

南京航空航天大学《计算机组成原理II课程设计》报告

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- 报告阶段：PA0
- 完成日期：2021.3.12
- 本次实验，我完成了所有内容。

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思考题

1. **Redhat**使用数量大，资料多。Redhat的包管理方式采用的是基于RPM包的YUM包管理方式，包分发方式是编译好的二进制文件。稳定性方面RHEL和CentOS的稳定性非常好，适合于服务器使用，但是Fedora Core的稳定性较差，最好只用于桌面应用。

Debian是社区类Linux的典范，是迄今为止最遵循GNU规范的Linux系统。Debian最具特色的是apt-get / dpkg包管理方式。Debian的资料也很丰富，有很多支持的社区。

CentOS每个版本的CentOS都会获得十年的支持（通过安全更新方式），新版本的CentOS大约每两年发行一次。而每个版本的CentOS会定期（大概每六个月）更新一次，以便支持新的硬件。通过这样建立一个安全、低维护、稳定、高预测性、高重复性的Linux环境。

Ubuntu是基于Debian的unstable版本加强而来，特点是界面非常友好，容易上手，对硬件的支持非常全面。

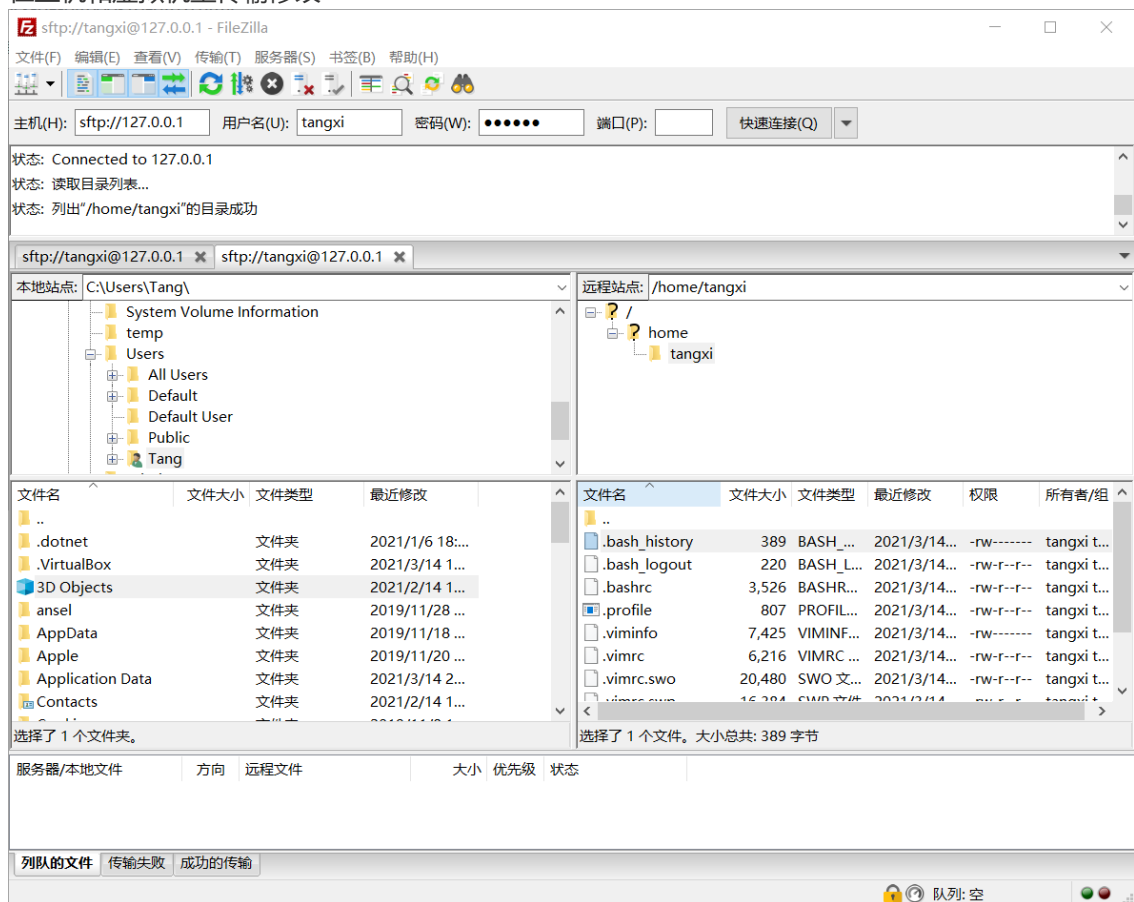
2. 因为32位系统的地址可以支配32根地址线，其内存上限是 2^{32} ，也就是他内存寻址能力的极限就是4Gb。
3. Why Windows is quite 'fat'?

因为Windows为了向下兼容其他的版本，又或者是其他各种硬件，会多出了很多驱动程序。而Linux对硬件要求比较低，堆内存控制比较好，所以需要内存比较小。

7. 使用make来组织helloworld

```
tangxi@debian: ~  
logout  
tangxi@debian:~$ cd project  
-bash: cd: project: No such file or directory  
tangxi@debian:~$ cd project/  
-bash: cd: project/: No such file or directory  
tangxi@debian:~$ ls  
hello.c vimrc  
tangxi@debian:~$ su -  
Password:  
root@debian:~# cd project/  
root@debian:~/project# ls  
>  
hello.c Makefile  
root@debian:~/project#  
root@debian:~/project# ls  
hello.c Makefile  
root@debian:~/project# make  
gcc hello.c -o ./hello  
root@debian:~/project# vim makefile  
root@debian:~/project# ls  
hello hello.c makefile Makefile  
root@debian:~/project# ./hello  
helloworld!  
root@debian:~/project# vim makefile  
root@debian:~/project# rm ./hello  
root@debian:~/project# make  
gcc hello.c -o ./hello  
root@debian:~/project# vim makefile  
root@debian:~/project# make clean  
rm ./hello  
root@debian:~/project# ls  
hello.c makefile Makefile  
root@debian:~/project# make  
gcc hello.c -o ./hello  
root@debian:~/project# make clean  
rm ./hello  
root@debian:~/project#
```

8. 在主机和虚拟机里传输修改



```
hello.c
1  #include<stdio.h>
2  int main()
3  {
4      int i;
5      for(i=0; i<10; i++)
6      {
7          printf("hello world!\n");
8      }
9      return 0;
10 }
```

```
tangxi@debian: ~
make: 'hello' is up to date.
root@debian:~/project# ls
hello hello.c makefile Makefile
root@debian:~/project# make clean
rm ./hello
root@debian:~/project# make run
gcc hello.c -o ./hello
./hello
helloworld!root@debian:~/project# make
make: 'hello' is up to date.
root@debian:~/project# make clean
rm ./hello
root@debian:~/project# make run
gcc hello.c -o ./hello
./hello
helloworld!root@debian:~/project# vim hello.c
root@debian:~/project# vim hello.c
root@debian:~/project# make clean
rm ./hello
root@debian:~/project# make run
gcc hello.c -o ./hello
./hello
helloworld!helloworld!helloworld!helloworld!helloworld!helloworld!hel
loworld!helloworld!helloworld!root@debian:~/project#
```

9. 现在, `STU_ID` 在中修改变量 `nemu/Makefile.git`

```

tangxi@debian: ~/ics2021
modified my STU_ID
# Please enter the commit message for your changes. Lines starting
# with '#' will be ignored, and an empty message aborts the commit.
#
# On branch pa0
# Changes to be committed:
#   modified:   nemu/Makefile.git
#
~
~
~
~
~
~
~
~
~
~
-- INSERT -- 1,19 All
For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./build/nemu...done.
(gdb) br main
Breakpoint 1 at 0x33e0: file src/main.c, line 6.
(gdb) r
Starting program: /home/tangxi/ics2021/nemu/build/nemu -l ./build/nemu-log.txt
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/i386-linux-gnu/libthread_db.so.1".

Breakpoint 1, main (argc=3, argv=0xbffff604) at src/main.c:6
6      int is_batch_mode = init_monitor(argc, argv);
(gdb) c
Continuing.
nemu: src/cpu/reg.c:21: reg_test: Assertion `reg_w(i) == (sample[i] & 0xffff)' failed.

Program received signal SIGABRT, Aborted.
0xb7fd4d31 in __kernel_vsyscall ()
(gdb) q
A debugging session is active.

    Inferior 1 [process 880] will be killed.

Quit anyway? (y or n) y
tangxi@debian:~/ics2021/nemu$

tangxi@debian: ~/ics2021/nemu
(gdb) c
Continuing.
nemu: src/cpu/reg.c:21: reg_test: Assertion `reg_w(i) == (sample[i] & 0xffff)' f

Program received signal SIGABRT, Aborted.
0xb7fd4d31 in __kernel_vsyscall ()
(gdb) q
A debugging session is active.

    Inferior 1 [process 880] will be killed.

Quit anyway? (y or n) y
tangxi@debian:~/ics2021/nemu$ git checkout
tangxi@debian:~/ics2021/nemu$ git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/2021'.
tangxi@debian:~/ics2021/nemu$ git checkout pa0
Switched to branch 'pa0'
tangxi@debian:~/ics2021/nemu$ git comit --allow-empty
git: 'comit' is not a git command. See 'git --help'.

The most similar command is
    commit

```

```
tangxi@debian: ~/ics2021
Makefile:3: /Makefile.lib: No such file or directory
make[2]: *** No rule to make target '/Makefile.lib'. Stop.
make[2]: Leaving directory '/home/tangxi/ics2021/nexus-am/libs/fixmath'
make[1]: [Makefile:11: libs/fixmath/] Error 2 (ignored)
make[1]: Leaving directory '/home/tangxi/ics2021/nexus-am'
make -C nanos-lite clean
make[1]: Entering directory '/home/tangxi/ics2021/nanos-lite'
Makefile:4: /Makefile.app: No such file or directory
make[1]: *** No rule to make target '/Makefile.app'. Stop.
make[1]: Leaving directory '/home/tangxi/ics2021/nanos-lite'
make: [Makefile:9: clean] Error 2 (ignored)
make -C navy-apps clean
make[1]: Entering directory '/home/tangxi/ics2021/navy-apps'
Makefile.check:3: *** Must set NAVY_HOME environment variable. Stop.
make[1]: Leaving directory '/home/tangxi/ics2021/navy-apps'
make: [Makefile:10: clean] Error 2 (ignored)
git gc
Enumerating objects: 1146, done.
Counting objects: 100% (1146/1146), done.
Compressing objects: 100% (894/894), done.
Writing objects: 100% (1146/1146), done.
Total 1146 (delta 216), reused 1133 (delta 208)
cd .. && tar cj ics2021 > 161920122.tar.bz2
tangxi@debian:~/ics2021$
```

10. 首先，编译器将高级语言转换为一系列的符号序列。接下来，编译器解析编程语言。随后，编译器执行语法分析来创建源的表示和源的语义含义。随后构建构建语法树。最后，编译器将输出结果。
11. Because this program has no input, so you can use the calculator, memory, controller, output device to build a computer. The controller sends instructions to let the calculator read the data from the memory, and then the calculator gets the results, which are finally converted into natural language and output to the output device.

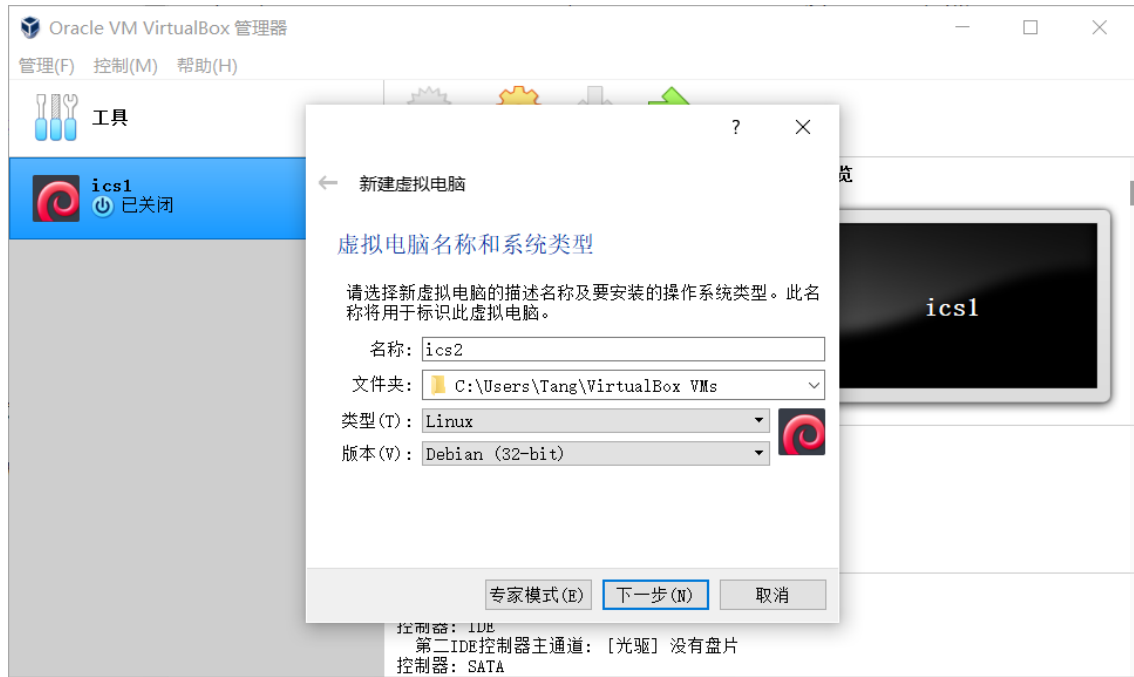
实验内容

PA0.1 Installing a GNU/Linux VM

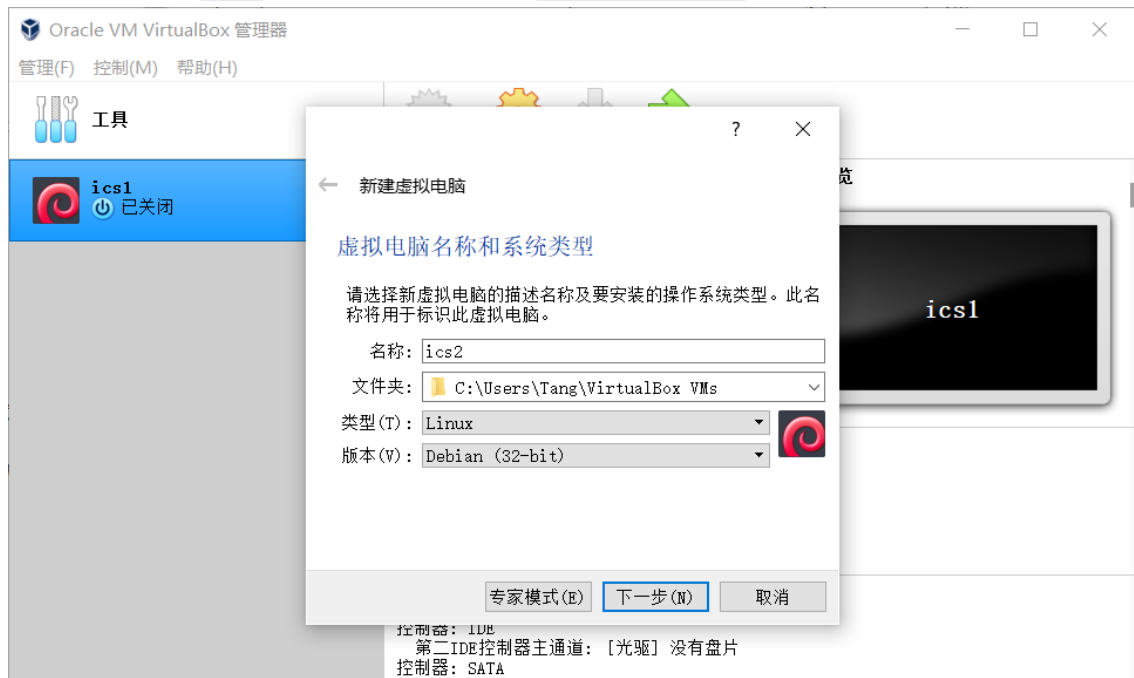
1. 打开 `Oracle VM VirtualBox Manager`。



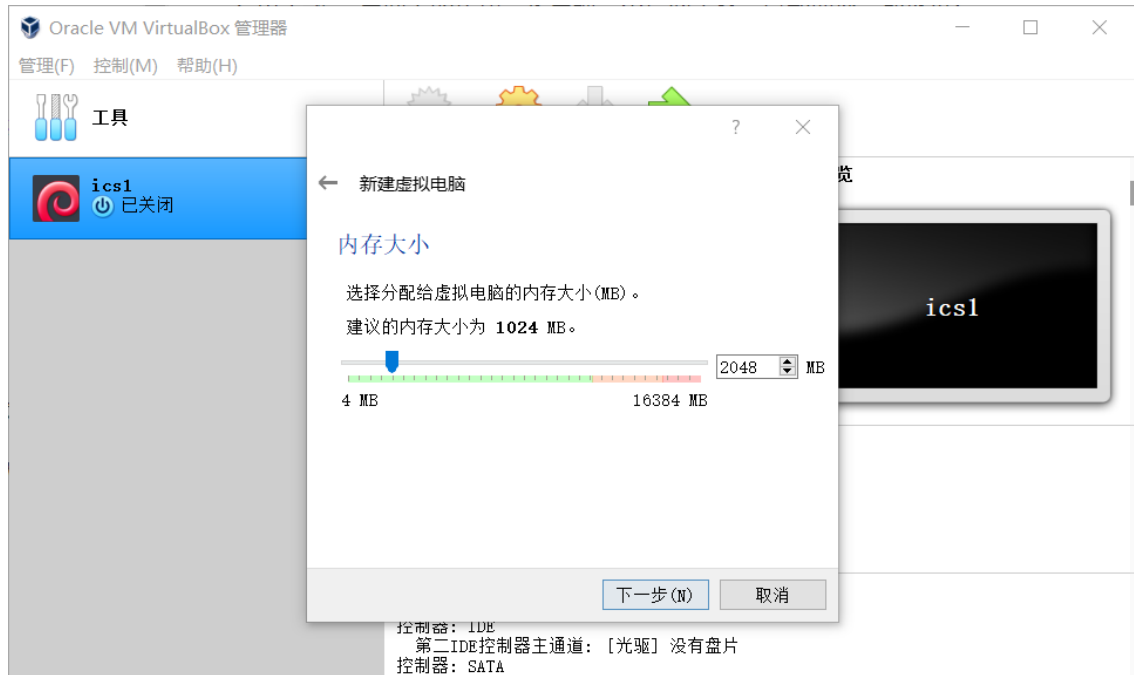
2. 点击 **New** 按钮建立一个新的虚拟机；



3. 设定虚拟机名称 **ics2**，选择操作系统类型为 **Debian (32-bit)**；

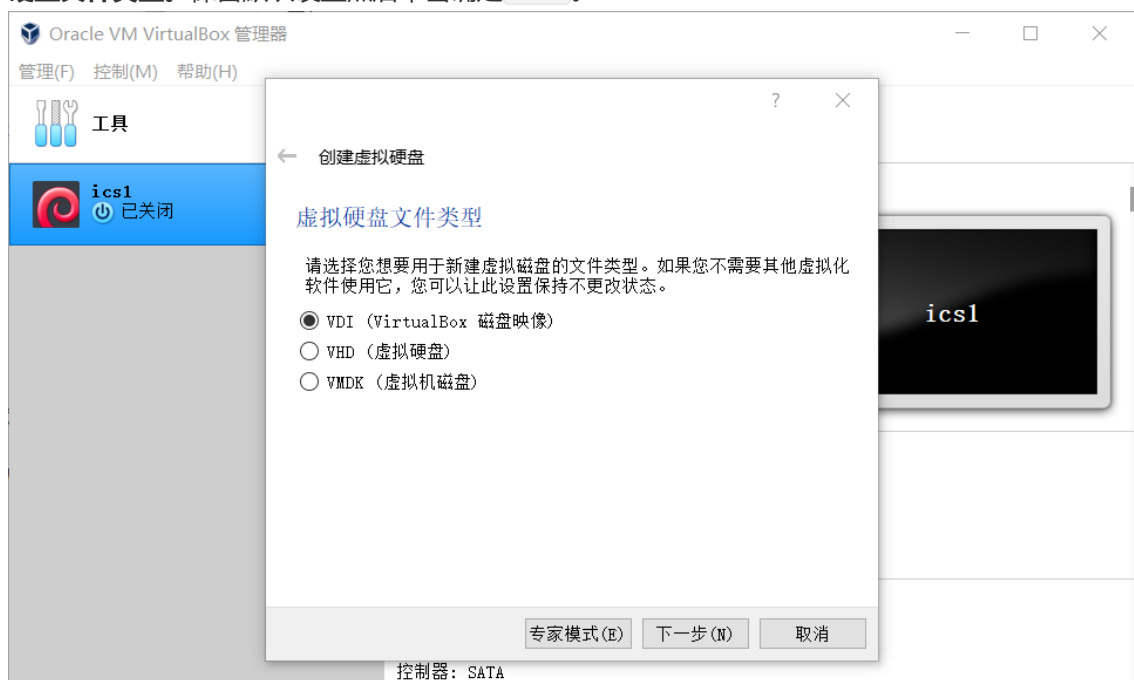


4. 设定内存大小，我给我的虚拟机设定了 2048MB 的内存；

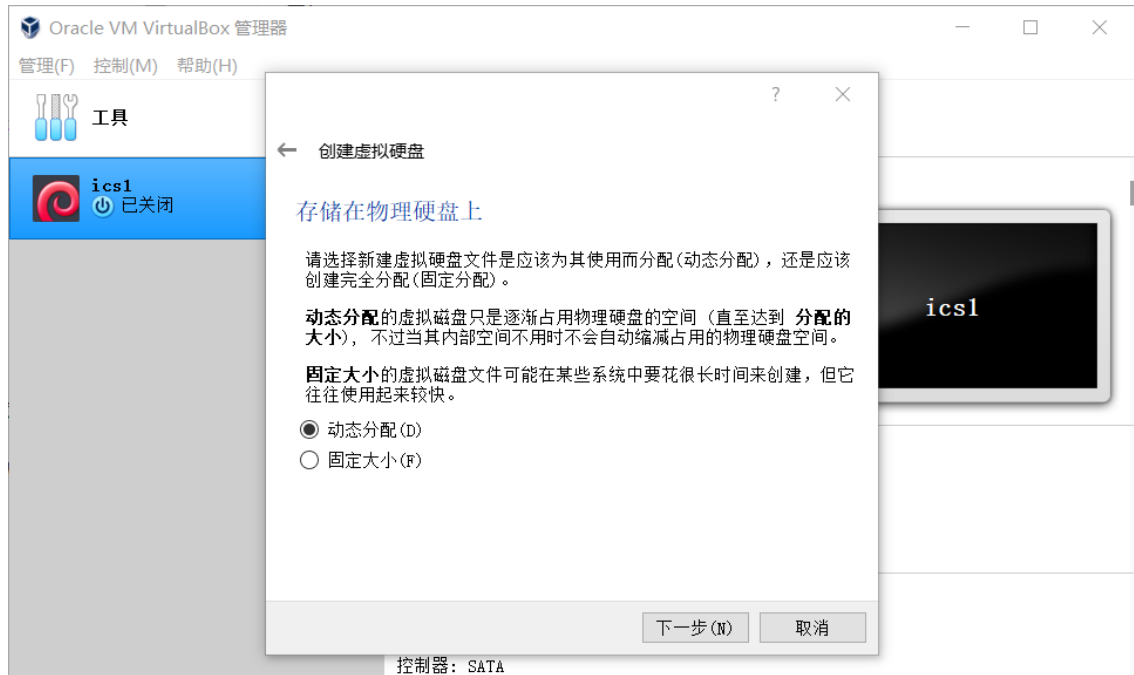


5. 选择 Create a virtual hard disk now 为VM创建硬盘，否则将没有可用空间安装OS。然后单击 Create。

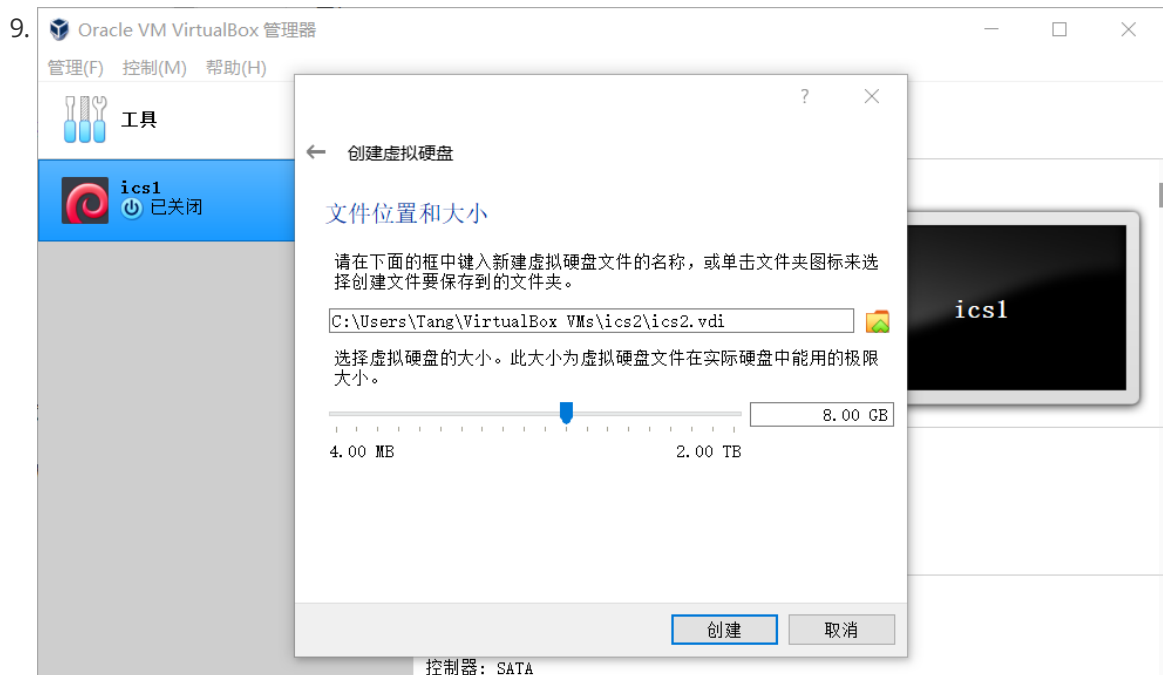
6. 硬盘文件类型。保留默认设置然后单击确定 Next。



7. 存储在物理硬盘上。保留默认选择 `Dynamically allocated`。然后点击 `Next`。

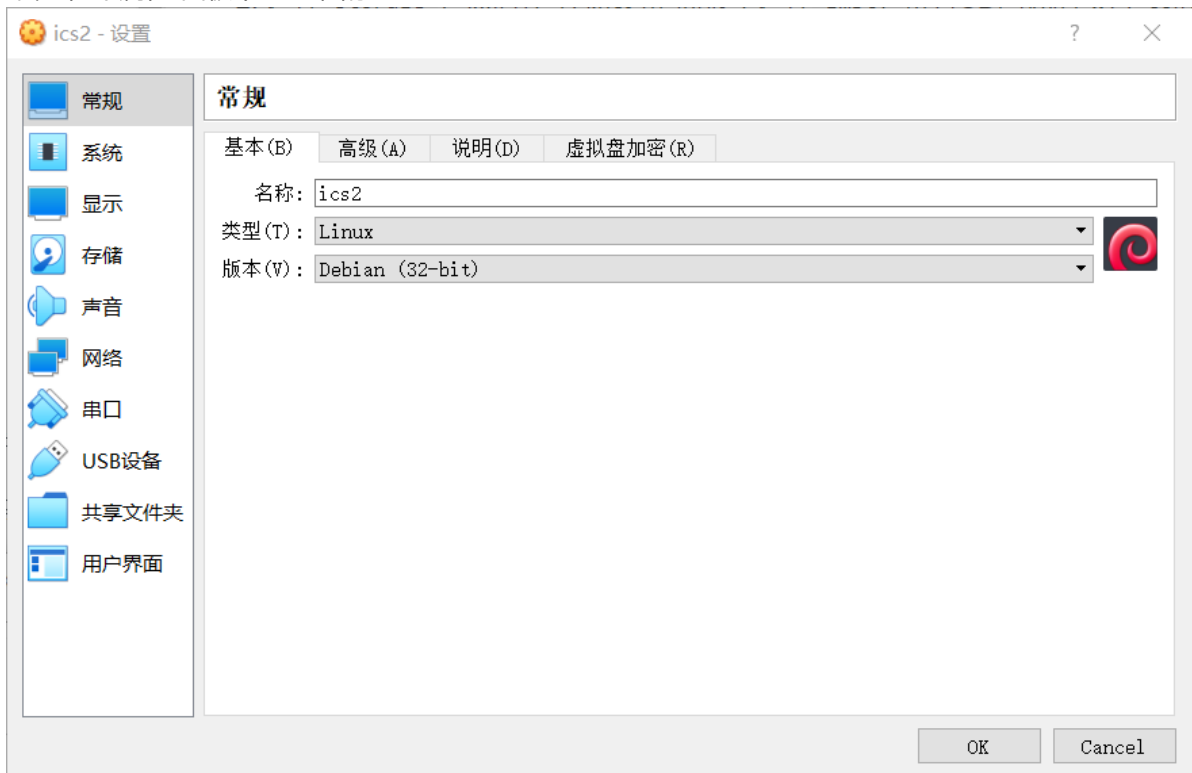


8. 选择文件位置和大小。保留默认设置。然后点击 `Create`。

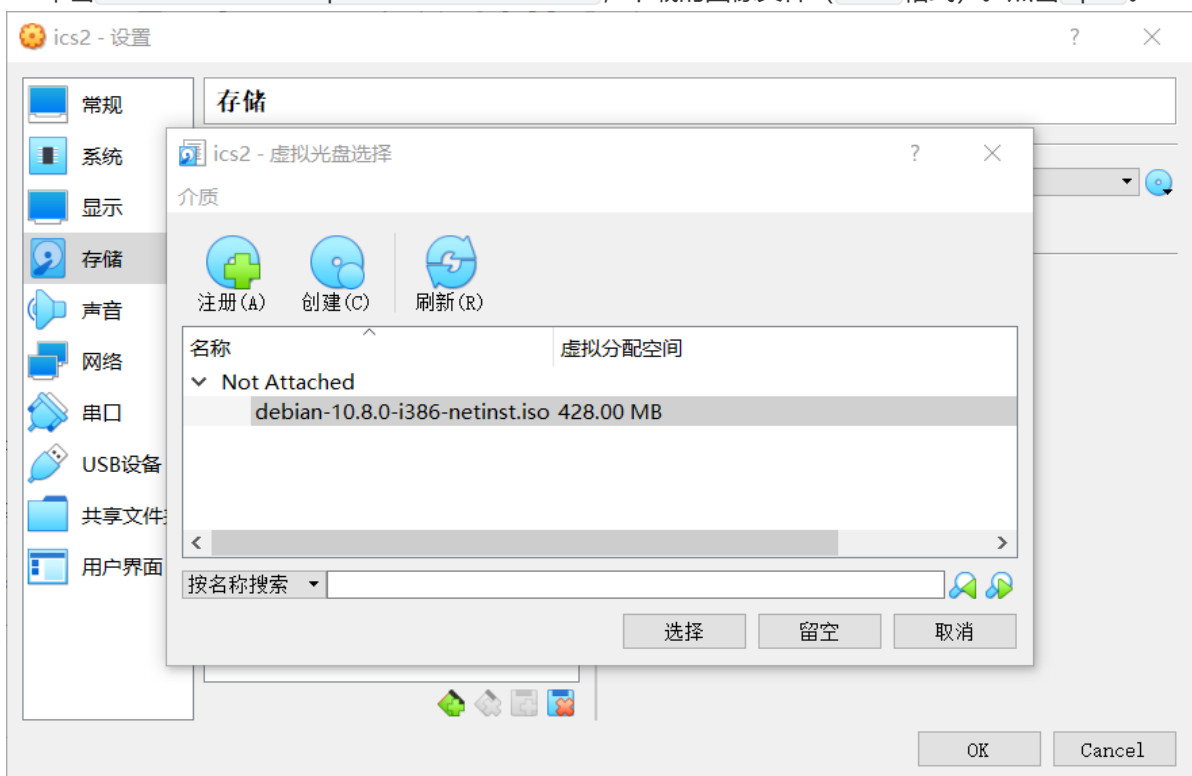


10. 加载debian安装镜像。在边栏上选择新创建的VM，然后 `settings` 在工具栏上选择。（如果您觉得窗口太小，可以单击 菜单栏中的“查看”，再单击“虚拟屏幕1”，然后选择一个合适的窗口。）

11.选择 Storage，然后在“存储设备”面板中选择 Empty 带有CD图标的项目 Controller: IDE。接下来，单击“属性”面板中的CD图标。

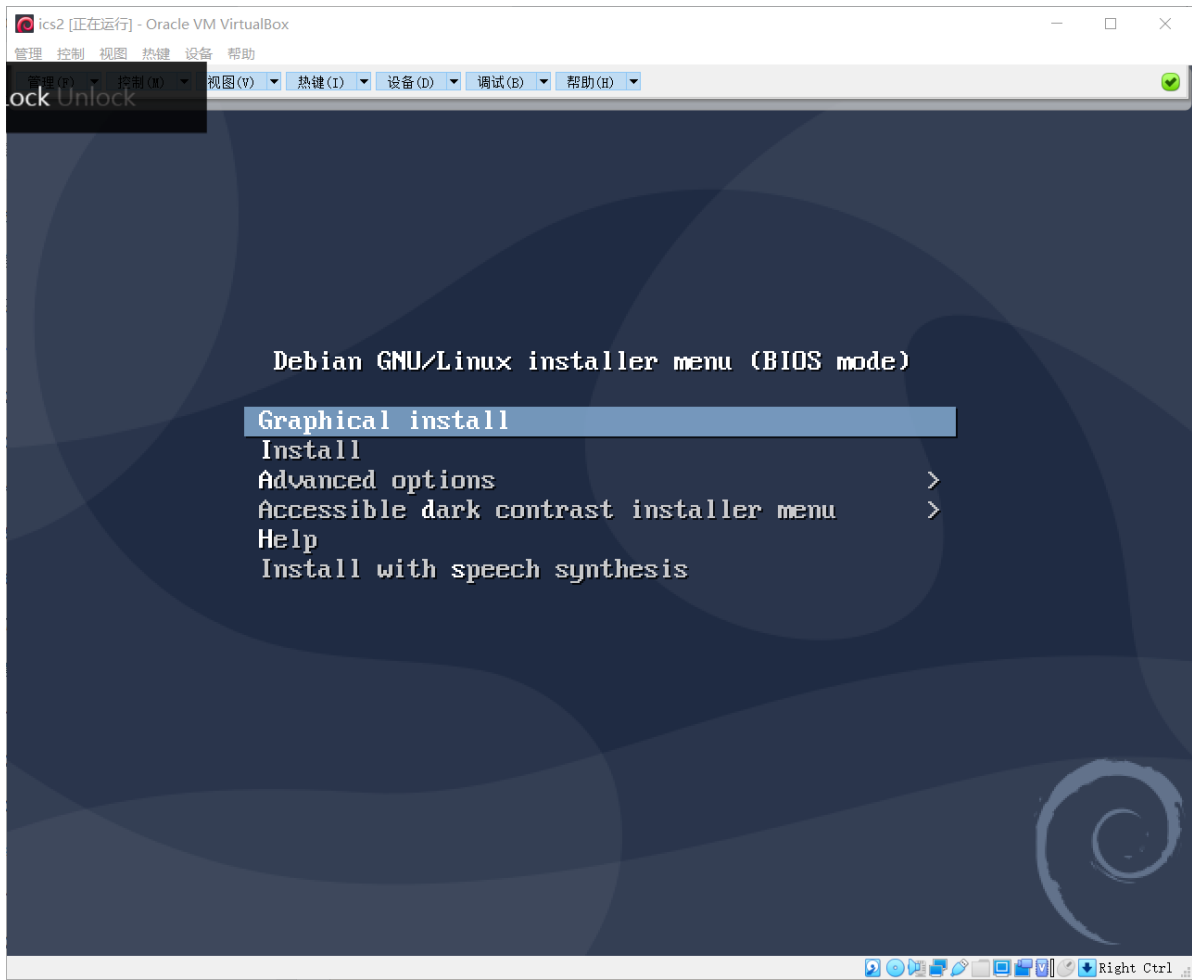


12.单击 Choose Virtual Optical Disk File...，下载的图像文件（.iso 格式）。点击 Open。

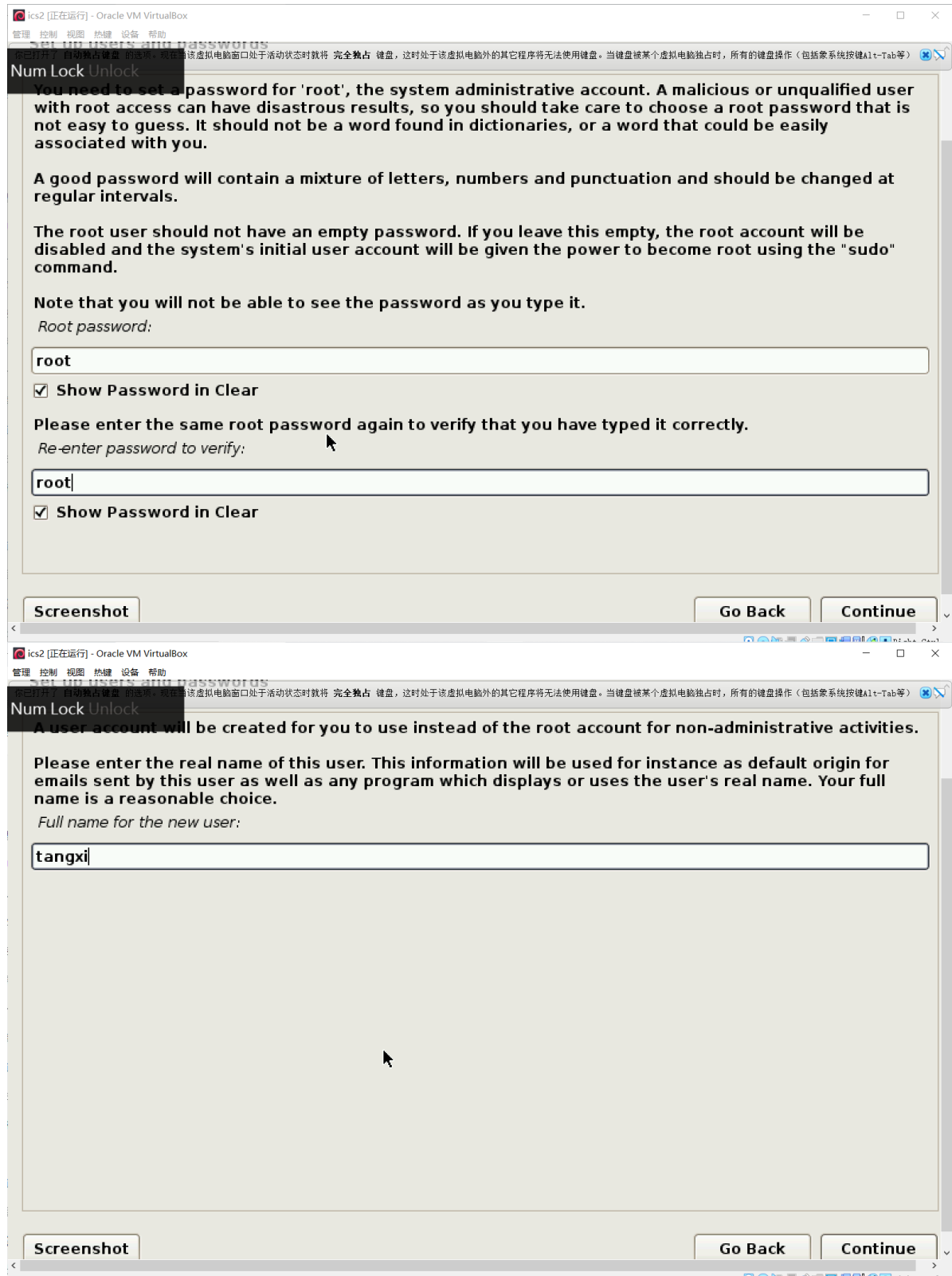


13.单击 OK Storage界面的底部。

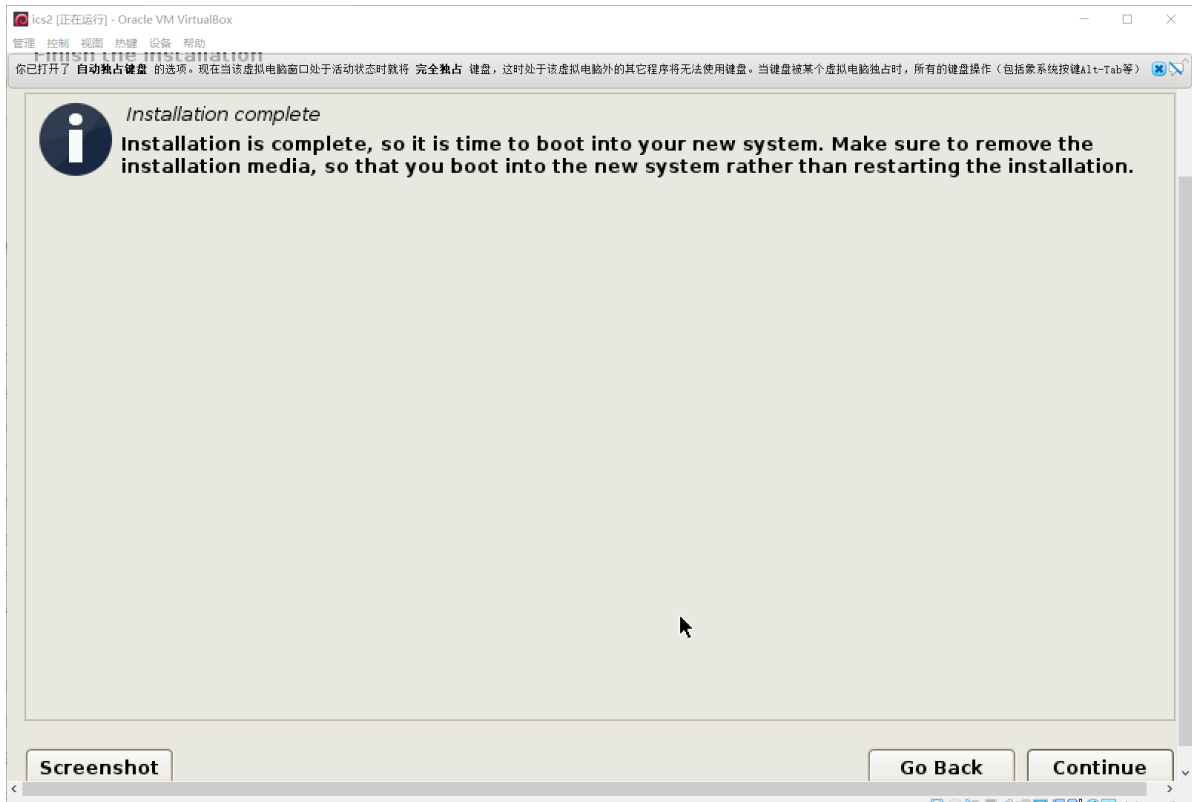
14.单击 Start 启动创建的VM，根据步骤在在VM中安装Debian中安装 debian 镜像



16.设置根密码和用户名

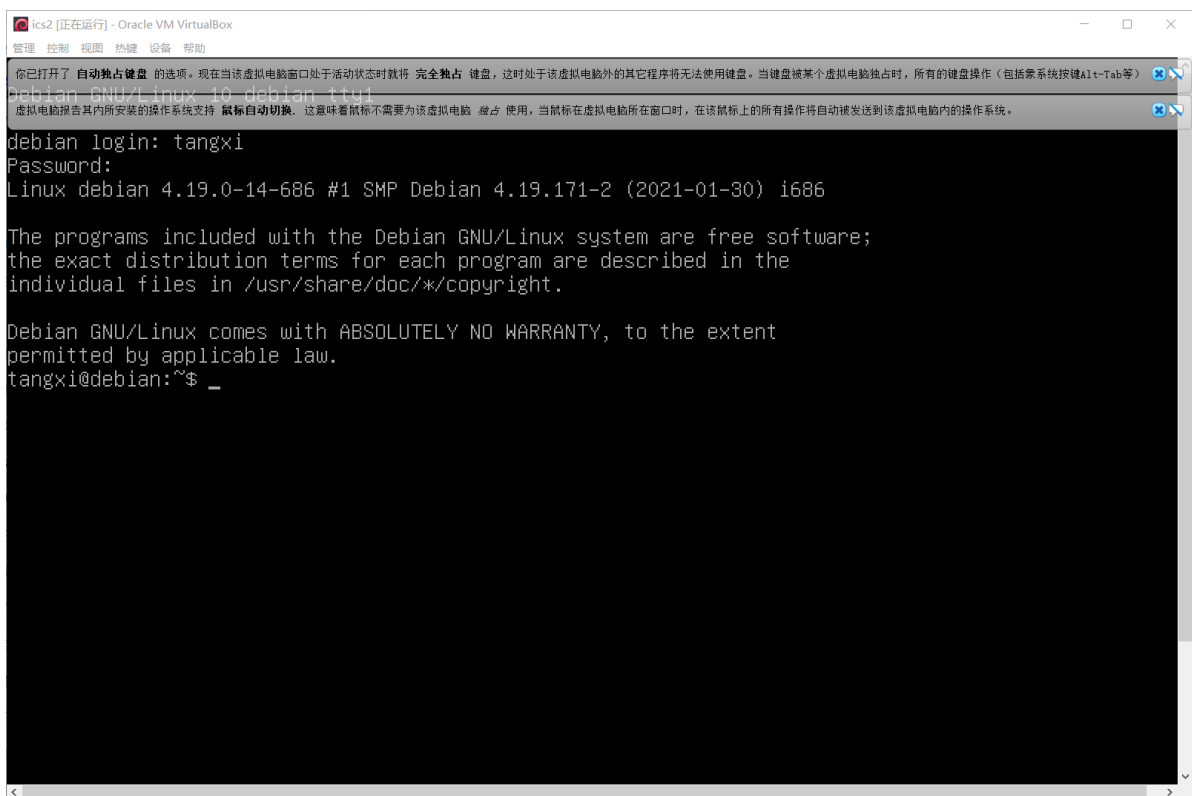


17.打开网络连接并取出CD，完成安装。



PA0.2 First Step into Linux

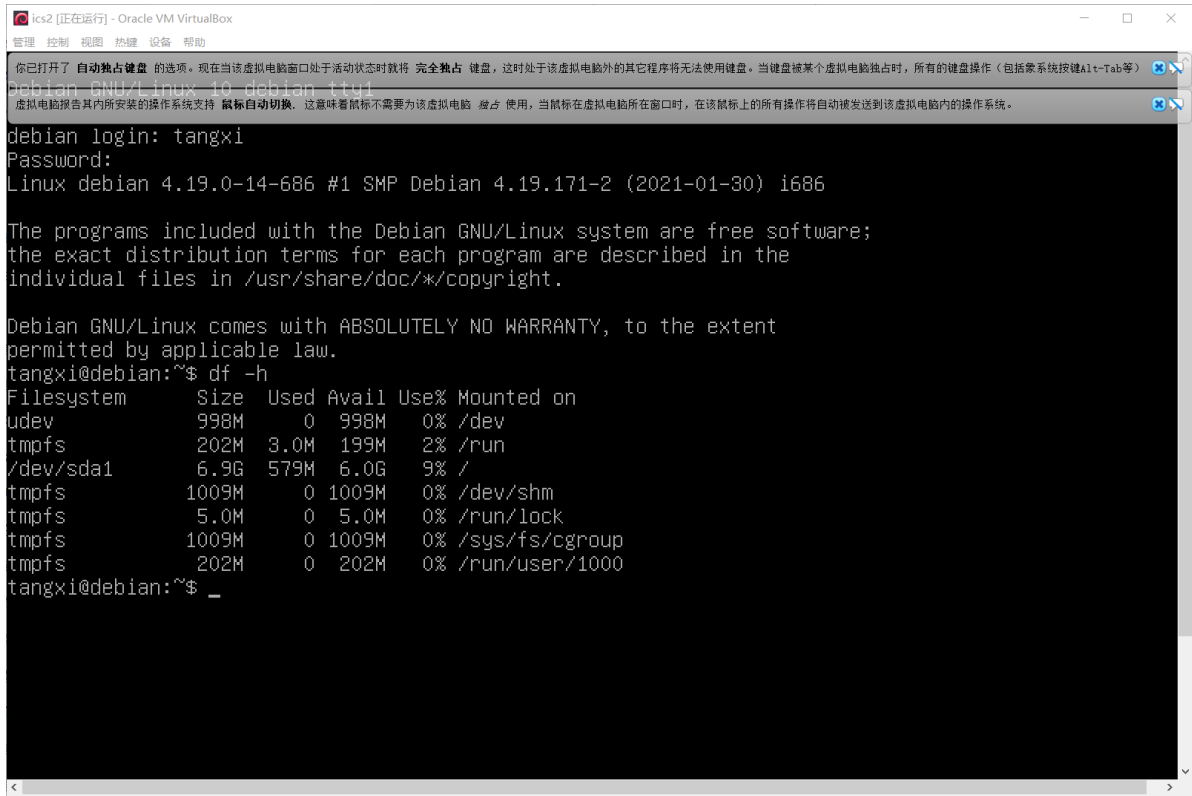
打开虚拟机，登录系统：



用命令

```
df -h
```

可以看到 Debian 占用了多少硬盘空间，这个空间比安装 Windows 要小得多



```
ics2 [正在运行] - Oracle VM VirtualBox
管理 控制 视图 热键 设备 帮助
你已打开了 自动独占键盘 的选项。现在当该虚拟电脑窗口处于活动状态时就将 完全独占 键盘，这时处于该虚拟电脑外的其它程序将无法使用键盘。当键盘被某个虚拟电脑独占时，所有的键盘操作（包括象系统按键Alt-Tab等）
虚拟电脑报告其所安装的操作系统支持 鼠标自动切换。这意味着鼠标不需要为该虚拟电脑 独占 使用，当鼠标在虚拟电脑所在窗口时，在该鼠标上的所有操作将自动被发送到该虚拟电脑内的操作系统。

debian login: tangxi
Password:
Linux debian 4.19.0-14-686 #1 SMP Debian 4.19.171-2 (2021-01-30) i686

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
tangxi@debian:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            998M   0  998M   0% /dev
tmpfs           202M  3.0M  199M   2% /run
/dev/sda1       6.9G  579M  6.0G   9% /
tmpfs           1009M   0 1009M   0% /dev/shm
tmpfs           5.0M   0   5.0M   0% /run/lock
tmpfs           1009M   0 1009M   0% /sys/fs/cgroup
tmpfs           202M   0   202M   0% /run/user/1000
tangxi@debian:~$ _
```

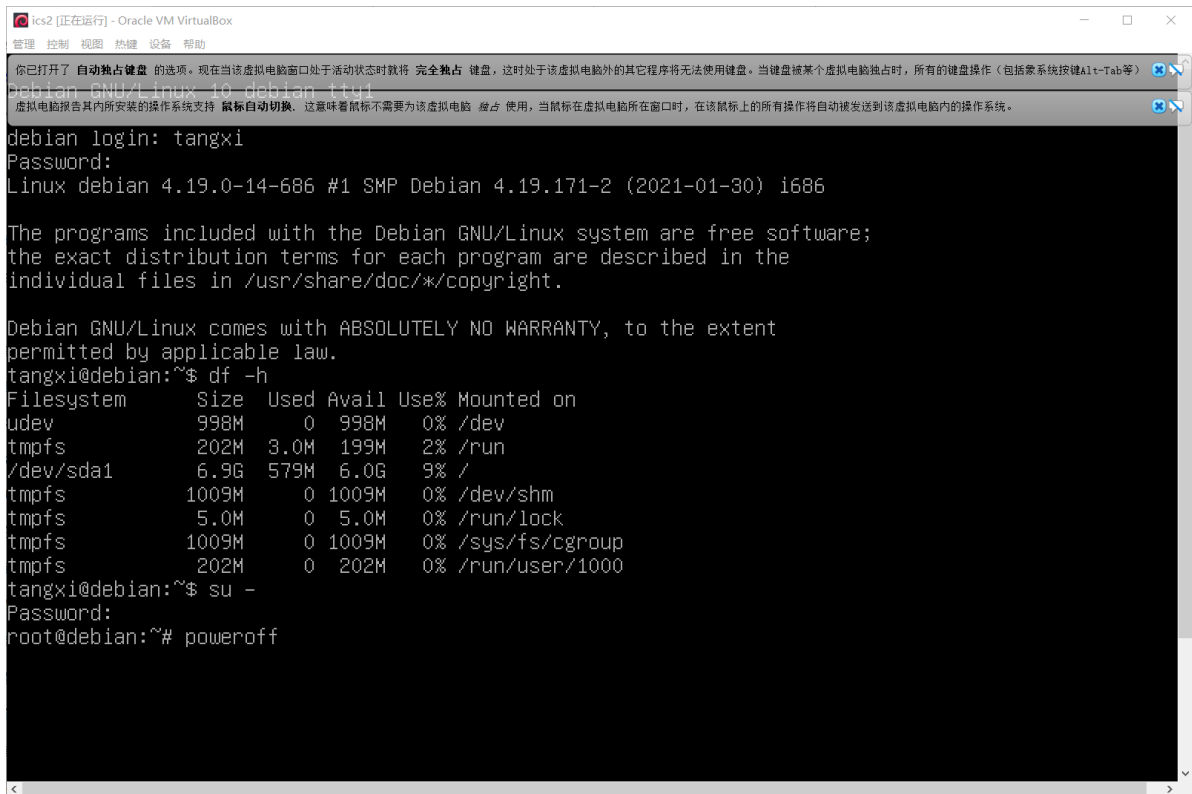
尝试关机，输入命令

```
su -
```

输入root密码，进入root账户

输入命令

```
poweroff
```



```
ics2 [正在运行] - Oracle VM VirtualBox
管理 控制 视图 热键 设备 帮助
你已打开了 自动独占键盘 的选项。现在当该虚拟电脑窗口处于活动状态时就将 完全独占 键盘，这时处于该虚拟电脑外的其它程序将无法使用键盘。当键盘被某个虚拟电脑独占时，所有的键盘操作（包括象系统按键Alt-Tab等）
虚拟电脑报告其所安装的操作系统支持 鼠标自动切换。这意味着鼠标不需要为该虚拟电脑 独占 使用，当鼠标在虚拟电脑所在窗口时，在该鼠标上的所有操作将自动被发送到该虚拟电脑内的操作系统。

debian login: tangxi
Password:
Linux debian 4.19.0-14-686 #1 SMP Debian 4.19.171-2 (2021-01-30) i686

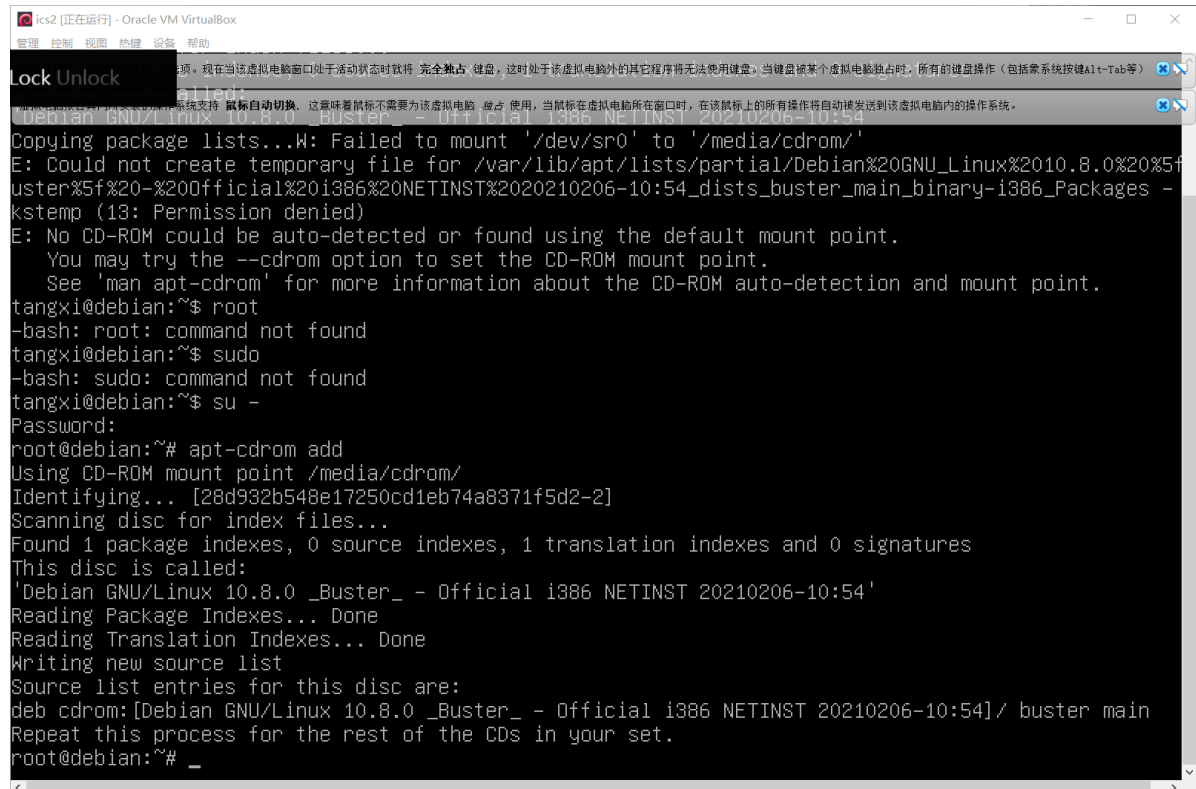
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
tangxi@debian:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            998M   0  998M   0% /dev
tmpfs           202M  3.0M  199M   2% /run
/dev/sda1       6.9G  579M  6.0G   9% /
tmpfs           1009M   0 1009M   0% /dev/shm
tmpfs           5.0M   0   5.0M   0% /run/lock
tmpfs           1009M   0 1009M   0% /sys/fs/cgroup
tmpfs           202M   0   202M   0% /run/user/1000
tangxi@debian:~$ su -
Password:
root@debian:~# poweroff
```

**PA0.3Installing Basic Tools

切换到根账户，输入命令

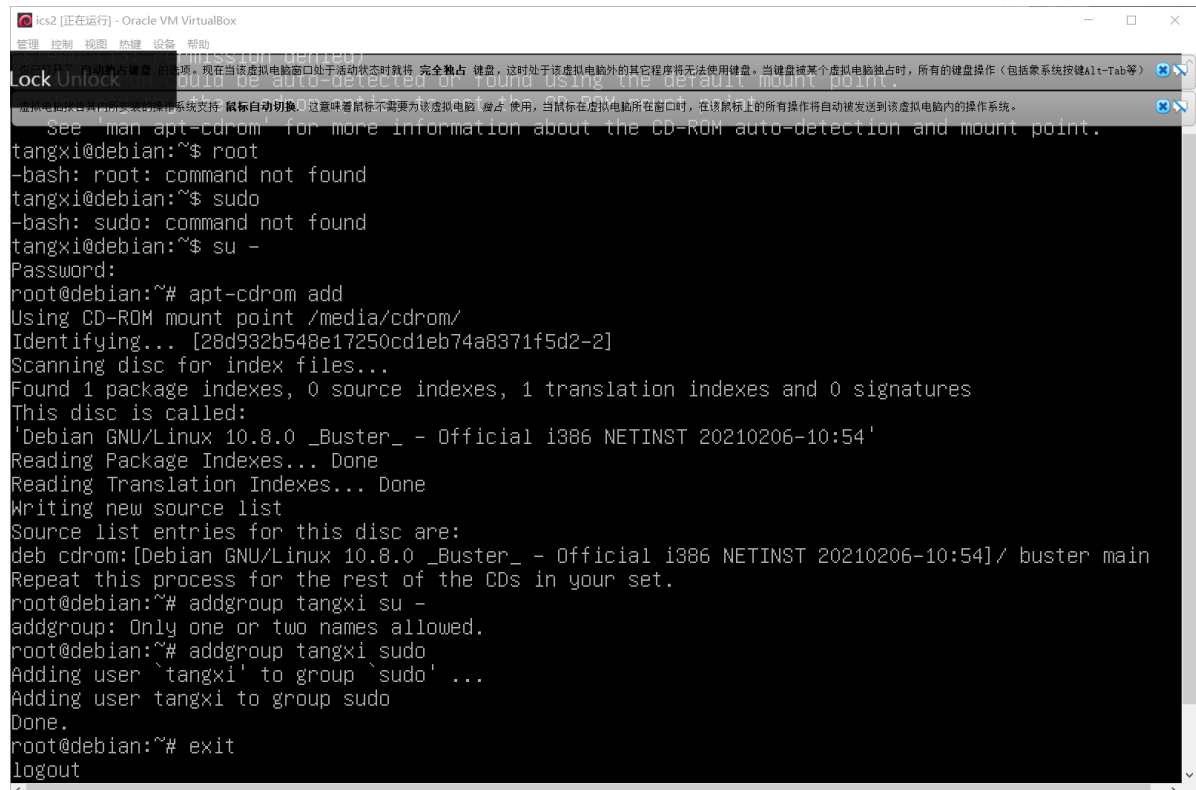
```
apt-cdrom add
```



```
ics2 [正在运行] - Oracle VM VirtualBox
管理 控制 视图 热键 设备 帮助
Lock Unlock
Copying package lists...W: Failed to mount '/dev/sr0' to '/media/cdrom/'
E: Could not create temporary file for /var/lib/apt/lists/partial/Debian%20GNU_Linux%2010.8.0%20%5f
uster%5f%20-%20Official%20i386%20NETINST%2020210206-10:54_dists_buster_main_binary-i386_Packages -
kstemp (13: Permission denied)
E: No CD-ROM could be auto-detected or found using the default mount point.
You may try the --cdrom option to set the CD-ROM mount point.
See 'man apt-cdrom' for more information about the CD-ROM auto-detection and mount point.
tangxi@debian:~$ root
-bash: root: command not found
tangxi@debian:~$ sudo
-bash: sudo: command not found
tangxi@debian:~$ su -
Password:
root@debian:~# apt-cdrom add
Using CD-ROM mount point /media/cdrom/
Identifying... [28d932b548e17250cd1eb74a8371f5d2-2]
Scanning disc for index files...
Found 1 package indexes, 0 source indexes, 1 translation indexes and 0 signatures
This disc is called:
'Debian GNU/Linux 10.8.0 _Buster_ - Official i386 NETINST 20210206-10:54'
Reading Package Indexes... Done
Reading Translation Indexes... Done
Writing new source list
Source list entries for this disc are:
deb cdrom:[Debian GNU/Linux 10.8.0 _Buster_ - Official i386 NETINST 20210206-10:54]/ buster main
Repeat this process for the rest of the CDs in your set.
root@debian:~# _
```

成功运行

将账户添加到sudo组中



```
ics2 [正在运行] - Oracle VM VirtualBox
管理 控制 视图 热键 设备 帮助
Lock Unlock
See 'man apt-cdrom' for more information about the CD-ROM auto-detection and mount point.
tangxi@debian:~$ root
-bash: root: command not found
tangxi@debian:~$ sudo
-bash: sudo: command not found
tangxi@debian:~$ su -
Password:
root@debian:~# apt-cdrom add
Using CD-ROM mount point /media/cdrom/
Identifying... [28d932b548e17250cd1eb74a8371f5d2-2]
Scanning disc for index files...
Found 1 package indexes, 0 source indexes, 1 translation indexes and 0 signatures
This disc is called:
'Debian GNU/Linux 10.8.0 _Buster_ - Official i386 NETINST 20210206-10:54'
Reading Package Indexes... Done
Reading Translation Indexes... Done
Writing new source list
Source list entries for this disc are:
deb cdrom:[Debian GNU/Linux 10.8.0 _Buster_ - Official i386 NETINST 20210206-10:54]/ buster main
Repeat this process for the rest of the CDs in your set.
root@debian:~# addgroup tangxi su -
addgroup: Only one or two names allowed.
root@debian:~# addgroup tangxi sudo
Adding user `tangxi' to group `sudo' ...
Adding user tangxi to group sudo
Done.
root@debian:~# exit
logout
```

安装vim

```
ics2 [正在运行] - Oracle VM VirtualBox
管理 控制 视图 热键 设备 帮助

Get:3 cdrom://[Debian GNU/Linux 10.8.0 _Buster_ - Official i386 NETINST 20210206-10:54] buster/main
i386 vim NumLock 24236 [1,342 kB]
Selecting previously unselected package libgpm2:i386.
(Reading database ... 22424 files and directories currently installed.)
Preparing to unpack .../gpm/libgpm2_1.20.7-5_i386.deb ...
Unpacking libgpm2:i386 (1.20.7-5) ...
Selecting previously unselected package vim-runtime.
Preparing to unpack .../vim-runtime_8.1.0875-5_all.deb ...
Adding 'diversion of /usr/share/vim/vim81/doc/help.txt to /usr/share/vim/vim81/doc/help.txt.vim-tiny
by vim-runtime'
Adding 'diversion of /usr/share/vim/vim81/doc/tags to /usr/share/vim/vim81/doc/tags.vim-tiny by vim
runtime'
Unpacking vim-runtime (2:8.1.0875-5) ...
Selecting previously unselected package vim.
Preparing to unpack .../vim/vim_8.1.0875-5_i386.deb ...
Unpacking vim (2:8.1.0875-5) ...
Setting up libgpm2:i386 (1.20.7-5) ...
Setting up vim-runtime (2:8.1.0875-5) ...
Setting up vim (2:8.1.0875-5) ...
update-alternatives: using /usr/bin/vim.basic to provide /usr/bin/vim (vim) in auto mode
update-alternatives: using /usr/bin/vim.basic to provide /usr/bin/vimdiff (vimdiff) in auto mode
update-alternatives: using /usr/bin/vim.basic to provide /usr/bin/rvim (rvim) in auto mode
update-alternatives: using /usr/bin/vim.basic to provide /usr/bin/rview (rview) in auto mode
update-alternatives: using /usr/bin/vim.basic to provide /usr/bin/vi (vi) in auto mode
update-alternatives: using /usr/bin/vim.basic to provide /usr/bin/view (view) in auto mode
update-alternatives: using /usr/bin/vim.basic to provide /usr/bin/ex (ex) in auto mode
Processing triggers for libc-bin (2.28-10) ...
root@debian:~# _
```

安装SSH

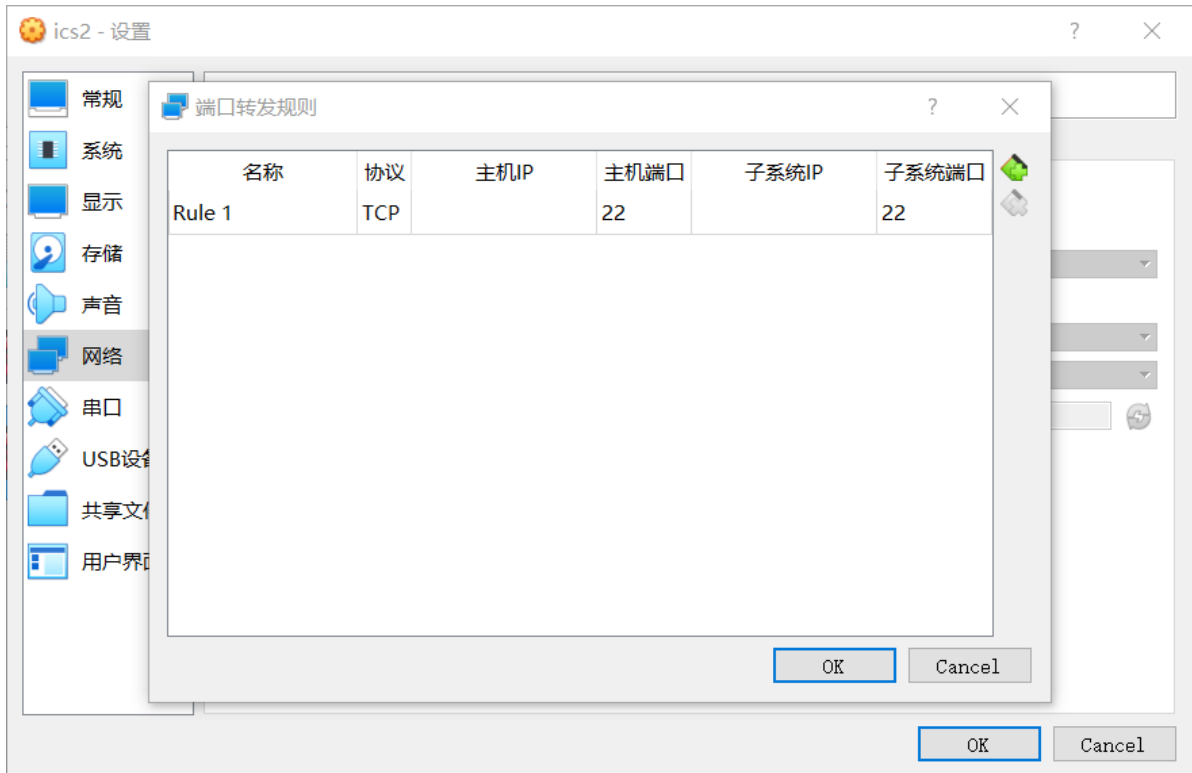
```
ics2 [正在运行] - Oracle VM VirtualBox
管理 控制 视图 热键 设备 帮助

Selecting previously unselected package libwrap0:i386.
(Reading database ... 24236 files and directories currently installed.)
Preparing to unpack .../libwrap0_7.6.q-28_i386.deb ...
Unpacking libwrap0:i386 (7.6.q-28) ...
Selecting previously unselected package openssh-sftp-server.
Preparing to unpack .../openssh-sftp-server_7.9p1-10+deb10u2_i386.deb ...
Unpacking openssh-sftp-server (1:7.9p1-10+deb10u2) ...
Selecting previously unselected package openssh-server.
Preparing to unpack .../openssh-server_7.9p1-10+deb10u2_i386.deb ...
Unpacking openssh-server (1:7.9p1-10+deb10u2) ...
Setting up openssh-sftp-server (1:7.9p1-10+deb10u2) ...
Setting up libwrap0:i386 (7.6.q-28) ...
Setting up openssh-server (1:7.9p1-10+deb10u2) ...

Creating config file /etc/ssh/sshd_config with new version
Creating SSH2 RSA key; this may take some time ...
2048 SHA256:v0EtJcyBhsW0ADIEYrcSTWArCJfVr5Vy7RzR2JD5rGY root@debian (RSA)
Creating SSH2 ECDSA key; this may take some time ...
256 SHA256:dTbzka5j+pPv1JmZ6rZzQsr0ycg6dCNEYb64vnxVX7A root@debian (ECDSA)
Creating SSH2 ED25519 key; this may take some time ...
256 SHA256:jCLM104LmDHv1wT+6pJDVwrZc8FiiJ2yXRTA17Hwxa4 root@debian (ED25519)
Created symlink /etc/systemd/system/ssh.service → /lib/systemd/system/ssh.service.
Created symlink /etc/systemd/system/multi-user.target.wants/ssh.service → /lib/systemd/system/ssh.s
ervice.
rescue-ssh.target is a disabled or a static unit, not starting it.
Processing triggers for systemd (241-7~deb10u6) ...
Processing triggers for libc-bin (2.28-10) ...
root@debian:~#
```

PA0.4 Installing More Tools

配置网络

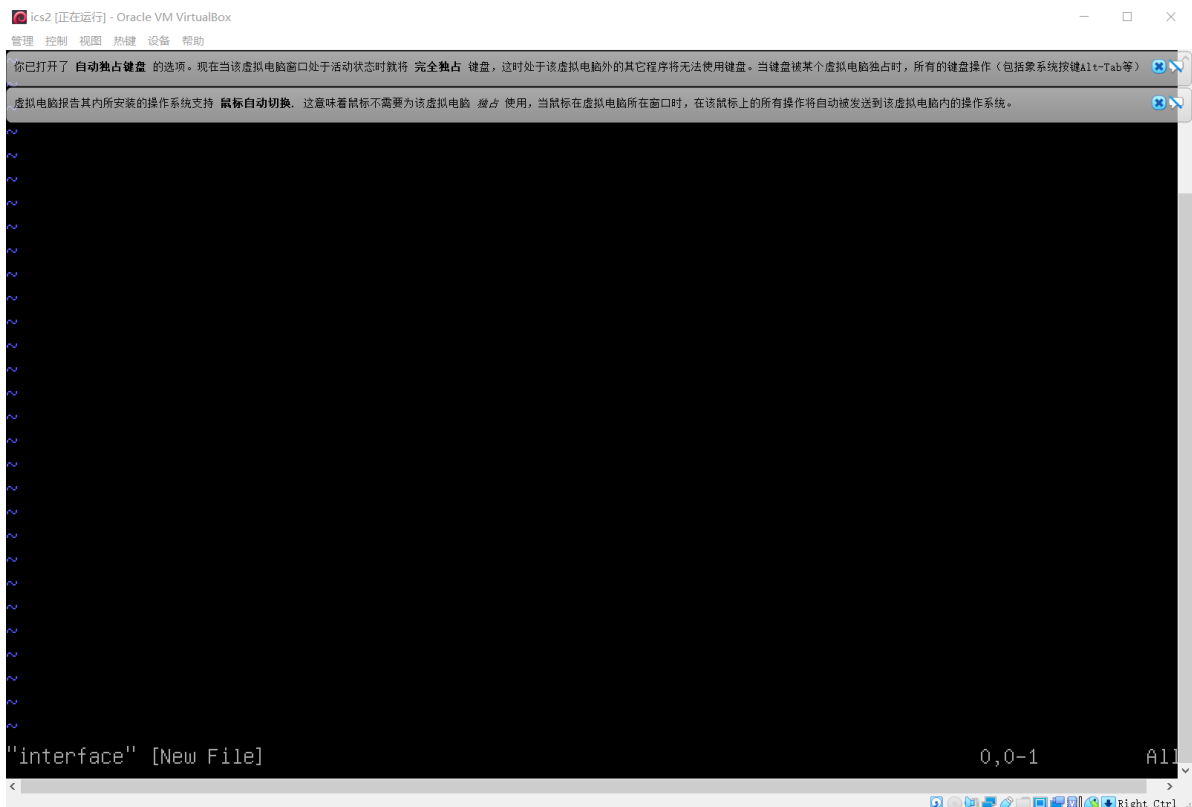


使用查看ip

```
ip addr
```

```
vim interface
```

进入编辑器



编辑enp0s3

```
ics2 [正在运行] - Oracle VM VirtualBox
管理 控制 视图 热键 设备 帮助

# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

auto enp0s3
iface enp0s3 inet dhcp_
~
```

测试与外网的连接

```
ics2 [正在运行] - Oracle VM VirtualBox
管理 控制 视图 热键 设备 帮助

Num Lock Unlock

interfaces" 11L, 276C written
root@debian:/etc/network# service networking restart
root@debian:/etc/network# ip addr
: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1
00
    link/ether 08:00:27:c5:85:34 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic enp0s3
        valid_lft 86378sec preferred_lft 86378sec
    inet6 fe80::a00:27ff:fec5:8534/64 scope link
        valid_lft forever preferred_lft forever
root@debian:/etc/network# ping www.baidu.com -c 4
PING www.a.shifen.com (112.80.248.75) 56(84) bytes of data.
4 bytes from 112.80.248.75 (112.80.248.75): icmp_seq=1 ttl=58 time=3.92 ms
4 bytes from 112.80.248.75 (112.80.248.75): icmp_seq=2 ttl=58 time=89.4 ms
4 bytes from 112.80.248.75 (112.80.248.75): icmp_seq=3 ttl=58 time=39.9 ms
4 bytes from 112.80.248.75 (112.80.248.75): icmp_seq=4 ttl=58 time=4.09 ms

-- www.a.shifen.com ping statistics --
4 packets transmitted, 4 received, 0% packet loss, time 8ms
rtt min/avg/max/mdev = 3.916/34.335/89.444/35.028 ms
root@debian:/etc/network#
```

安装Putty, 输入hostname127.0.0.1, 并登录

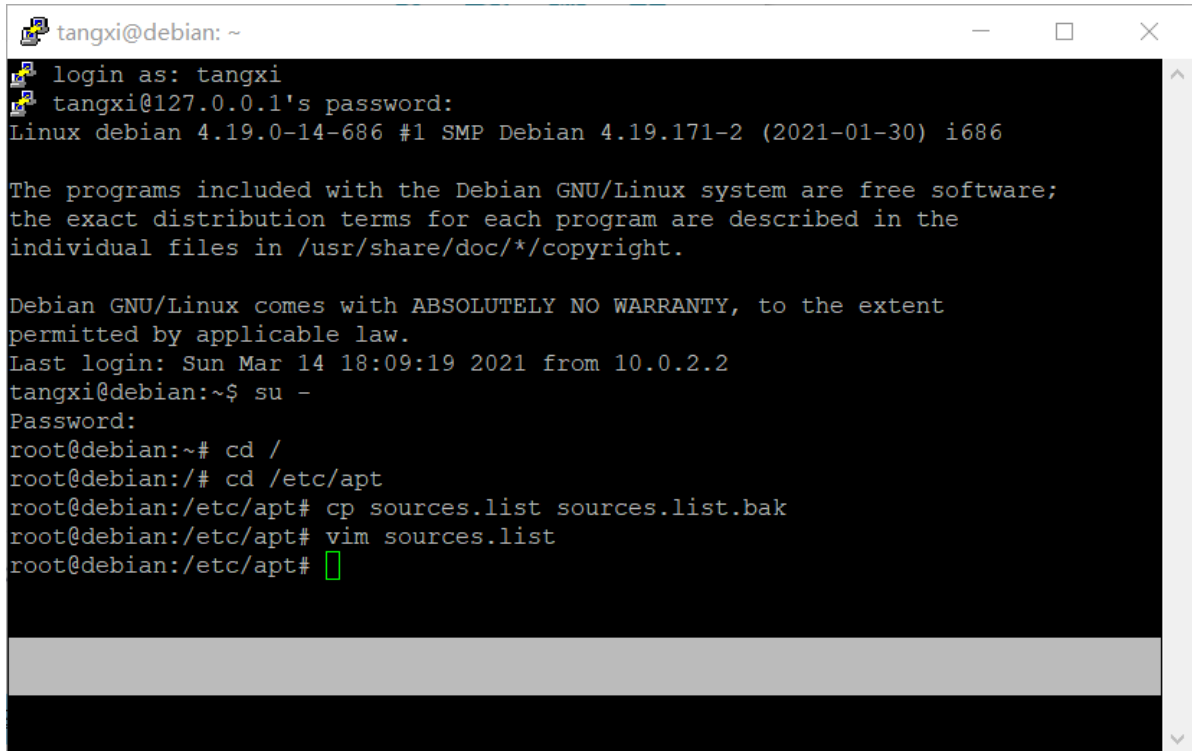
```
tangxi@debian: ~
login as: tangxi
tangxi@127.0.0.1's password:
Linux debian 4.19.0-14-686 #1 SMP Debian 4.19.171-2 (2021-01-30) i686

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sun Mar 14 17:47:54 2021
tangxi@debian:~$
```

PA0.4安装更多工具

添加APT来源

A terminal window titled 'tangxi@debian: ~' showing the following commands and output:

```
login as: tangxi
tangxi@127.0.0.1's password:
Linux debian 4.19.0-14-686 #1 SMP Debian 4.19.171-2 (2021-01-30) i686

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sun Mar 14 18:09:19 2021 from 10.0.2.2
tangxi@debian:~$ su -
Password:
root@debian:~# cd /
root@debian:/# cd /etc/apt
root@debian:/etc/apt# cp sources.list sources.list.bak
root@debian:/etc/apt# vim sources.list
root@debian:/etc/apt#
```

编辑完成后输入命令

```
sudo apt update
```

```
sudo apt upgrade -y
```

等待下载完成

PA0.5More Exploration

我们首先通过 cp 命令将 vimrc 复制到主目录

显示隐藏文件，输入

```
ls -a
```

用vim打开vimrc

```
vim .vimrc
```

```
tangxi@debian: ~  
" All system-wide defaults are set in $VIMRUNTIME/debian.vim and sourced by  
" the call to :runtime you can find below. If you wish to change any of those  
" settings, you should do it in this file (/etc/vim/vimrc), since debian.vim  
" will be overwritten everytime an upgrade of the vim packages is performed.  
" It is recommended to make changes after sourcing debian.vim since it alters  
" the value of the 'compatible' option.  
  
" This line should not be removed as it ensures that various options are  
" properly set to work with the Vim-related packages available in Debian.  
runtime! debian.vim  
  
" Vim will load $VIMRUNTIME/defaults.vim if the user does not have a vimrc.  
" This happens after /etc/vim/vimrc(.local) are loaded, so it will override  
" any settings in these files.  
" If you don't want that to happen, uncomment the below line to prevent  
" defaults.vim from being loaded.  
" let g:skip_defaults_vim = 1  
  
" Uncomment the next line to make Vim more Vi-compatible  
" NOTE: debian.vim sets 'nocompatible'. Setting 'compatible' changes numerous  
" options, so any other options should be set AFTER setting 'compatible'.  
"set compatible  
  
".vimrc" 55L, 2389C 1,1 Top
```

启用更多vim功能

```
ks2 [正在运行] - Oracle VM VirtualBox  
管理 控制 视图 热键 设备 帮助  
你已打开了 64 位的 Oracle VM VirtualBox 虚拟机。当虚拟机处于活动状态时就将 完全独占 键盘，这时处于该虚拟电脑外的其它程序将无法使用键盘。当键盘被某个虚拟电脑独占时，所有的键盘操作（包括象系统按键Alt+Tab等）都将直接发送到该虚拟电脑。  
虚拟机键盘包含其自身的 Num Lock 功能。当鼠标在虚拟电脑所在窗口时，在该鼠标上的所有操作将自动被发送到该虚拟电脑内的操作系统。  
" NOTE: debian.vim sets 'nocompatible'. Setting 'compatible' changes numerous  
" options, so any other options should be set AFTER setting 'compatible'.  
"set compatible  
  
" Vim5 and later versions support syntax highlighting. Uncommenting the next  
" line enables syntax highlighting by default.  
syntax on  
  
" If using a dark background within the editing area and syntax highlighting  
" turn on this option as well  
set background=dark  
  
" Uncomment the following to have Vim jump to the last position when  
" reopening a file  
"au BufReadPost * if line("'\"") > 1 && line("'\"") <= line("$") | exe "normal! g'\"" | endif  
  
" Uncomment the following to have Vim load indentation rules and plugins  
" according to the detected filetype.  
"filetype plugin indent on  
  
" The following are commented out as they cause vim to behave a lot  
" differently from regular Vi. They are highly recommended though.  
"set showcmd " Show (partial) command in status line.  
"set showmatch " Show matching brackets.  
"set ignorecase " Do case insensitive matching  
"set smartcase " Do smart case matching  
"set incsearch " Incremental search  
"set autowrite " Automatically save before commands like :next and :make  
"set hidden " Hide buffers when they are abandoned
```



```
tangxi@debian: ~
root@debian:~# vim gcc hello.c -o ./hello
3 files to edit
root@debian:~# ls
gcc hello hello.c interfaces
root@debian:~# vim hello.c
root@debian:~# cat hello.c
#include<stdio.h>

int main()
{
    printf("helloworld!");
    return 0;
}
root@debian:~# gcc hello.c -o ./hello
root@debian:~# ls
gcc hello hello.c interfaces
root@debian:~# ls -l
total 24
-rw-r--r-- 1 root root    0 Mar 14 21:16 gcc
-rwxr-xr-x 1 root root 15480 Mar 14 21:19 hello
-rw-r--r-- 1 root root   69 Mar 14 21:19 hello.c
-rw-r--r-- 1 root root    2 Mar 14 17:50 interfaces
root@debian:~# ./hello
root@debian:~#
```

调试程序

```
tangxi@debian: ~
For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./hello...(no debugging symbols found)...done.
(gdb) br main
Breakpoint 1 at 0x11a8
(gdb) r
Starting program: /root/hello

Breakpoint 1, 0x004011a8 in main ()
(gdb) disas
Dump of assembler code for function main:
0x00401199 <+0>: lea    0x4(%esp),%ecx
0x0040119d <+4>: and    $0xffffffff,%esp
0x004011a0 <+7>: pushl  -0x4(%ecx)
0x004011a3 <+10>: push   %ebp
0x004011a4 <+11>: mov    %esp,%ebp
0x004011a6 <+13>: push   %ebx
0x004011a7 <+14>: push   %ecx
=> 0x004011a8 <+15>: call   0x4011d5 <_x86.get_pc_thunk.ax>
0x004011ad <+20>: add    $0x2e53,%eax
0x004011b2 <+25>: sub    $0xc,%esp
0x004011b5 <+28>: lea    -0x1ff8(%eax),%edx
0x004011bb <+34>: push   %edx
0x004011bc <+35>: mov    %eax,%ebx
0x004011be <+37>: call   0x401030 <printf@plt>
0x004011c3 <+42>: add    $0x10,%esp
0x004011c6 <+45>: mov    $0x0,%eax
0x004011cb <+50>: lea    -0x8(%ebp),%esp
0x004011ce <+53>: pop    %ecx
0x004011cf <+54>: pop    %ebx
0x004011d0 <+55>: pop    %ebp
0x004011d1 <+56>: lea    -0x4(%ecx),%esp
0x004011d4 <+59>: ret
--Type <RET> for more, q to quit, c to continue without paging--
End of assembler dump.
(gdb)
```

用make组织项目

```

tangxi@debian: ~
logout
tangxi@debian:~$ cd project
-bash: cd: project: No such file or directory
tangxi@debian:~$ cd project/
-bash: cd: project/: No such file or directory
tangxi@debian:~$ ls
hello.c  vimrc
tangxi@debian:~$ su -
Password:
root@debian:~# cd project/
root@debian:~/project# ls\
>
>
hello.c  Makefile
root@debian:~/project#
root@debian:~/project# ls
hello.c  Makefile
root@debian:~/project# make
gcc hello.c -o ./hello
root@debian:~/project# vim makefile
root@debian:~/project# ls
hello  hello.c  makefile  Makefile
root@debian:~/project# ./hello
helloworld!root@debian:~/project# vim makefile
root@debian:~/project# rm ./hello
root@debian:~/project# make
gcc hello.c -o ./hello
root@debian:~/project# vim makefile
root@debian:~/project# make clean
rm ./hello
root@debian:~/project# ls
hello.c  makefile  Makefile
root@debian:~/project# make
gcc hello.c -o ./hello
root@debian:~/project# make clean
rm ./hello
root@debian:~/project# █

```

同步时间

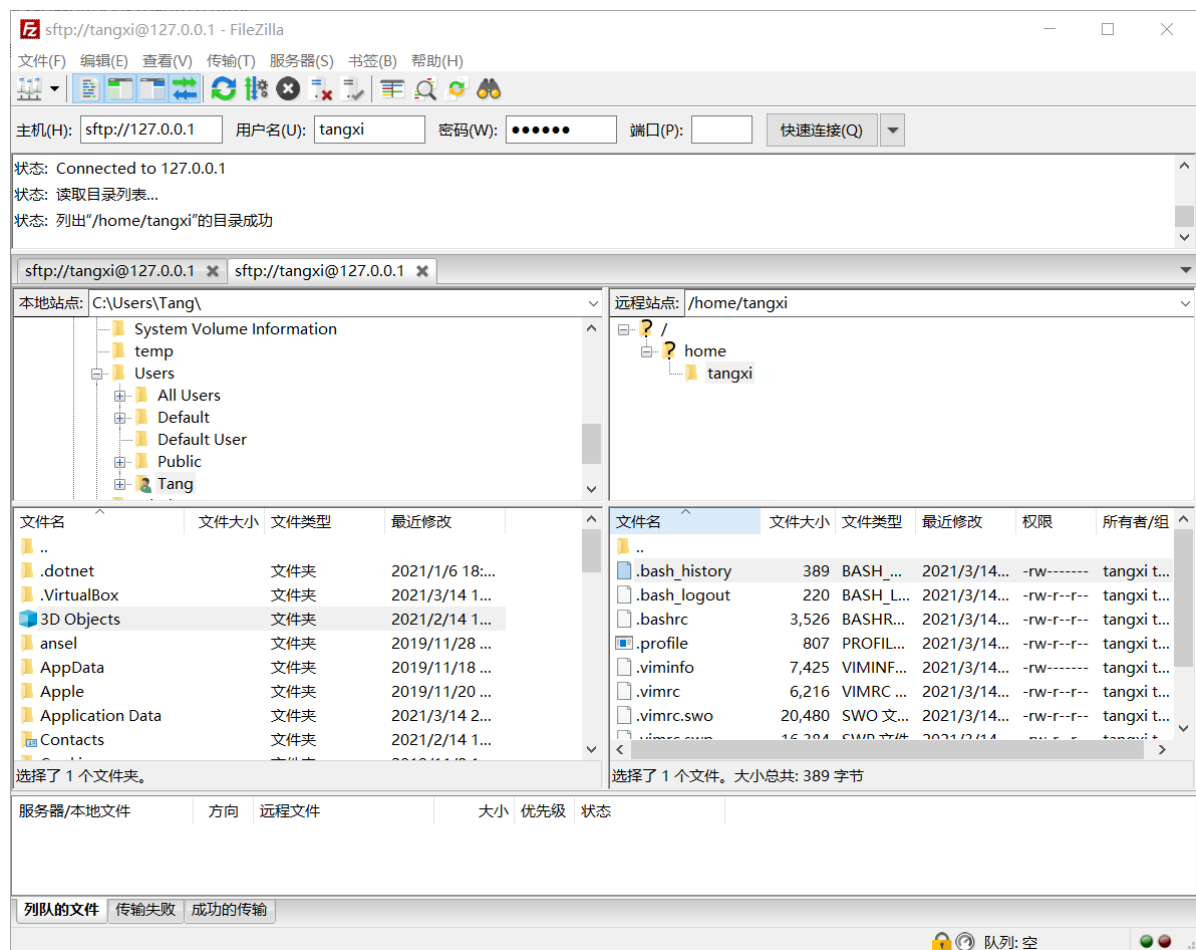
```

tangxi@debian: ~
dist-upgrade - Distribution upgrade, see apt-get(8)
dselect-upgrade - Follow dselect selections
build-dep - Configure build-dependencies for source packages
clean - Erase downloaded archive files
autoclean - Erase old downloaded archive files
check - Verify that there are no broken dependencies
source - Download source archives
download - Download the binary package into the current directory
changelog - Download and display the changelog for the given package

See apt-get(8) for more information about the available commands.
Configuration options and syntax is detailed in apt.conf(5).
Information about how to configure sources can be found in sources.list(5).
Package and version choices can be expressed via apt_preferences(5).
Security details are available in apt-secure(8).
This APT has Super Cow Powers.
root@debian:~/project# apt-get install ntpdate
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  ntpdate
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 155 kB of archives.
After this operation, 248 kB of additional disk space will be used.
Get:1 http://mirrors.aliyun.com/debian buster/main i386 ntpdate i386 1:4.2.8p12+dfsg-4 [155 kB]
Fetched 155 kB in 5s (29.0 kB/s)
Selecting previously unselected package ntpdate.
(Reading database ... 49914 files and directories currently installed.)
Preparing to unpack .../ntpdate_1%3a4.2.8p12+dfsg-4_i386.deb ...
Unpacking ntpdate (1:4.2.8p12+dfsg-4) ...
Setting up ntpdate (1:4.2.8p12+dfsg-4) ...
Processing triggers for man-db (2.8.5-2) ...
root@debian:~/project# ntpdate ntp.ntsc.ac.cn
14 Mar 21:54:11 ntpdate[22107]: adjust time server 114.118.7.161 offset 0.027439 sec
root@debian:~/project# █

```

PA0.6Logging in and Transferring Files via SSH



把hello.c传到主机进行修改

```

hello.c
1  #include<stdio.h>
2  int main()
3  {
4      int i;
5      for(i=0; i<10; i++)
6      {
7          printf("hello world!\n");
8      }
9      return 0;
10 }
```

传回文件


```
tangxi@debian: ~  
make: 'hello' is up to date.  
root@debian:~/project# ls  
hello hello.c makefile Makefile  
root@debian:~/project# make clean  
rm ./hello  
root@debian:~/project# make run  
gcc hello.c -o ./hello  
./hello  
helloworld!root@debian:~/project# make  
make: 'hello' is up to date.  
root@debian:~/project# make clean  
rm ./hello  
root@debian:~/project# make run  
gcc hello.c -o ./hello  
./hello  
helloworld!root@debian:~/project# vim hello.c  
root@debian:~/project# vim hello.c  
root@debian:~/project# make clean  
rm ./hello  
root@debian:~/project# make run  
gcc hello.c -o ./hello  
./hello  
helloworld!helloworld!helloworld!helloworld!helloworld!helloworld!helloworld!hel  
loworld!helloworld!helloworld!root@debian:~/project#
```

安装x11应用

```
tangxi@debian: ~  
Reading state information... Done  
The following additional packages will be installed:  
  libxaw7 libxft2 libxkbfile1 libxmu6 libxpm4 xbitmaps  
Suggested packages:  
  mesa-utils  
The following NEW packages will be installed:  
  libxaw7 libxft2 libxkbfile1 libxmu6 libxpm4 x11-apps xbitmaps  
0 upgraded, 7 newly installed, 0 to remove and 0 not upgraded.  
Need to get 1,164 kB of archives.  
After this operation, 3,570 kB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://mirrors.aliyun.com/debian buster/main i386 libxmu6 i386 2:1.1.2-2+b  
3 [62.8 kB]  
Get:2 http://mirrors.aliyun.com/debian buster/main i386 libxpm4 i386 1:3.5.12-1  
[50.9 kB]  
Get:3 http://mirrors.aliyun.com/debian buster/main i386 libxaw7 i386 2:1.0.13-1+  
b2 [209 kB]  
Get:4 http://mirrors.aliyun.com/debian buster/main i386 libxft2 i386 2.3.2-2 [58  
.2 kB]  
Get:5 http://mirrors.aliyun.com/debian buster/main i386 libxkbfile1 i386 1:1.0.9  
-2+b1 [80.3 kB]  
Get:6 http://mirrors.aliyun.com/debian buster/main i386 x11-apps i386 7.7+7 [670  
kB]  
81% [6 x11-apps 511 kB/670 kB 76%] 39.0 kB/s 4s
```

打开xming, 输入

xclock

完成配置


```

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./build/nemu...done.
(gdb) br main
Breakpoint 1 at 0x33e0: file src/main.c, line 6.
(gdb) r
Starting program: /home/tangxi/ics2021/nemu/build/nemu -l ./build/nemu-log.txt
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/i386-linux-gnu/libthread_db.so.1".

Breakpoint 1, main (argc=3, argv=0xbffff604) at src/main.c:6
6      int is_batch_mode = init_monitor(argc, argv);
(gdb) c
Continuing.
nemu: src/cpu/reg.c:21: reg_test: Assertion `reg_w(i) == (sample[i] & 0xffff)' failed.

Program received signal SIGABRT, Aborted.
0xb7fd4d31 in __kernel_vsyscall ()
(gdb) q
A debugging session is active.

        Inferior 1 [process 880] will be killed.

Quit anyway? (y or n) y
tangxi@debian:~/ics2021/nemu$ 

```

现在允许空的提交

```

tangxi@debian: ~/ics2021/nemu
(gdb) c
Continuing.
nemu: src/cpu/reg.c:21: reg_test: Assertion `reg_w(i) == (sample[i] & 0xffff)' f

Program received signal SIGABRT, Aborted.
0xb7fd4d31 in __kernel_vsyscall ()
(gdb) q
A debugging session is active.

        Inferior 1 [process 880] will be killed.

Quit anyway? (y or n) y
tangxi@debian:~/ics2021/nemu$ git checkout
tangxi@debian:~/ics2021/nemu$ git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/2021'.
tangxi@debian:~/ics2021/nemu$ git checkout pa0
Switched to branch 'pa0'
tangxi@debian:~/ics2021/nemu$ git comit --allow-empty
git: 'comit' is not a git command. See 'git --help'.

The most similar command is
    commit
tangxi@debian:~/ics2021/nemu$ 

```

用submit打包上传到仓库里

```
tangxi@debian: ~/ics2021
Makefile:3: /Makefile.lib: No such file or directory
make[2]: *** No rule to make target '/Makefile.lib'. Stop.
make[2]: Leaving directory '/home/tangxi/ics2021/nexus-am/libs/fixmath'
make[1]: [Makefile:11: libs/fixmath/] Error 2 (ignored)
make[1]: Leaving directory '/home/tangxi/ics2021/nexus-am'
make -C nanos-lite clean
make[1]: Entering directory '/home/tangxi/ics2021/nanos-lite'
Makefile:4: /Makefile.app: No such file or directory
make[1]: *** No rule to make target '/Makefile.app'. Stop.
make[1]: Leaving directory '/home/tangxi/ics2021/nanos-lite'
make: [Makefile:9: clean] Error 2 (ignored)
make -C navy-apps clean
make[1]: Entering directory '/home/tangxi/ics2021/navy-apps'
Makefile.check:3: *** Must set NAVY_HOME environment variable. Stop.
make[1]: Leaving directory '/home/tangxi/ics2021/navy-apps'
make: [Makefile:10: clean] Error 2 (ignored)
git gc
Enumerating objects: 1146, done.
Counting objects: 100% (1146/1146), done.
Compressing objects: 100% (894/894), done.
Writing objects: 100% (1146/1146), done.
Total 1146 (delta 216), reused 1133 (delta 208)
cd .. && tar cj ics2021 > 161920122.tar.bz2
tangxi@debian:~/ics2021$
```



遇到的问题及解决办法

1. 遇到问题：尽管账户已经添加到了sudo组中，还是没办法前置sudo使用超级用户特权。

解决方案：重装虚拟机

实验心得

经过本次的实验，我学会了在 Windows 主机上安装 Debian 虚拟机，安装相应的应用，连接网络，传输文件到修改代码。给我展现了一个大不相同的虚拟机世界。尽管与Windows有着很大的不同，但是我会努力去适应并掌握更多技能的。

其他备注

无