Tutorial Lesson

Linux & Tools

OUTLINE

Linux

Tools

Linux

Tools

- Introduction
- Installation
- Shell

BACKGROUND

- The History of Linux 
  - Linus Torvalds, 1991
  - Based on POSIX and Unix
  - Multi-user task thread CPU
  - Unix-like Operating Systems
    - Heirs: **Linux**, **BSD**, **Solaris**, **MacOS X**, …
    - Principle: **KISS**

Keep **I**t **S**imple, **S**tupid !

COMPARISON

- Differences between Windows and Linux
  - One Kernel and Multiple Distribution
    - 5.8.x kernel (latest stable: 5.8.9 2020-09-12)
    - RedHat / Fedora, Debian
    - Suse, Gentoo, Arch, Ubuntu, …
  - Powerful Command Line Interface
  - Directories Organization
  - …


redhat


fedora


ubuntu


openSUSE


Mandriva


debian


gentoo linux

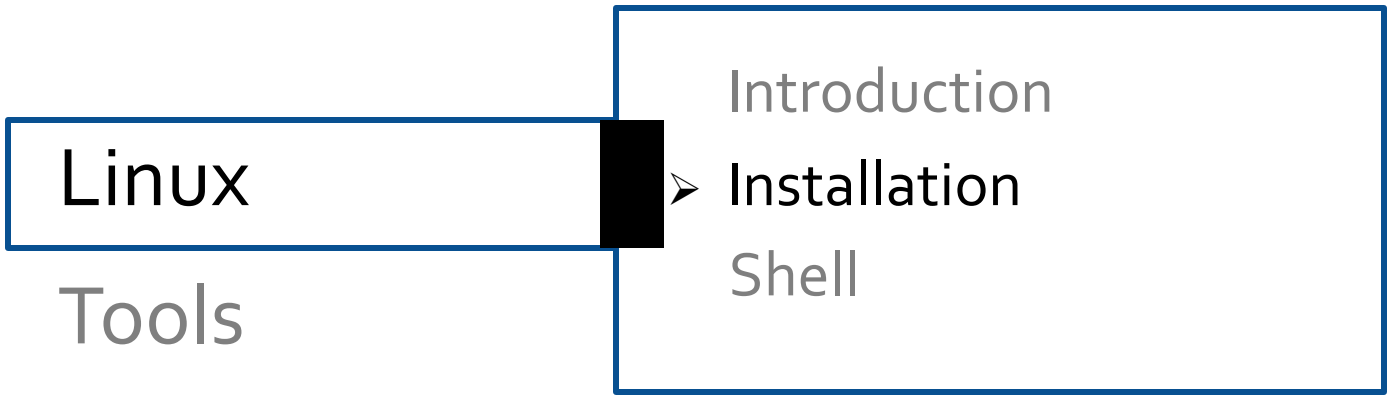

slackware


红旗


Hiweed


KNOPPIX


CentOS


Linux
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INSTALL

- Step 0: How to find it ?
  - Ftp
    - 10.12.5.33/classes/19/计算机系统基础（上）/Materials目录下
  - Online: *get the official web-site by google*
  - e.g. Ubuntu

INSTALL

- Step 1: Where to install it ?
  - Cygwin
    - Sorry, no technical support
  - on RAW machine
    - Cool ! Dangerous !
  - on VIRTUAL machine
    - Safety! Recommendation !

Tips: virtual machine

Definition

provides a complete system platform which supports the execution of a complete operating system

~~Java Runtime Environment~~

INSTALL

Tips: VMware Workstation

Benefit

hosted, popular, graphic
easy, stable, checkpointed

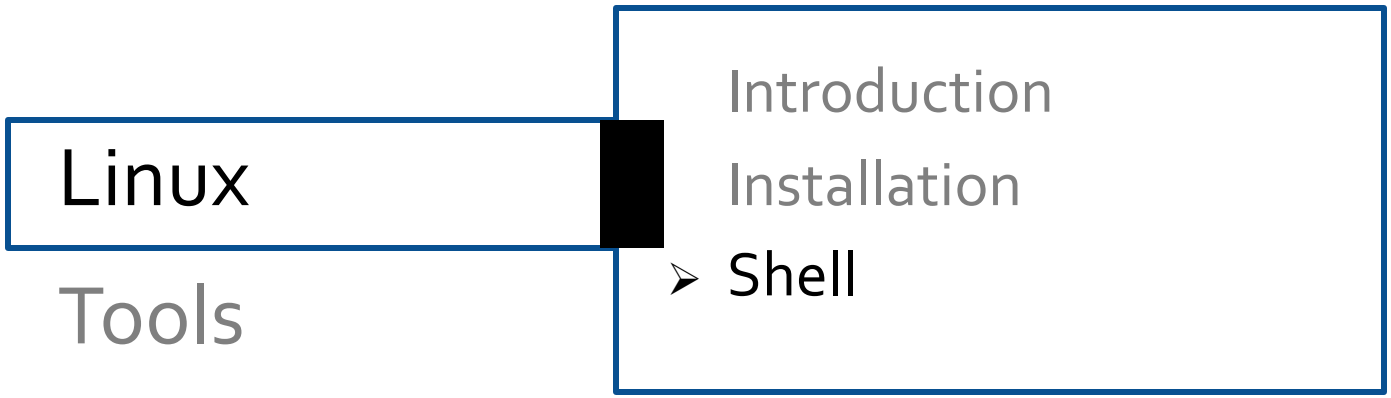
- Step 2: Create VM
  - Create VM from ISO file
    - e.g. ubuntu-16.04.7-desktop-amd64.iso
  - Set name and location
  - Disk capacity
    - 20G (engross on demand)
  - Network connection (customized)
    - Bridge (separate IP) or NAT (internal IP, default)

Done !

INSTALL

- Step 3: Configure VM
  - Configure Hardware (Customized)
    - Memory Size
    - #CPU / #Core
    - Ethnet Mode
  - Power On

Let's go !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SHELL

- Operating System Shell
  - Provide access to the services of a kernel
  - Command-Line Interface (CLI)
    - Unix Shell
      - e.g. Bounce-Again Shell, bash
    - Non-Unix Shell
      - e.g. DOS
  - Graphical User Interface (GUI)
    - Windows, X Window (KDE, GNOME, Xfce), Mac OS

Commands

- MOST IMPORTANT
  - Search Path: `/bin, /usr/bin, ...`
  - Command is case sensitive
  - **man** – display the manual pages
    e.g. >man ls
  - **whatis** – search the whatis database for complete words
    e.g. >whatis passwd

Commands

- File and Directory
  - **ls** - list files/dirs e.g. >ls
  - **mkdir** – create a dir e.g. >mkdir test
  - **cd** - change dir e.g. >cd test
  - **rm** - remove files/dirs e.g. >rm -f a.txt
  - **cp** - copy files/dirs e.g. >cp a.txt b.txt
  - **mv** – move files/dirs e.g. >mv a.txt c.txt
  - **pwd** – show current path e.g. >pwd

Commands

- File and Directory
  - **chmod** – change mode of file/dir
    e.g. >chmod 777 test
  - **chown** – change owner of file/dir
    e.g. >chown ics edit
  - **chgrp** – change group of file/dir
    e.g. >chgrp guest draft -R

```
$ ls -l
drwxr--r--  1 peter  admin  4096   Mar 1 2007 drafts
-rw-r--r--  1 peter  admin  30405  Mar 1 2007 edition-32
-r-xr-xr-x  1 terry  admin  8460   Mar 1 2007 edit
duuuggguoo  C owner  group  size   date       name
```

r: read w:write x:excute rwx=111=7

u: owner g:user group o:other users

Commands

- Search
  - **whereis** - locate special files for a command (binary, src and manual file)
    e.g. >whereis cp
  - **find** – search for files/dirs in a dir hierarchy
    e.g. >find . –name "c.txt"
  - **locate** – locate files/dirs by name in system based on a database
    e.g. >locate test
  - **grep** – text search utility
    e.g. >grep -r "abc" .

Commands

- User Account
  - **useradd** – create a new user
    e.g. >useradd ics
  - **userdel** – delete a user account
    e.g. >userdel ics
  - **passwd** – set password for a user account based on a database
    e.g. >passwd ics
  - **users** – print name of user currently logged
    e.g. >users

Commands

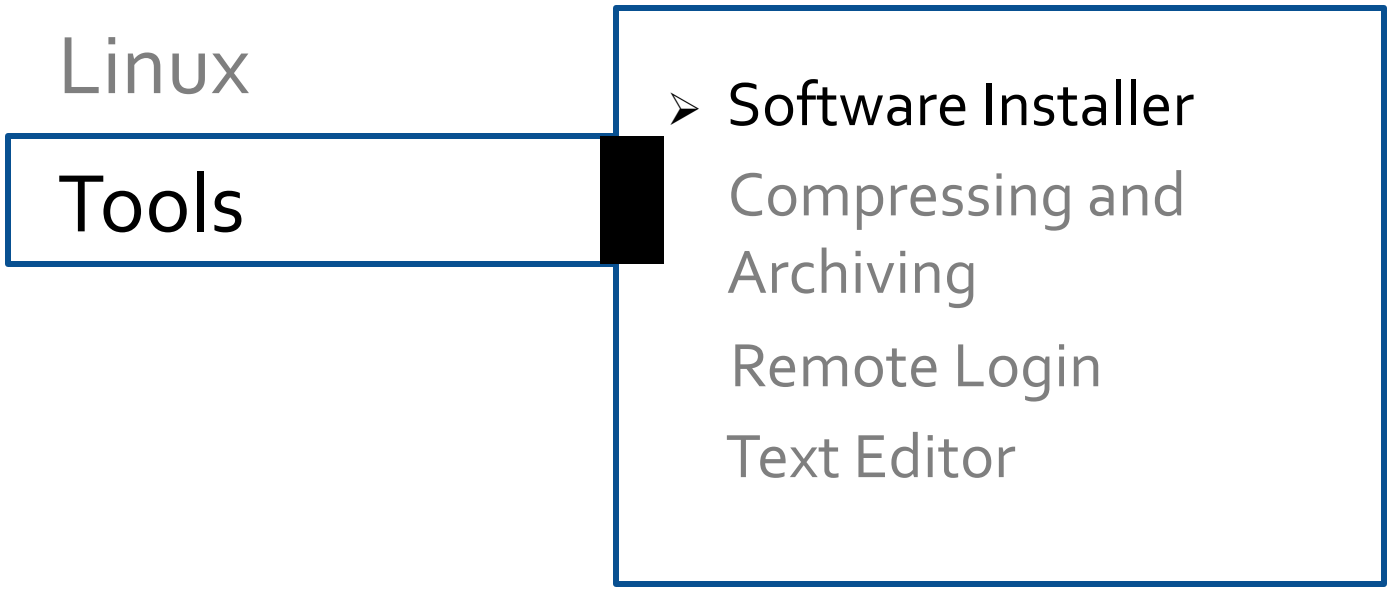
- Text
  - **cat** – concatenate and print files
    e.g. >cat b.txt
  - **head** – output the first part of files
    e.g. >head -n 4 b.txt
  - **tail** – output the last part of files
    e.g. >tail -c 50 b.txt
  - **wc** – print the number of newlines, words, and bytes in files
    e.g. >wc b.txt
  - **cut** – remove sections from each line of files
    e.g. >cut -c 4-10 b.txt

Commands

- Misc
  - **echo** – display a line of text
    e.g. >echo $PATH
  - **mount** – mount a file system
    e.g. >mount /dev/sda3 /mnt
  - **umount** – unmount a file system
    e.g. >umount /mnt
  - **ping** – send ICMP ECHO_REQUEST to network hosts
    e.g. >ping 10.12.5.33
  - **date** – print or set the system date and time
    e.g. >date '+%c'
  - **time** – time a simple command
    e.g. >time ls

Commands

- Misc
  - `;` – join two command in one line
    e.g. >echo $PATH; whereis echo
  - `< > >>` – redirect input and output
    e.g. >cat b.txt >> c.txt
  - `|` – pipe the former output as the later input
    e.g. >cat b.txt | grep “abc”
  - `&` – do command in new process
    e.g. >cat b.txt &


Linux
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Software Installer
Compressing and Archiving
Remote Login
Text Editor

Software Installer

- APT (Advanced Package Tools)
  - A management system for software packages
  - Package resource list for
    - **/etc/apt/sources.list**

```
$ cat /etc/apt/source.list
...
```

deb	http://mirrors.163.com/debian/	jessie	main
dbe-src	http://mirrors.163.com/debian/	jessie	main
type	**URI of source**	**dist**	**comp**

```
URI type: http, ftp, cdrom, file, ssh ...
```

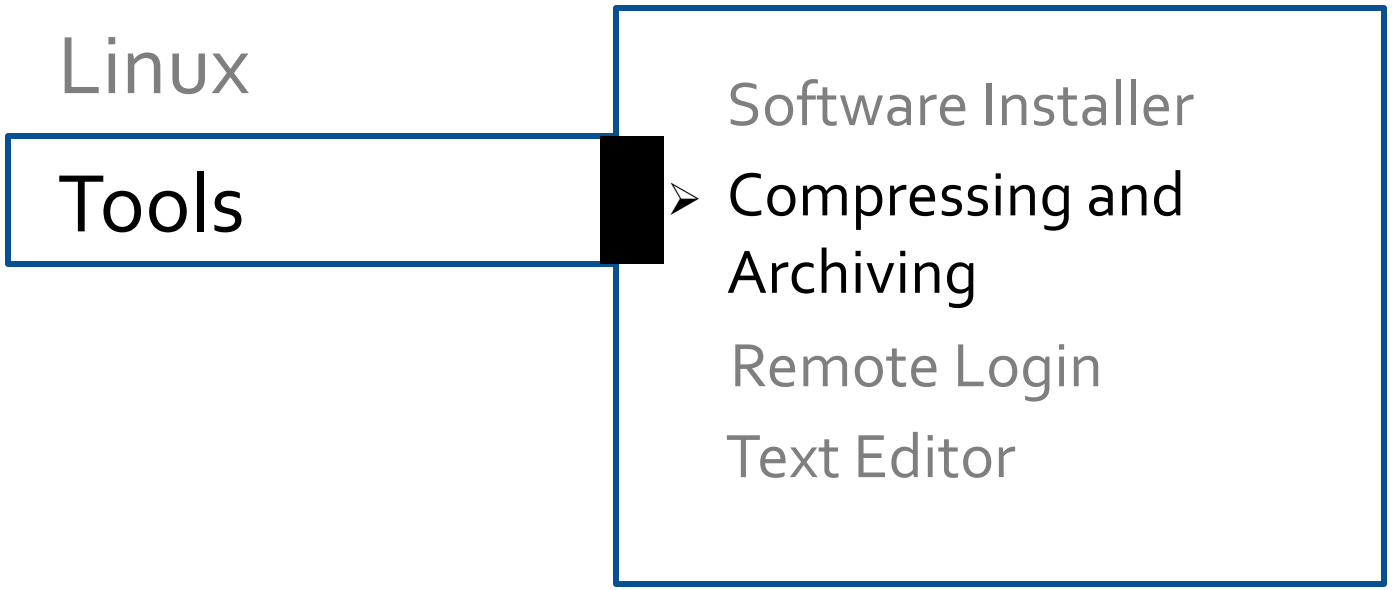
Software Installer

- APT Advanced Package Tools
  - apt-get: *command-line tool*
    - **update** e.g. >apt-get update
    - **install** e.g. >apt-get install htop
    - **remove** e.g. >apt-get remove htop
    - **upgrade** e.g. >apt-get upgrade htop
  - apt-cache: *cache manipulator*
    - **search** e.g. >apt-cache search htop
    - **showpkg** e.g. >apt-cache showpkg htop

Software Installer

- APT Advanced Packag Tools)
  - example: *install vim*
    - >su
    - >apt-get update
    - >apt-cache search vim
    - >apt-get install vim
    - >man vim

```
$ apt-cache search vim
...
vim  - Vi IMproved - enhanced vi editor
vim-doc  - Vi IMproved - HTML documentation
...
```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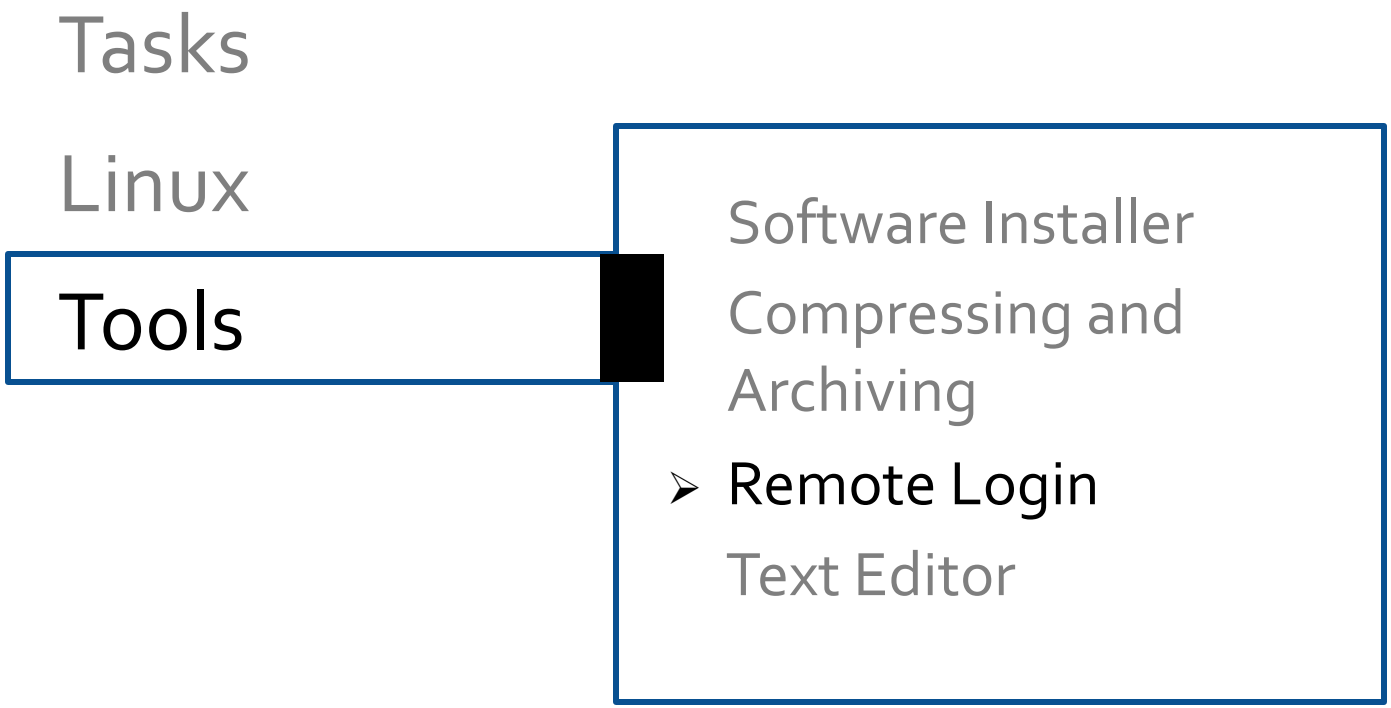
COMPRESSING

- GZIP (Gnu ZIP)
  - **`gzip`** file format
  - Compress just single file
  - Replace the original file with .gz file
  - `e.g. >gzip test.txt`
  - `>gunzip test.txt.gz`

ARCHIVING

- TAR (Tape ARchive)
  - **`tar`** file format
  - Suffix:
    - **`.tar`** `e.g. >tar -cf src.tar src/`
    - **`.tgz/.tar.gz`** `e.g. >tar -zxf src.tar.gz`
    - **`.tbz/.tar.bz2`** `e.g. >tar -jcf src.tbz src/`


Tasks
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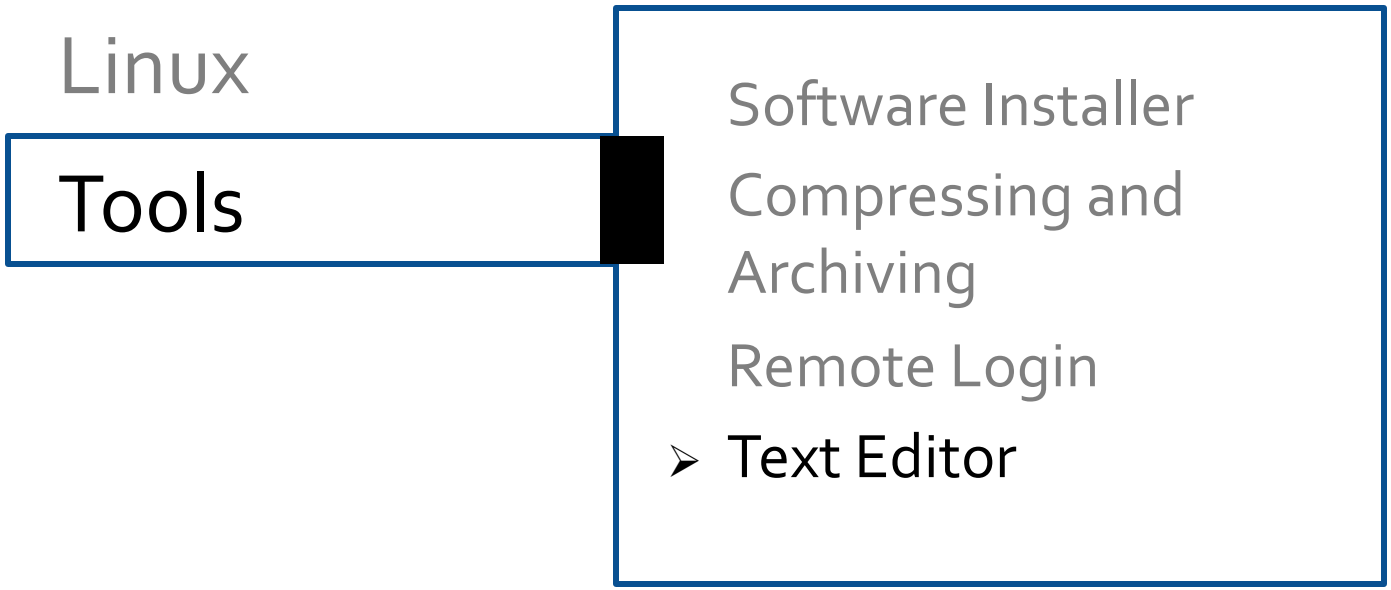
Text Editor

REMOTE LOGIN

- SSH (Secure SHell)
  - A Replacement for Telnet
    - Communication through a **secure** channel
  - Tatu Ylönen, 1995
  - OpenSSH (OpenBSD Secure Shell), 1999
  - e.g. `>ssh -l root 127.0.0.1`
  - SCP, A Replacement for FTP
    - e.g. `>scp b.txt root@127.0.0.1:~/test/`
      `>scp root@127.0.0.1:~/test/b.txt ./`

REMOTE LOGIN

- Remote Login from Windows
  - Command-Line Interface
    - **PuTTY**
      - act as a client for SSH and Telnet
      - Developed by Microsoft
  - Graphical User Interface
    - **VNC** (Virtual Network Client)
      - Platform Independent
      - Client-Sever Model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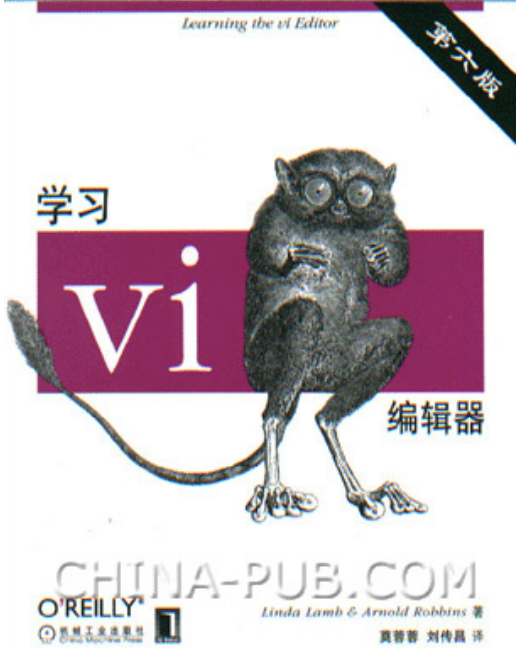
TEXT EDITOR

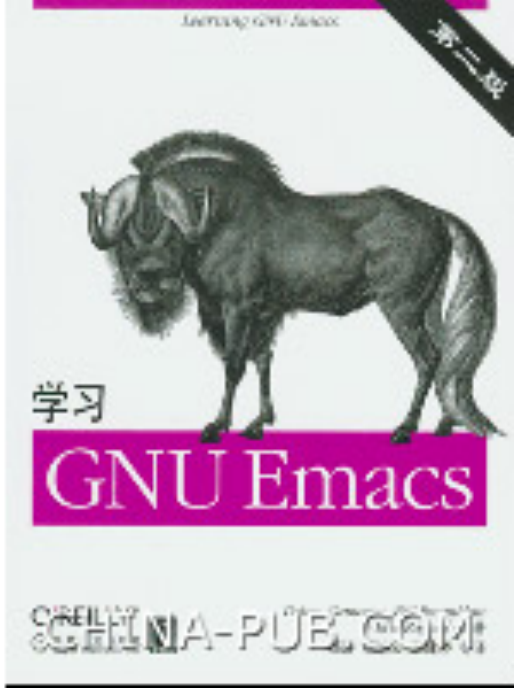


- vi (Visual Editor)
  - /'vi:'ai/, not /'siks/ ☺
  - Extension: vim, vile, xvi, …
  - Simple and Convenient
  - BOOK: "learning the vi editor"
    http://www.china-pub.com/computers/common/info.asp?id=9208
  - Cheat Sheet *(Chinese version)*
    http://jserv.sayya.org/misc/vi-vim-cheat-sheet.png
  - ">vimtutor" to get a simple tutorial

TEXT EDITOR

- Emacs (Editing MACroS)
  - /'imæks/
  - More powerful than IDE !
    - Emacs List
  - BOOK: "Learning GNU Emacs"

    http://www.china-pub.com/computers/common/info.asp?id=13395



Thanks

UBUNTU系统镜像获取

下载Ubuntu镜像

- FTP获取
  - 10.12.5.33/classes/19/计算机系统基础（上）/Materials目录下
- 官网下载：
- http://releases.ubuntu.com/16.04/
- 镜像下载：
  - http://mirrors.ustc.edu.cn/ubuntu-releases/16.04/（中科大）
  - https://mirror.tuna.tsinghua.edu.cn/ubuntu-releases/16.04/(清华镜像)
- ubuntu-16.04.6-desktop-i386.iso（32位）
- ubuntu-16.04.7-desktop-amd64.iso（64位）

VMWARE激活（获取）

在校园网的情况下进行

申请序列号

- 序列号申请网站：
  - http://tac.fudan.edu.cn/thirds/vm.act

VMware Global Education and Research Programs 详情	
说明	此处为序列号申请，可获得的产品包括: VMWare产品: • VMware eLearning • VMware Workstation 15.x Pro • VMware Fusion 11.x Pro (for Intel-based Macs) • VMware vSphere 6.7 Enterprise Plus (仅教师) • VMware vCenter Server 6.7 Standard (仅教师) 软件可前往http://mvls.fudan.edu.cn/vmware下载
用户类型	硕士生
注册类型	VMware
请输入你的email:	*(结尾必须为必须为@fudan.edu.cn或@shmu.edu.cn，相关序列号会发送至该邮件地址)
	提交 还原

可以在获取序列号之后直接下载软件，也可以从官网下载

从官网下载需要注意版本

- Vmware Fusion：11.x
- Vmware Workstation : 15.x

Vmware官网

- https://www.vmware.com/cn.html

Students | Faculty/Staff

VMware | More Software

Software | eLab | eLearning

VMware

All

VMware Fusion 11.x Pro (for Intel-based Macs)

VMware Workstation 15.x Player

VMware Workstation 15.x Pro

VMware vCenter Server 7.x Standard

VMware vRealize Suite 2019 Enterprise

VMware vSAN 7.x Enterprise

VMware vSphere 7.x Enterprise Plus

VMware vCenter Server 6.x Standard

VMware Fusion 10.x Pro (for Intel-based Macs)

VMware Workstation 14.x Pro

VMware vRealize Suite 7.0 Enterprise

VMware vSAN 6.x Enterprise

VMware vSphere 6.x Enterprise Plus

VMware Workstation 15.x Pro

VMware Workstation Pro takes virtualization to the next level with the broadest operating system support, rich user experience, a comprehensive feature set and high performance.

Choose a platform: Windows

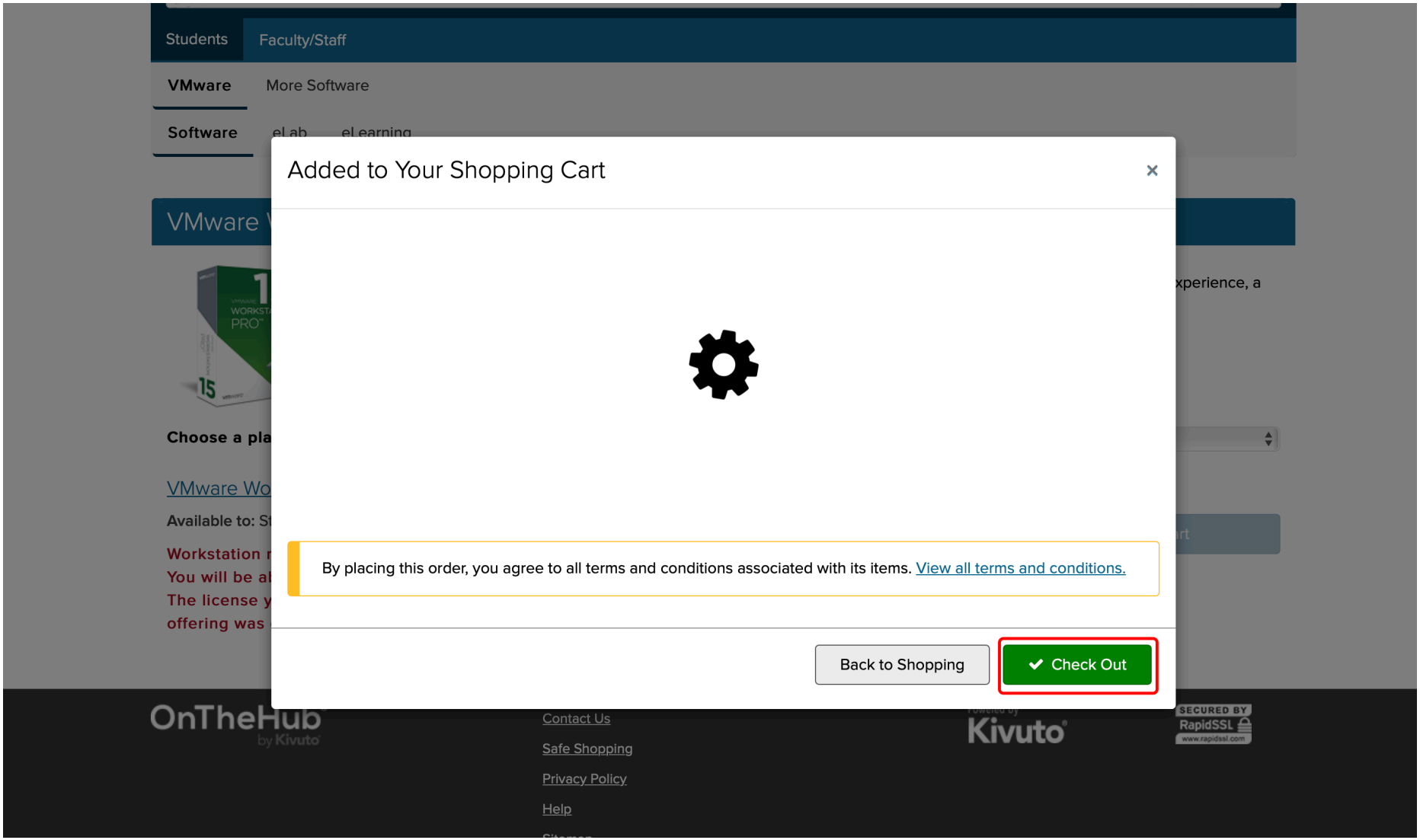
VMware Workstation 15.x Pro for Windows

Free

Available to: Students

Add to Cart

Workstation requires a 64-bit processor and 64-bit host operating system.
You will be able to place an order for this product again in 12 months after the initial order.
The license you will receive with this offering is valid 12 months starting with the 1st of the month the offering was ordered.


Students
Faculty/Staff
VMware
More Software
Software
eLab
eLearning
Added to Your Shopping Cart
By placing this order, you agree to all terms and conditions associated with its items. View all terms and conditions.
Back to Shopping
Check Out
Contact Us
Safe Shopping
Privacy Policy
Help

Details

Your order has been placed and a confirmation email will be sent to you shortly. An invoice you can print is available here. Detailed information about all of your orders can always be found under Your Account.

Details (Order Number: 100694414449)

Downloads

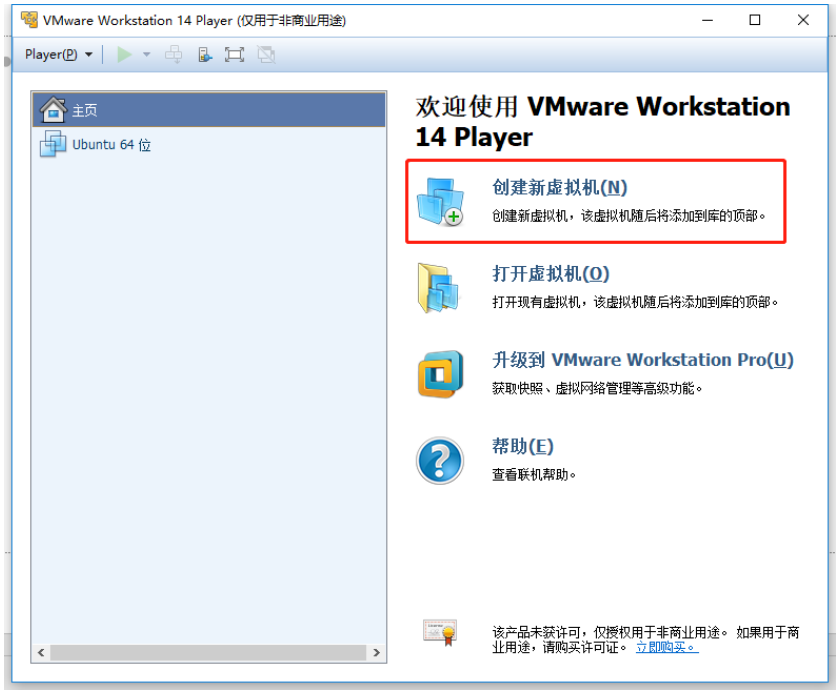
VMware Workstation 15.x Pro for Windows - Download

Serial Number: [redacted]

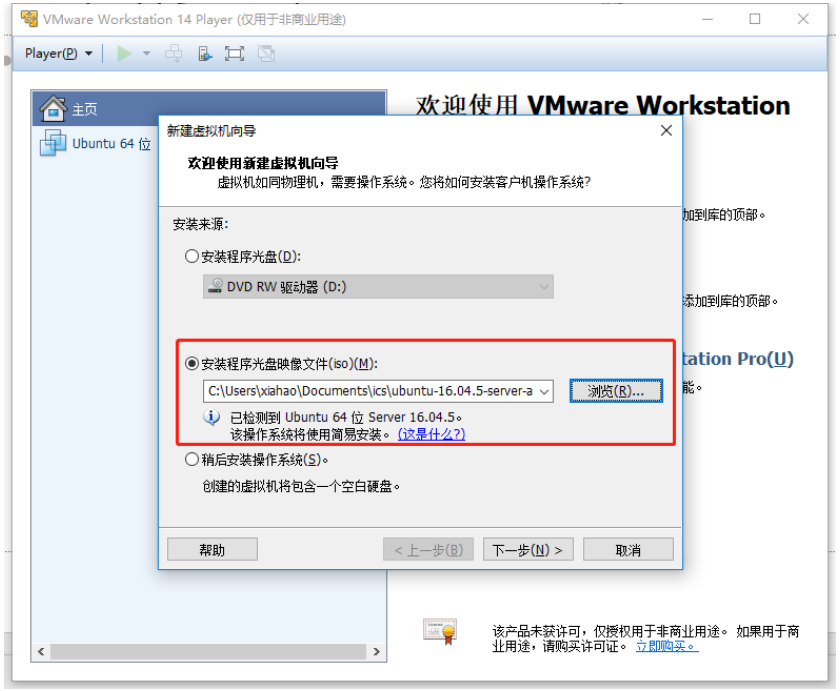
Download

使用VMWARE WORKSTATION安装UBUNTU系统

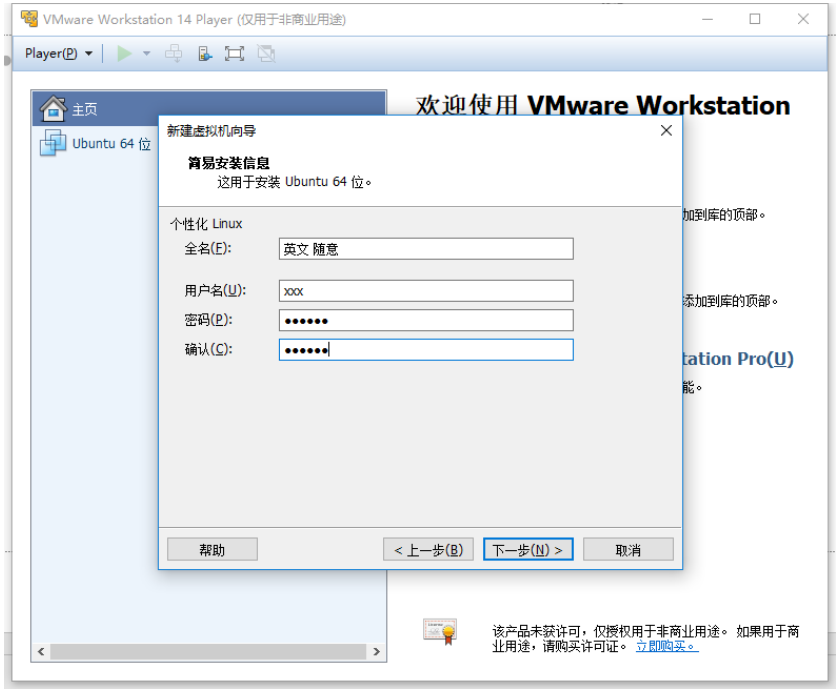
创建新虚拟机


VMware Workstation 14 Player (仅用于非商业用途)
Player(P)
主页
Ubuntu 64 位
欢迎使用 VMware Workstation 14 Player
创建新虚拟机(N)
创建新虚拟机，该虚拟机随后将添加到库的顶部。
打开虚拟机(O)
打开现有虚拟机，该虚拟机随后将添加到库的顶部。
升级到 VMware Workstation Pro(U)
获取快照、虚拟网络管理等高级功能。
帮助(E)
查看联机帮助。
该产品未获许可，仅授权用于非商业用途。 如果用于商业用途，请购买许可证。 立即购买。

选择安装程序光盘映像文件，也就是刚刚下载的那个Ubuntu



设置个人信息


VMware Workstation 14 Player (仅用于非商业用途)
Player(P)
主页
Ubuntu 64 位
欢迎使用 VMware Workstation
新建虚拟机向导
简易安装信息
这用于安装 Ubuntu 64 位。
个性化 Linux
全名(F):
英文 随意
用户名(U):
xxx
密码(P):
确认(C):
帮助
< 上一步(B)
下一步(N) >
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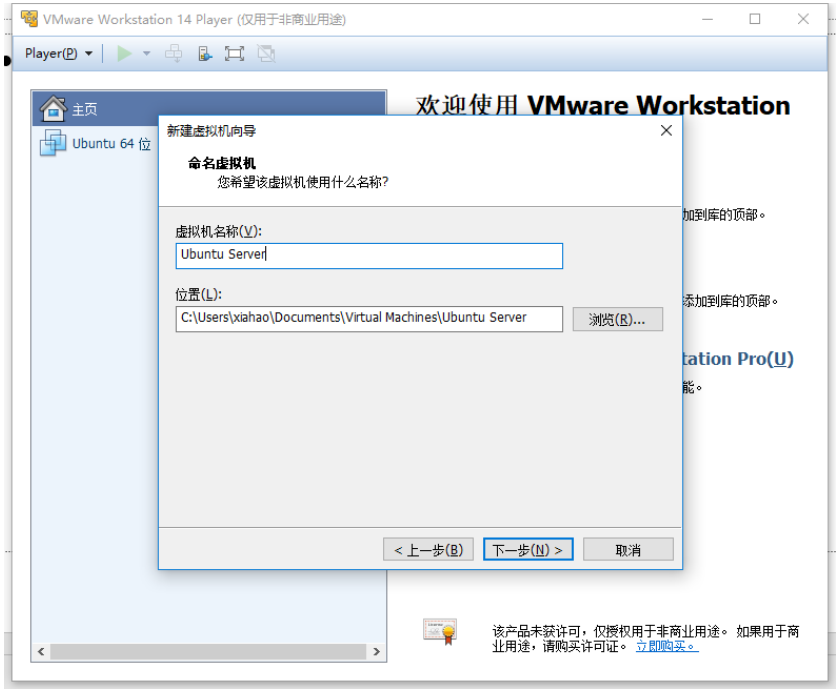
命名虚拟机


VMware Workstation 14 Player (仅用于非商业用途)
Player(P)
主页
Ubuntu 64 位
欢迎使用 VMware Workstation
新建虚拟机向导
命名虚拟机
您希望该虚拟机使用什么名称?
虚拟机名称(V):
Ubuntu Server
位置(L):
C:\Users\xiahao\Documents\Virtual Machines\Ubuntu Server
浏览(R)...
< 上一步(B)
下一步(N) >
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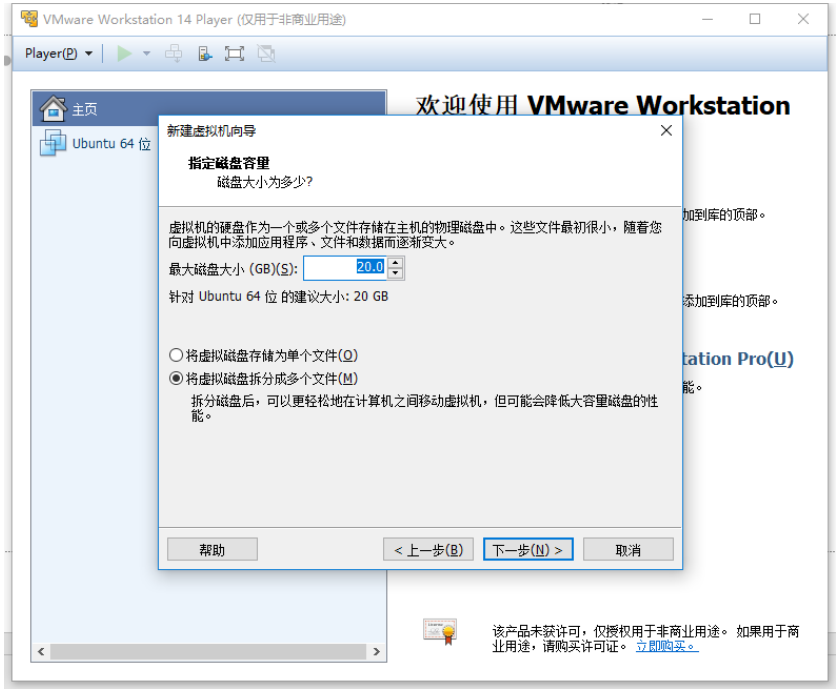
指定磁盘容量


VMware Workstation 14 Player (仅用于非商业用途)
Player(P)
主页
Ubuntu 64 位
欢迎使用 VMware Workstation
新建虚拟机向导
指定磁盘容量
磁盘大小为多少?
虚拟机的硬盘作为一个或多个文件存储在主机的物理磁盘中。这些文件最初很小，随着您向虚拟机中添加应用程序、文件和数据而逐渐变大。
最大磁盘大小 (GB)(S):
20.0
针对 Ubuntu 64 位 的建议大小: 20 GB
将虚拟磁盘存储为单个文件(O)
将虚拟磁盘拆分成多个文件(M)
拆分磁盘后，可以更轻松地在计算机之间移动虚拟机，但可能会降低大容量磁盘的性能。
帮助
< 上一步(B)
下一步(N) >
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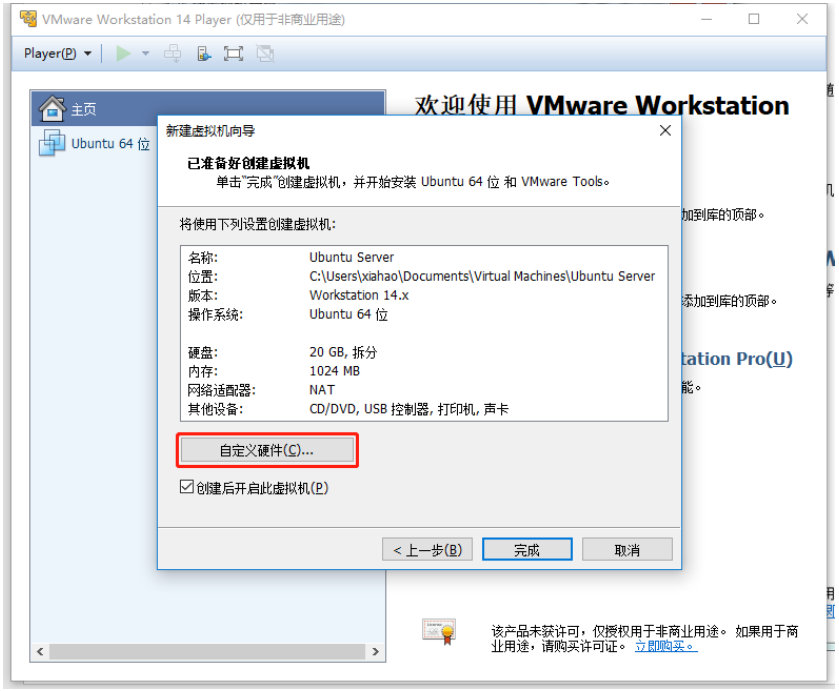
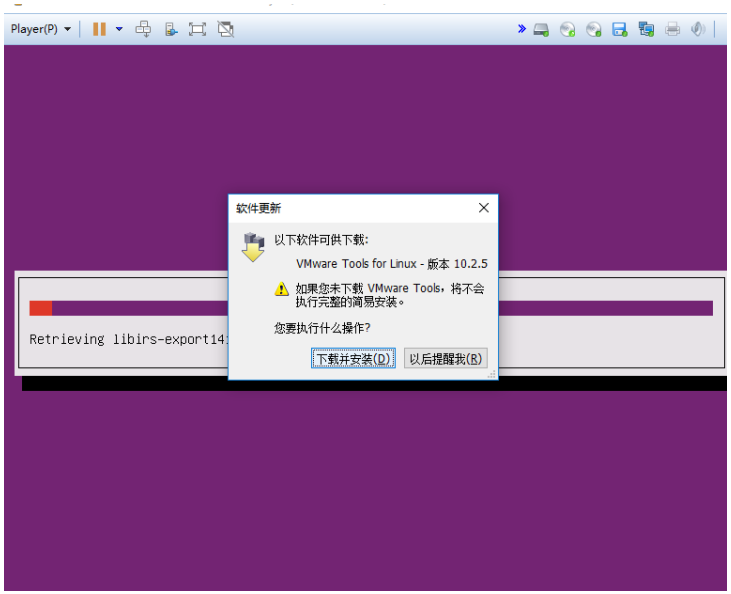
如果内存不是1024MB，请使用自定义硬件设置为1024MB

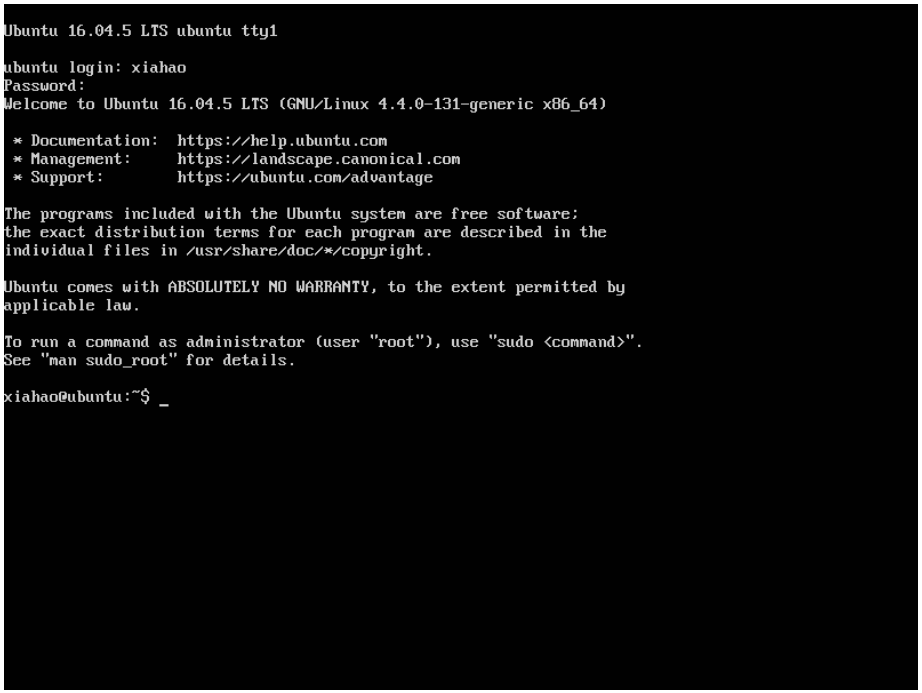


注意，如果出现这个界面选择“以后提醒我”



点击完成后，安装虚拟机需要一段时间。然后输入自己设置的用户名和密码就可以登录Linux虚拟机了

这样就ok了


Ubuntu 16.04.5 LTS ubuntu tty1
ubuntu login: xiahao
Password:
Welcome to Ubuntu 16.04.5 LTS (GNU/Linux 4.4.0-131-generic x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
xiahao@ubuntu:~$ _

使用VMWARE FUSION安装UBUNTU系统

将下载好的ubuntu镜像拖入红框

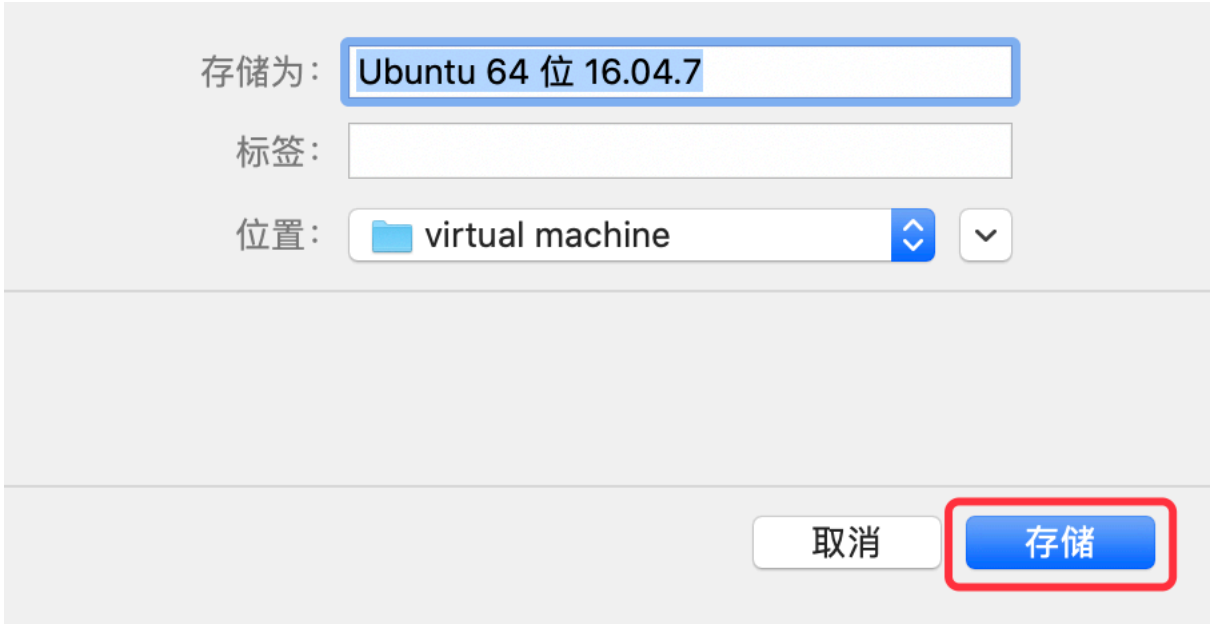

创建新的虚拟机
该助理将指导您在 Mac 上的虚拟机中安装 Windows 或其他操作系统。
选择光盘或映像
配置
完成
选择操作系统安装光盘或映像:
ubuntu-16.04.7-desktop-amd64.iso
Ubuntu 64 位 16.04.7
在 Finder 中显示
使用其他光盘或光盘映像...
?
取消
返回
继续

填写相关信息


Linux 快捷安装
通过快捷安装，VMware Fusion 将根据此处提供的信息自动从安装光盘安装 Ubuntu 64 位 16.04.7，并安装驱动程序以优化您的虚拟机。
选择光盘或映像
配置
完成
使用快捷安装
显示名称: ubuntu create
帐户名: ubuntu
密码: ••••••
确认密码: ••••••
在虚拟机中访问个人文件夹
虚拟机能够 读与写
?
取消
返回
继续

如果不使用它初始化的虚拟机设置，可以选择自定设置虚拟机。

选择存储的位置



等待ubuntu初始化完成