

南昌大学实验报告

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专业班级： 网络工程161班

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课程名称： 云计算技术

实验项目名称

homework 2

实验目的

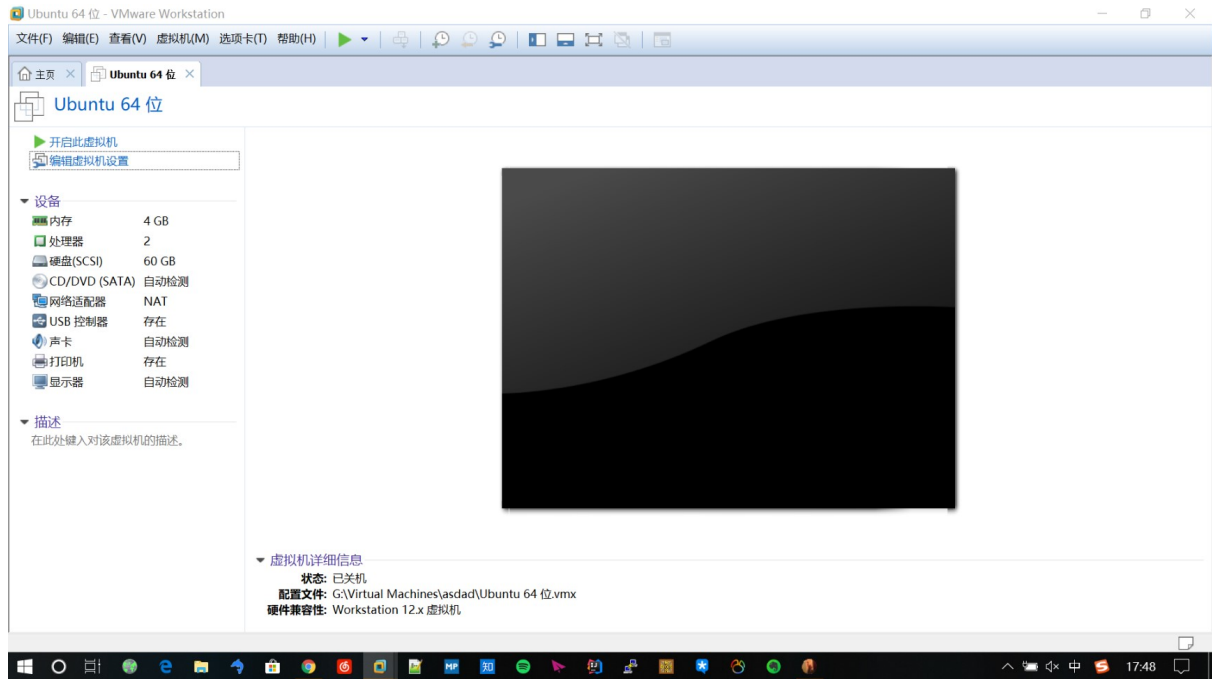
This assignment will be done using KVM, a popular type-2 hypervisor. KVM is built on the Linux kernel to reuse its existing functions to support virtualization. As a part of this assignment, you will be experimenting with KVM and gaining familiarity with the development environment and add new features to it. KVM can run on many different architectures, but the specific platform we will be targeting is the x86_64 CPU family.

实验基础

We will use VMware Workstation/Fusion in this assignment so your custom hypervisor can be isolated from the rest of your system. VMware Workstation/Fusion supports nested virtualization, allowing you to install, run and develop hypervisors in a virtual machine. You will first install a Linux/KVM host on VMware, and then create virtual machines on the host. Note that this is different from deployment in production platforms which the hypervisor runs directly on bare metal.

实验步骤

1. Create a New Virtual Machine.



2. Select "Custom (advanced)" and click Next".

3. Click next until you reach the page "Guest Operating System Installation"

4. Download the iso image for Ubuntu-XX.XX.X from here.

5. Continue to setup your VM spec.

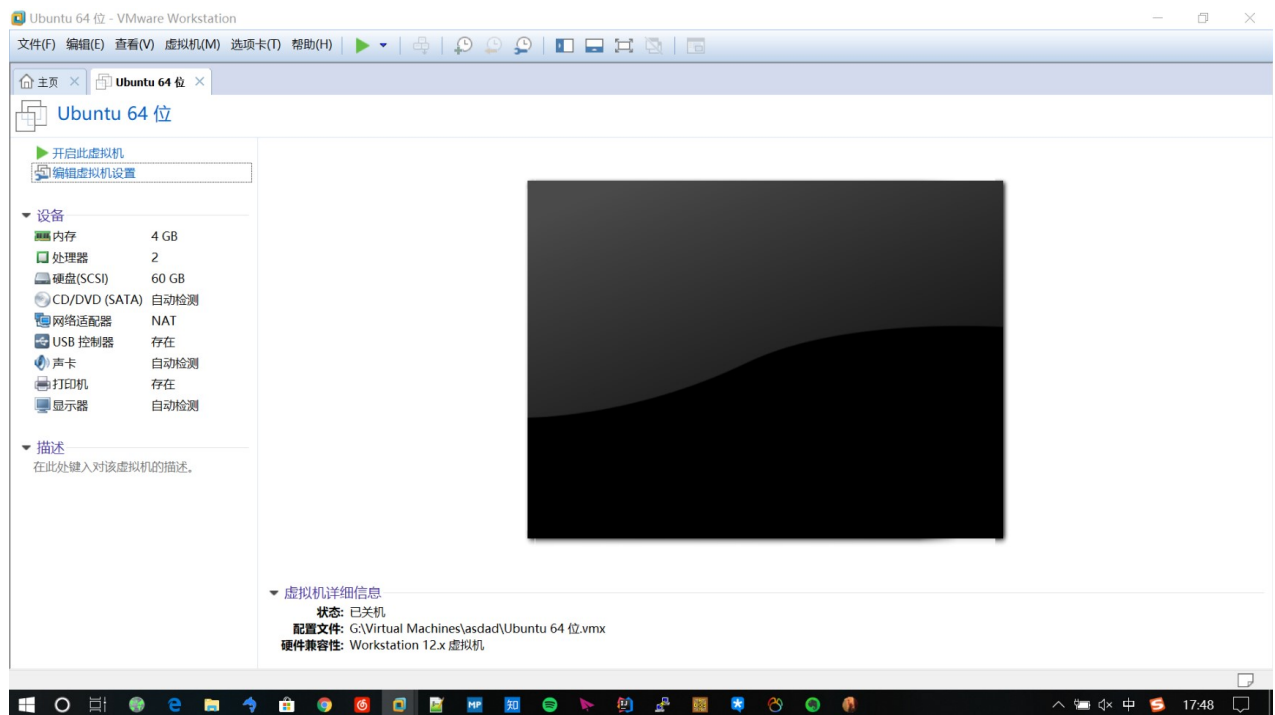
6. We then need to expose the hardware virtualization feature to the KVM running in the VM. On VMware Workstation, go to Processors of your VM configuration, then select both "Virtualize Intel VT-x/EPT and AMD-V/RVI" and "Virtualize CPU performance counters".

NOTE: The exact location to the virtualization hardware to the VM might be different depending on the VMware version.

NOTE: You may need to enable hardware virtualization (Intel VT) features for your computer in the BIOS. You can get more information from [here](#).

7. Click "Finish" and Install Ubuntu-XX.XX.X on your VM.

Once your VM is set up, you can use the terminal directly or ssh into the VM to run commands. Recommended VM Spec: At least 4 VCPU, 2GB RAM, NAT network, 50GB virtual disk.



In "Processors", set "Preferred mode" as "Automatic" to leverage hardware features to accelerate the VM.

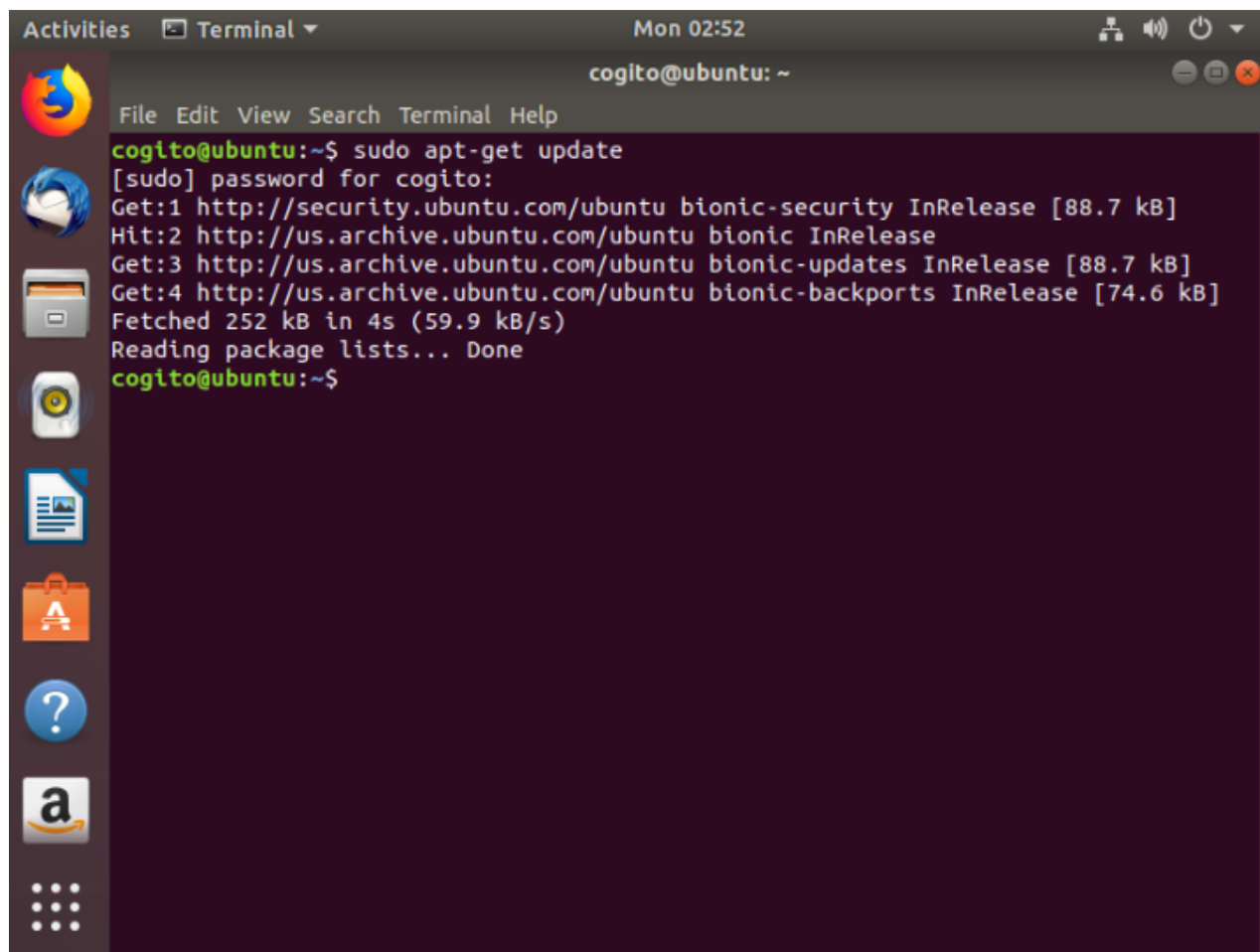
Once you finish installing Ubuntu, it's time to configure the environment for KVM.

In libguestfs-tools install, YES should be selected when it prompts about supermin.

```
sudo apt-get update
```

```
sudo apt-get install qemu-kvm libvirt-bin ubuntu-vm-builder bridge-utils \
```

```
libosinfo-bin libguestfs-tools virt-top virtinst
```



```
Activities  Terminal  Mon 02:52
cogito@ubuntu: ~
File Edit View Search Terminal Help
cogito@ubuntu:~$ sudo apt-get update
[sudo] password for cogito:
Get:1 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Hit:2 http://us.archive.ubuntu.com/ubuntu bionic InRelease
Get:3 http://us.archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Fetched 252 kB in 4s (59.9 kB/s)
Reading package lists... Done
cogito@ubuntu:~$
```

Now we are ready to install a VM (nested VM) on KVM. Type the following command to install a Ubuntu XX.XX.X guest.

```
virt-install \
--name guest0 \
--virt-type=kvm \
--ram 1024 \
--disk path=guest0.img,size=25 \
--vcpus 2 \
--os-type linux \
--graphics none \
--console pty,target_type=serial \
--location 'http://us.archive.ubuntu.com/ubuntu/dists/trusty/main/installer-amd64/' \
--extra-args 'console=ttyS0,115200n8 serial'
```

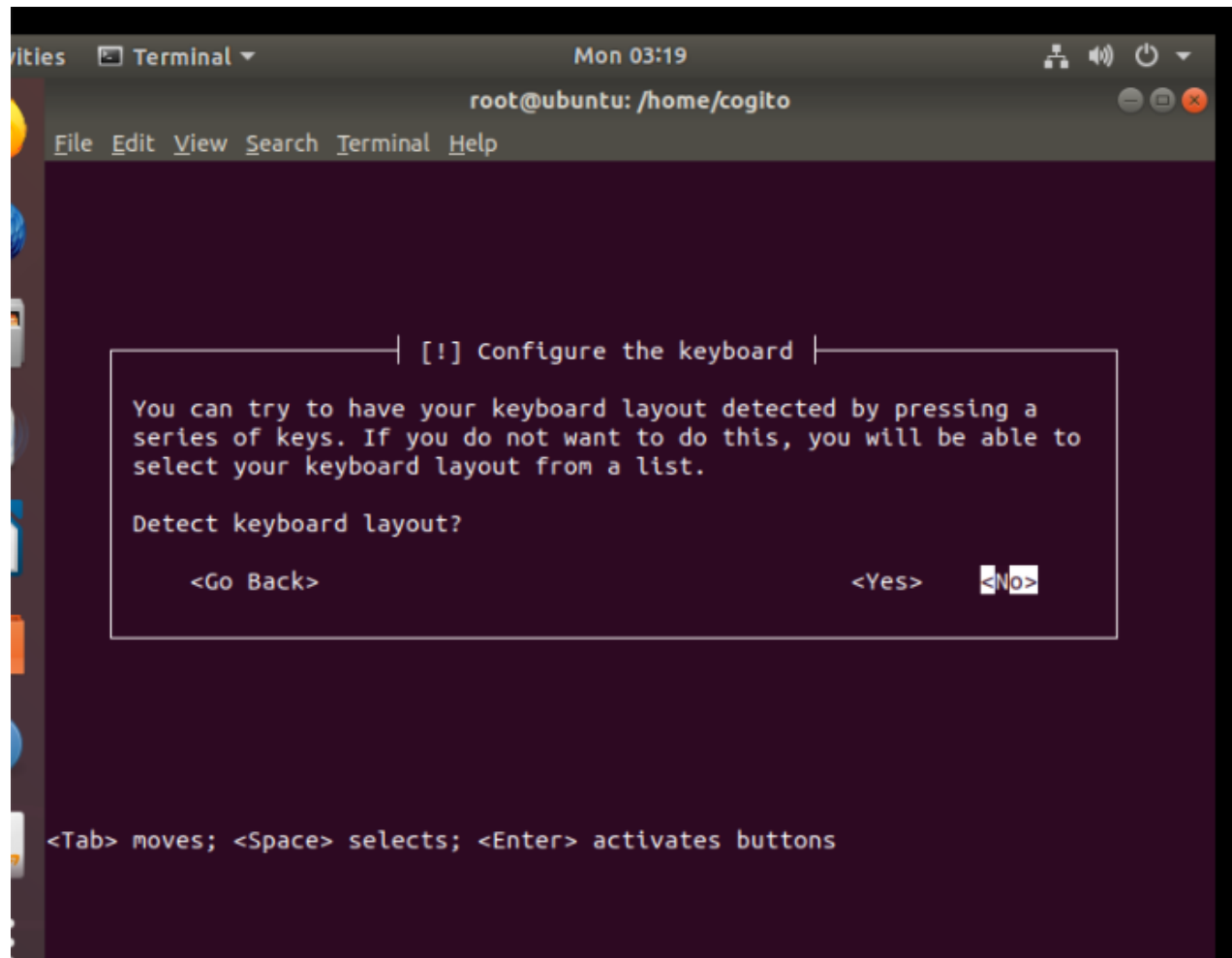
```
> --extra-args 'console=ttyS0,115200n8 serial'
ERROR    Host does not support domain type kvm for virtualization type 'hvm' arch 'x86_64'
root@ubuntu:/home/cogito# virt-install --name guest0 kvm --ram 1024 --disk path=guest0.img,size=25 --vcpus 2 --os-type linux --graphics none --console pty,target_type=serial --location 'http://us.archive.ubuntu.com/ubuntu/dists/trusty/main/installer-amd64/' --extra-args 'console=ttyS0,115200n8 serial'
usage: virt-install --name NAME --memory MB STORAGE INSTALL [options]
virt-install: error: unrecognized arguments: kvm
root@ubuntu:/home/cogito# virt-install --name guest0 --ram 1024 --disk path=guest0.img,size=25 --vcpus 2 --os-type linux --graphics none --console pty,target_type=serial --location 'http://us.archive.ubuntu.com/ubuntu/dists/trusty/main/installer-amd64/' --extra-args 'console=ttyS0,115200n8 serial'
WARNING  KVM acceleration not available, using 'qemu'
WARNING  No operating system detected, VM performance may suffer. Specify an OS with --os-variant for optimal results.

Starting install...
```

遇到报错：Host does not support domain type kvm for virtualization type 'hvm' arch 'x86_64'
百度后找到解决方法：

- 1.modprobe kvm
- 2.去掉命令中的--virt-type=kvm

开始安装：



| Detecting network hardware |

95%

Loading module 'usb-storage' for 'USB storage'...

| [!] Configure the network |

Please enter the hostname for this system.

The hostname is a single word that identifies your system to the network. If you don't know what your hostname should be, consult your network administrator. If you are setting up your own home network, you can make something up here.

Hostname:

ubuntu

<Go Back>

<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons

| [!] Choose a mirror of the Ubuntu archive |

Please select an Ubuntu archive mirror. You should use a mirror in your country or region if you do not know which mirror has the best Internet connection to you.

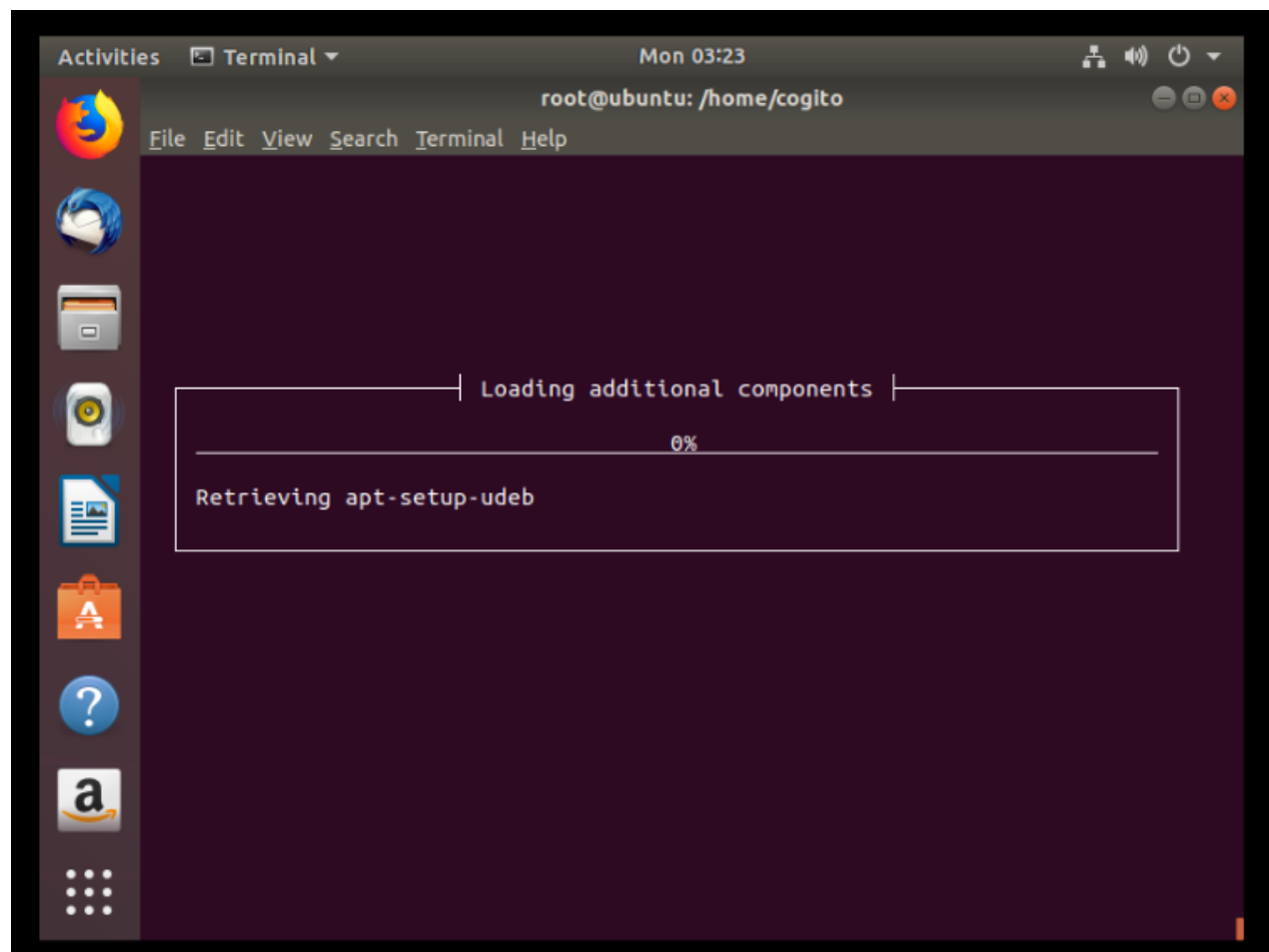
Usually, <your country code>.archive.ubuntu.com is a good choice.

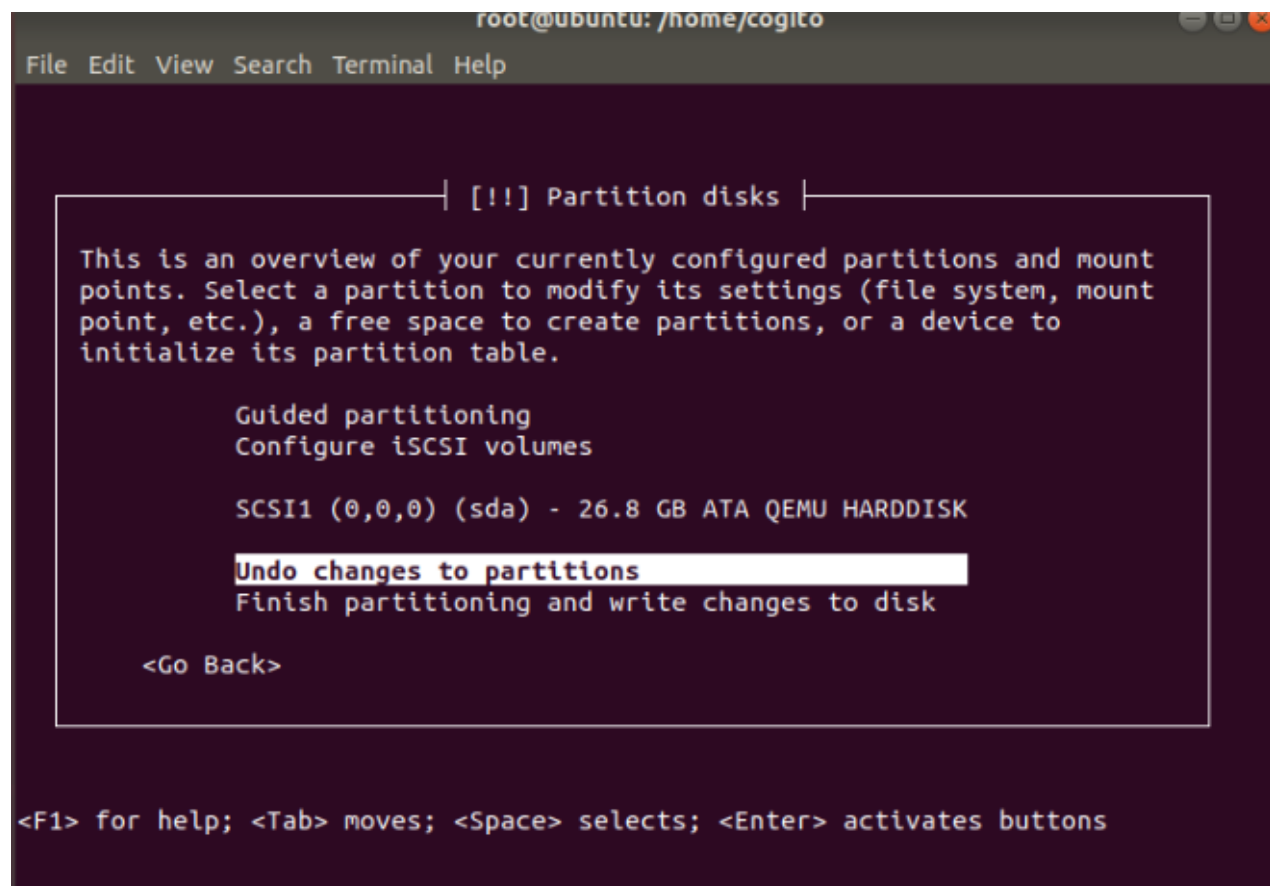
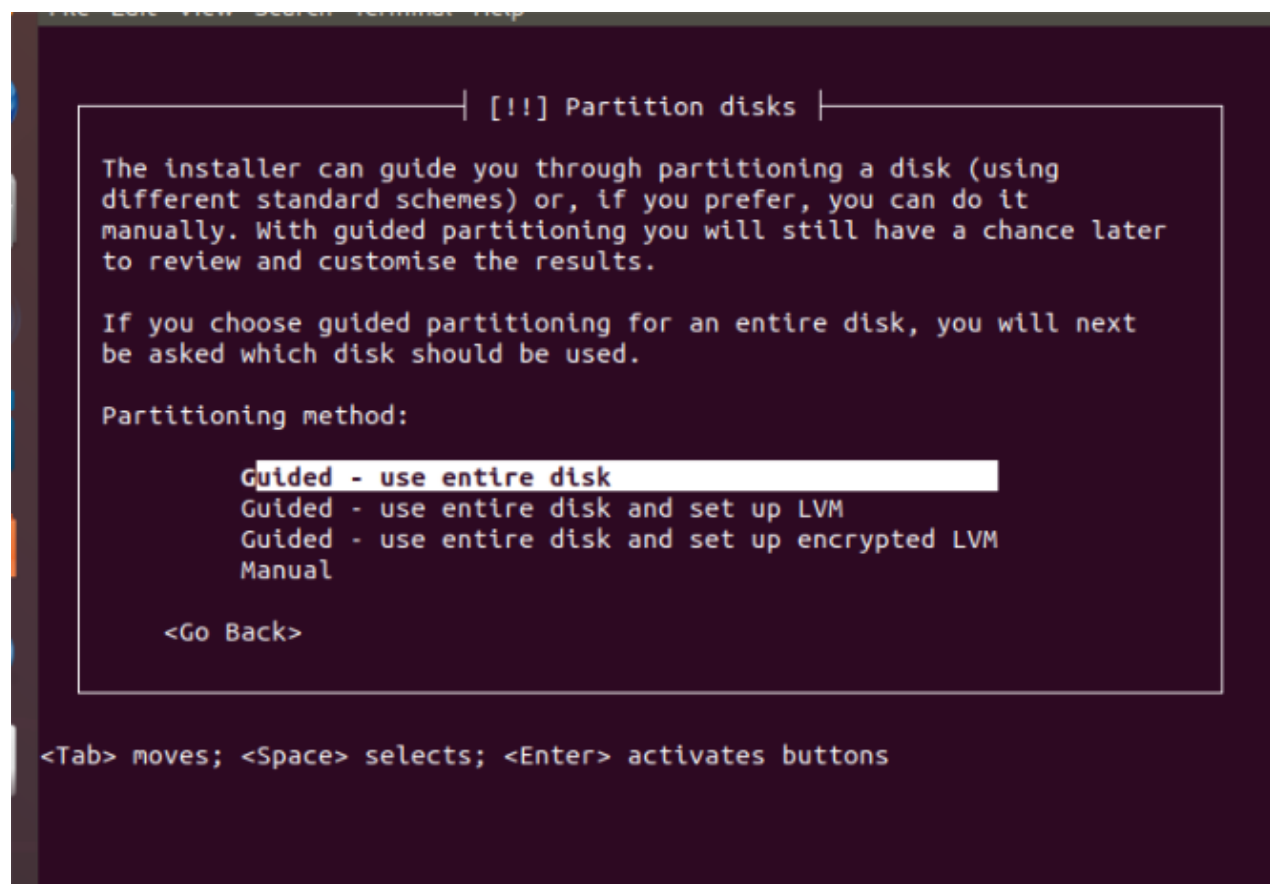
Ubuntu archive mirror:

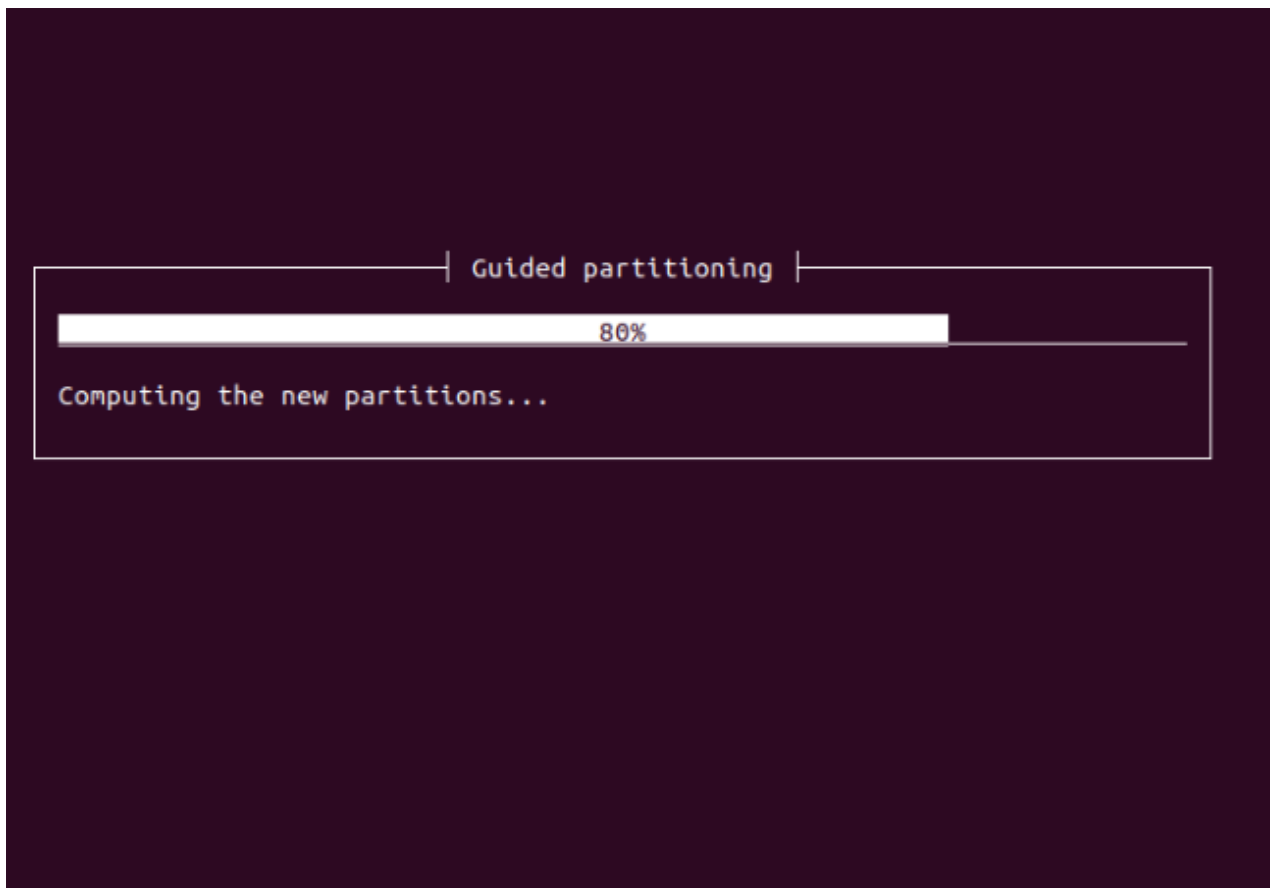
us.archive.ubuntu.com

<Go Back>

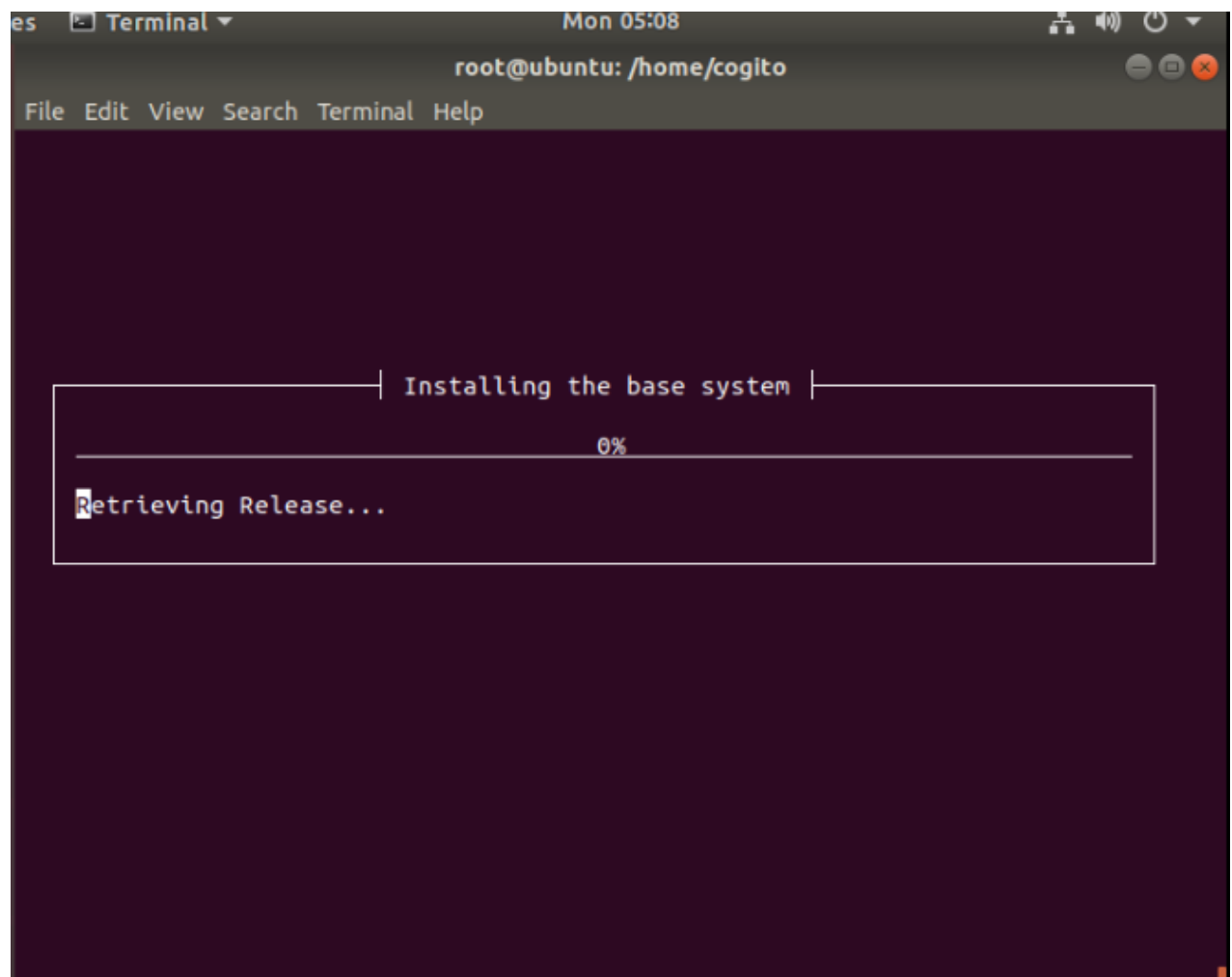
<Tab> moves; <Space> selects; <Enter> activates buttons







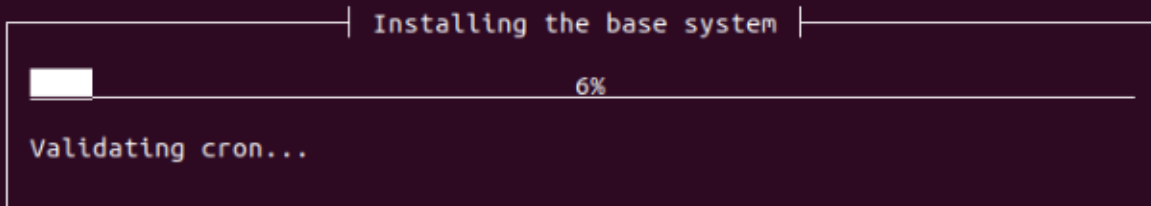
经过漫长的等待。。



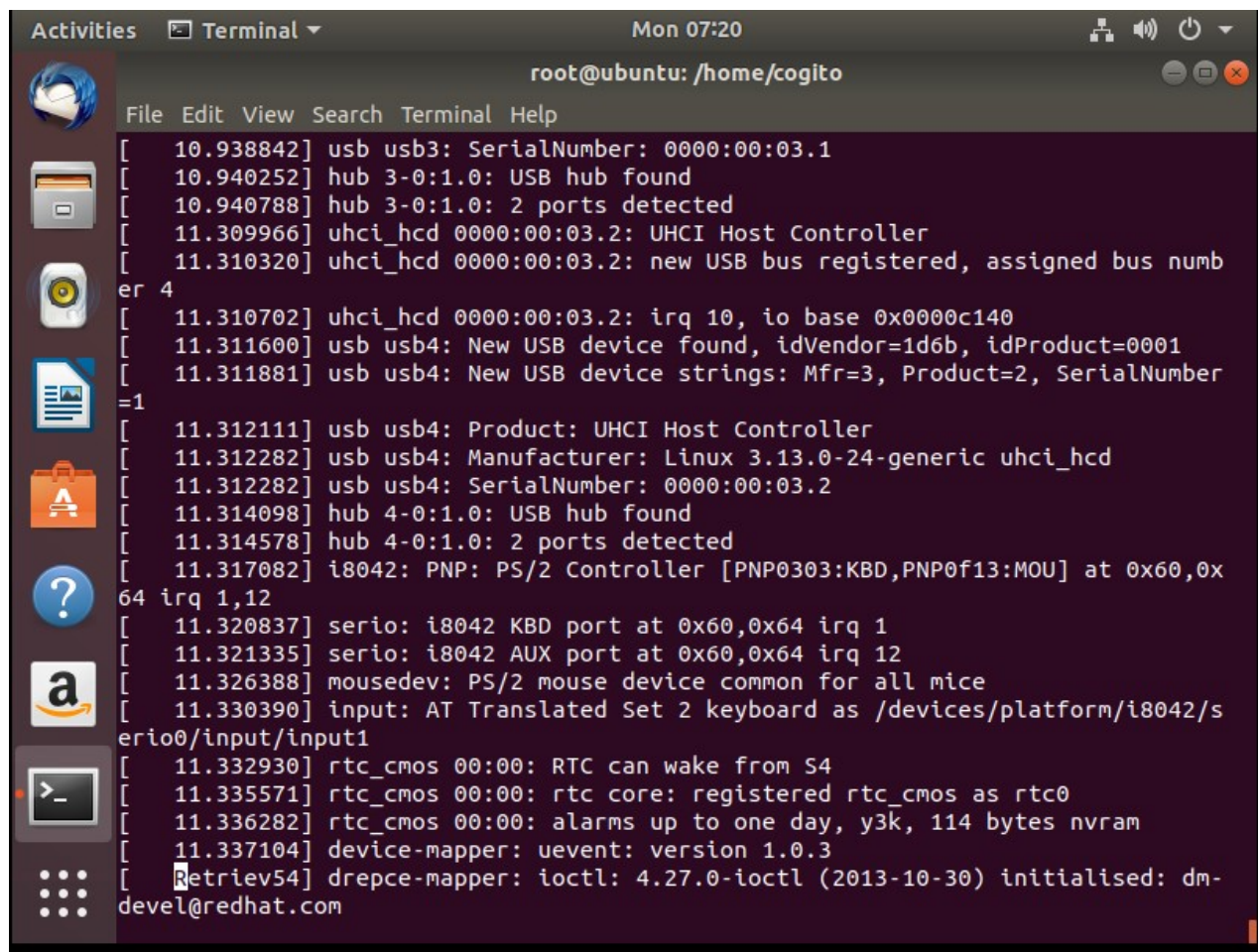
仍然是漫长的等待。。

```
[ 11.353442] Key type dns_resolver registered
[ 11.566818] Loading compiled-in X.509 certificates
[ 11.580540] Loaded X.509 cert 'Magrathea: Glacier signing key: 00a5a65759de474bc5c43120880c1b94a539f431'
[ 11.580614] registered taskstats version 1
[ 12.262946] Key type trusted registered
```

Retrieving debconf...



遇到问题：滑轮不能下拉，见不到下面的进度条



```
Activities  Terminal  Mon 07:20
root@ubuntu: /home/cogito
File Edit View Search Terminal Help
[ 10.938842] usb usb3: SerialNumber: 0000:00:03.1
[ 10.940252] hub 3-0:1.0: USB hub found
[ 10.940788] hub 3-0:1.0: 2 ports detected
[ 11.309966] uhci_hcd 0000:00:03.2: UHCI Host Controller
[ 11.310320] uhci_hcd 0000:00:03.2: new USB bus registered, assigned bus numb
er 4
[ 11.310702] uhci_hcd 0000:00:03.2: irq 10, io base 0x0000c140
[ 11.311600] usb usb4: New USB device found, idVendor=1d6b, idProduct=0001
[ 11.311881] usb usb4: New USB device strings: Mfr=3, Product=2, SerialNumber
=1
[ 11.312111] usb usb4: Product: UHCI Host Controller
[ 11.312282] usb usb4: Manufacturer: Linux 3.13.0-24-generic uhci_hcd
[ 11.312282] usb usb4: SerialNumber: 0000:00:03.2
[ 11.314098] hub 4-0:1.0: USB hub found
[ 11.314578] hub 4-0:1.0: 2 ports detected
[ 11.317082] i8042: PNP: PS/2 Controller [PNP0303:KBD,PNP0f13:MOU] at 0x60,0x
64 irq 1,12
[ 11.320837] serio: i8042 KBD port at 0x60,0x64 irq 1
[ 11.321335] serio: i8042 AUX port at 0x60,0x64 irq 12
[ 11.326388] mousedev: PS/2 mouse device common for all mice
[ 11.330390] input: AT Translated Set 2 keyboard as /devices/platform/i8042/s
erio0/input/input1
[ 11.332930] rtc_cmos 00:00: RTC can wake from S4
[ 11.335571] rtc_cmos 00:00: rtc core: registered rtc_cmos as rtc0
[ 11.336282] rtc_cmos 00:00: alarms up to one day, y3k, 114 bytes nvram
[ 11.337104] device-mapper: uevent: version 1.0.3
[ Retrieval54] drepce-mapper: ioctl: 4.27.0-ioclt (2013-10-30) initialised: dm-
devel@redhat.com
```

尝试等待

两小时过后依旧如此

全选终端中文本，复制到Windows下记事本，发现文本中底部和终端显示内容相同，即全选文本无法获取下面的进度条内容。

尝试关闭终端，测试是否安装好虚拟机。

更改/etc/default/grub中的一行为GRUB_CMDLINE_LINUX="console=ttyS0,115200n8"

```
...
GRUB_CMDLINE_LINUX="console=ttyS0,115200n8"
...
```

```
Activities  Terminal  Mon 07:52
cogito@ubuntu: ~
File Edit View Search Terminal Help
# If you change this file, run 'update-grub' afterwards to update
# /boot/grub/grub.cfg.
# For full documentation of the options in this file, see:
#   info -f grub -n 'Simple configuration'

GRUB_DEFAULT=0
GRUB_HIDDEN_TIMEOUT=0
GRUB_HIDDEN_TIMEOUT_QUIET=true
GRUB_TIMEOUT=10
GRUB_DISTRIBUTOR=`lsb_release -i -s 2> /dev/null || echo Debian`
GRUB_CMDLINE_LINUX_DEFAULT="quiet"
GRUB_CMDLINE_LINUX="console=ttyS1,115200n8"
# Uncomment to enable BadRAM filtering, modify to suit your needs
# This works with Linux (no patch required) and with any kernel that obtains
# the memory map information from GRUB (GNU Mach, kernel of FreeBSD ...)
#GRUB_BADRAM="0x01234567,0xfefefefefefefefefefef,0x89abcdef,0xefefefefef"

# Uncomment to disable graphical terminal (grub-pc only)
#GRUB_TERMINAL=console

# The resolution used on graphical terminal
# note that you can use only modes which your graphic card supports via VBE
# you can see them in real GRUB with the command `vbeinfo'
#GRUB_GFXMODE=640x480

# Uncomment if you don't want GRUB to pass "root=UUID=xxx" parameter to Linux
#GRUB_DISABLE_LINUX_UUID=true
"/etc/default/grub" 33 lines, 1251 characters
```

运行几条命令来使用虚拟机

update-grub //更新引导项

```
File Edit View Search Terminal Help
cogito@ubuntu:~$ vi /etc/default/grub
cogito@ubuntu:~$ sudo vi /etc/default/grub
[sudo] password for cogito:
cogito@ubuntu:~$ sudo vi /etc/default/grub
cogito@ubuntu:~$ update-grub
grub-mkconfig: You must run this as root
cogito@ubuntu:~$ sudo su
root@ubuntu:/home/cogito# update-grub
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-4.15.0-20-generic
Found initrd image: /boot/initrd.img-4.15.0-20-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
root@ubuntu:/home/cogito#
```

virsh list //查看数据

```
ties Terminal ▾ Mon 07:55
root@ubuntu: /home/cogito

File Edit View Search Terminal Help
cogito@ubuntu:~$ vi /etc/default/grub
cogito@ubuntu:~$ sudo vi /etc/default/grub
[sudo] password for cogito:
cogito@ubuntu:~$ sudo vi /etc/default/grub
cogito@ubuntu:~$ update-grub
grub-mkconfig: You must run this as root
cogito@ubuntu:~$ sudo su
root@ubuntu:/home/cogito# update-grub
Generating grub configuration file ...
Warning: Setting GRUB_TIMEOUT to a non-zero value when GRUB_HIDDEN_TIMEOUT is s
et is no longer supported.
Found linux image: /boot/vmlinuz-4.15.0-20-generic
Found initrd image: /boot/initrd.img-4.15.0-20-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
root@ubuntu:/home/cogito# virsh list
  Id    Name                State
  ----  ---
  1     guest0               running

root@ubuntu:/home/cogito#
```

virsh console guest0 //连接客户机

```
File Edit View Search Terminal Help
cogito@ubuntu:~$ vi /etc/default/grub
cogito@ubuntu:~$ sudo vi /etc/default/grub
[sudo] password for cogito:
cogito@ubuntu:~$ sudo vi /etc/default/grub
cogito@ubuntu:~$ update-grub
grub-mkconfig: You must run this as root
cogito@ubuntu:~$ sudo su
root@ubuntu:/home/cogito# update-grub
Generating grub configuration file ...
Warning: Setting GRUB_TIMEOUT to a non-zero value when GRUB_HIDDEN_TIMEOUT is s
et is no longer supported.
Found linux image: /boot/vmlinuz-4.15.0-20-generic
Found initrd image: /boot/initrd.img-4.15.0-20-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
root@ubuntu:/home/cogito# virsh list
  Id    Name                State
  ----  ---
  1     guest0               running

root@ubuntu:/home/cogito# virsh console guest0
Connected to domain guest0
Escape character is ^]
```



```
virsh start guest0 //开启客户机
```

```
Connected to domain guest0
Escape character is ^]

root@ubuntu:/home/cogito# virsh start guest0
error: Domain is already active

root@ubuntu:/home/cogito#
```

```
virsh shutdown guest0 //关闭客户机
```

```
root@ubuntu:/home/cogito# virsh start guest0
error: Domain is already active

root@ubuntu:/home/cogito# virsh shutdown guest0
Domain guest0 is being shutdown

root@ubuntu:/home/cogito#
```

实验结束

实验数据或结果

数据及结果在上述实验步骤中。

实验思考

即使成熟的工业软件，也有不如人意的明显错误

这次作业体验了从Windows下安装ubuntu虚拟机以及在虚拟机下构建KVM，实现hypervisor管理虚拟机下的虚拟机。虚拟机下安装虚拟机让人极度痛苦，在linux中建议换国内源，以更快的更新或安装软件。

参考资料
