" has been executed, and the output is displayed in green text: "Linux albert-VirtualBox 6.5.7AL20231012 #3 SMP PREEMPT\_DYNAMIC Thu Oct 12 23:41:43 CST 2023 x86\_64 x86\_64 x86\_64 GNU/Linux". The terminal window is part of a desktop environment with a dark purple background and a sidebar on the left containing icons for various applications like Chrome, Files, LibreOffice, and others. The bottom of the window shows a taskbar with icons for the applications and a "Right Ctrl" button.

```
albert@albert-VirtualBox:~$ uname -a
Linux albert-VirtualBox 6.5.7AL20231012 #3 SMP PREEMPT_DYNAMIC Thu Oct 12 23:41:43 CST 2023 x86_64 x86_64 x86_64 GNU/Linux
albert@albert-VirtualBox:~$
```

End.