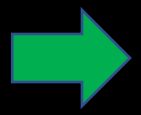
Operating Systems

Lab 01: Ubuntu installation

Content



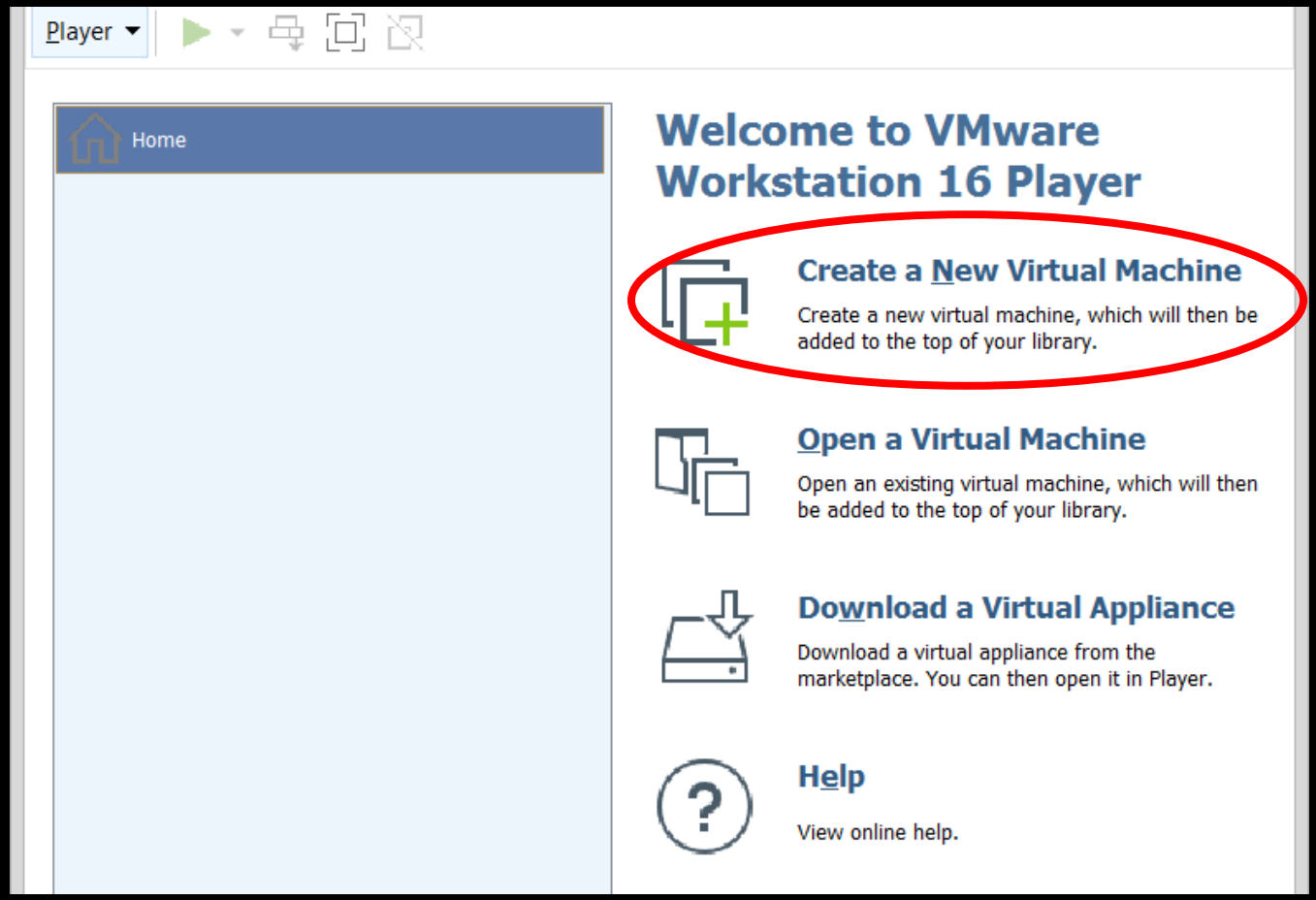
Content
Environment Setup
Introduction to Ubuntu
Navigation

Environment Setup

- Download LTS version of Ubuntu: https://ubuntu.com/download/desktop
- Download VMware Player: https://www.vmware.com/mena/products/workstation-player/workstation-player-evaluation.html
- Install VMware player on your host machine.
- Make sure that virtualization is enabled on your processor: https://www.youtube.com/watch?v=ZDeje9wgDp4 https://www.youtube.com/watch?v=KxYaDQvJizU

Environment Setup

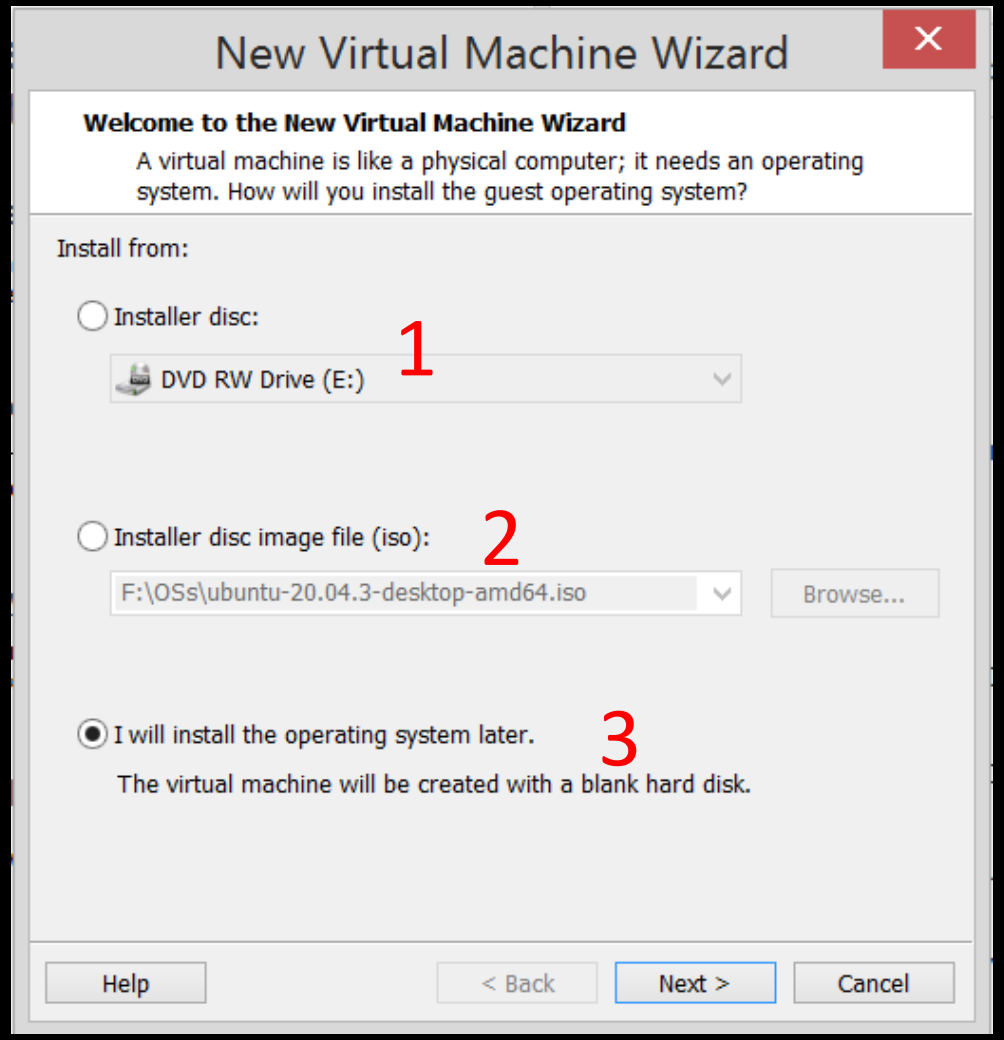
- Create new virtual machine on VMware to run Ubuntu



Environment Setup

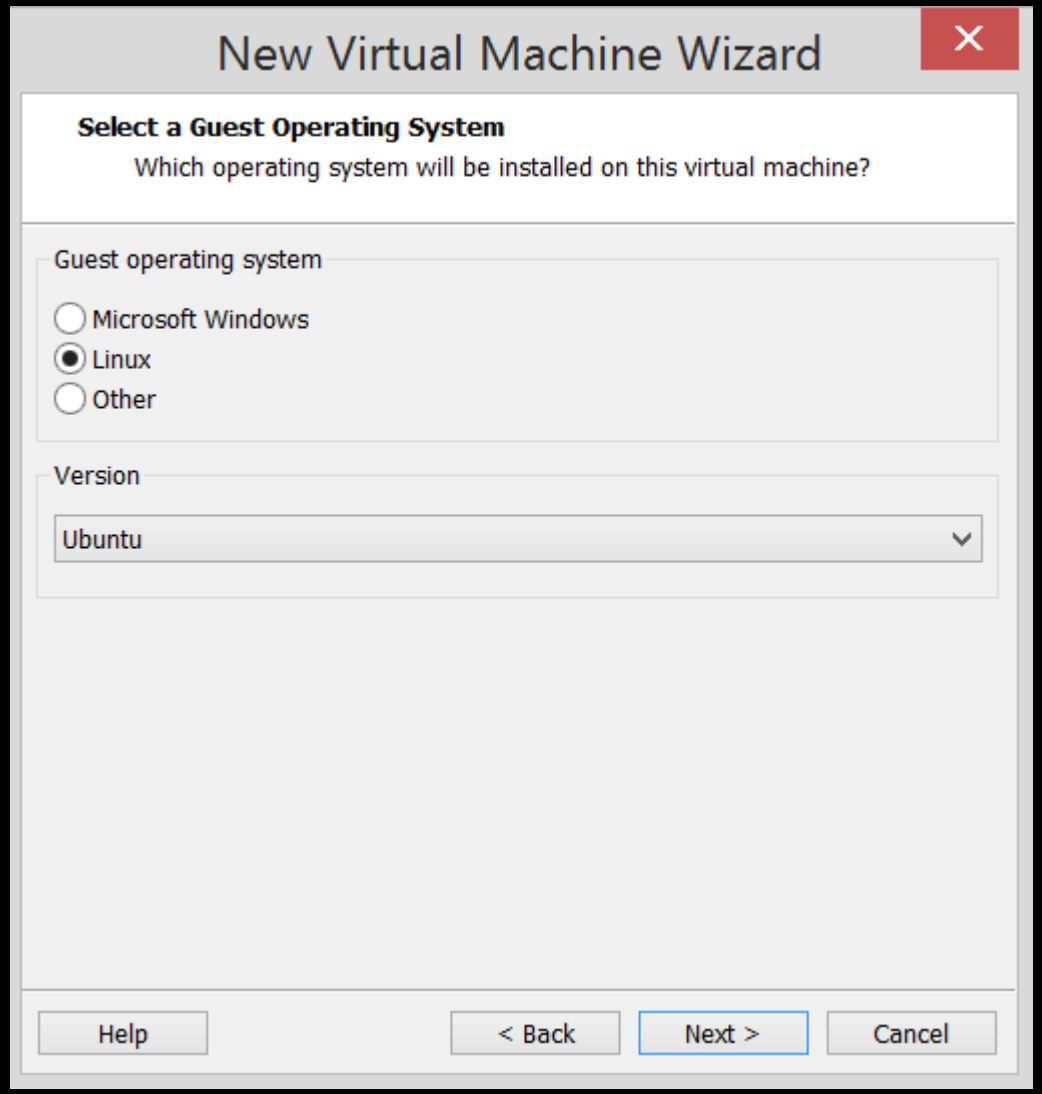
- Option 1: installs Ubuntu from disc.
- Option 2: provides the feature to automatically install Ubuntu, given iso file.
- Option 3: allows you install it manually.

- Select option 3 and click Next.



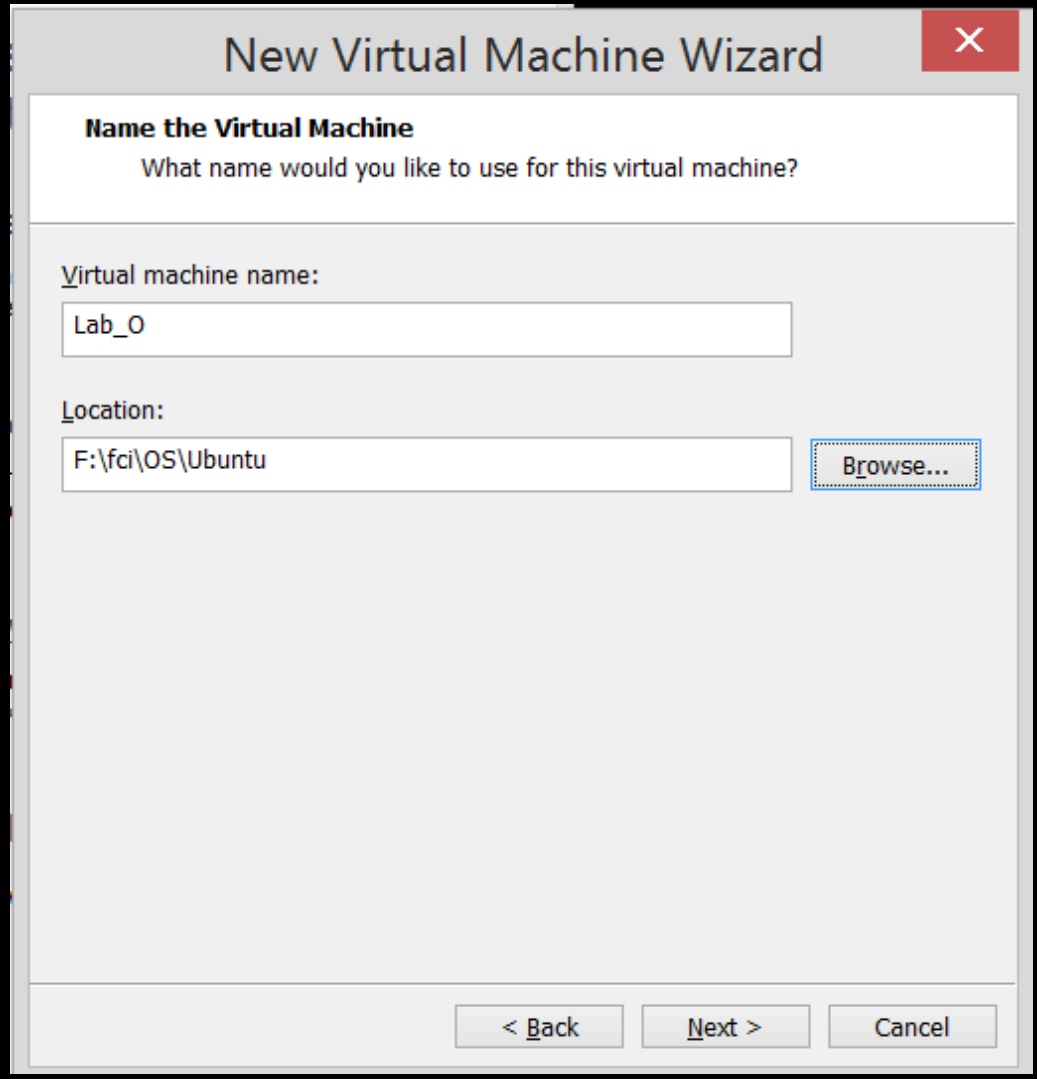
Environment Setup

- Select Linux.
- Select Ubuntu from drop-down menu.
- Click Next.



Environment Setup

- Enter virtual machine name: “Lab_O”
- Browse for a location to store the machine.
- Click Next.



Environment Setup

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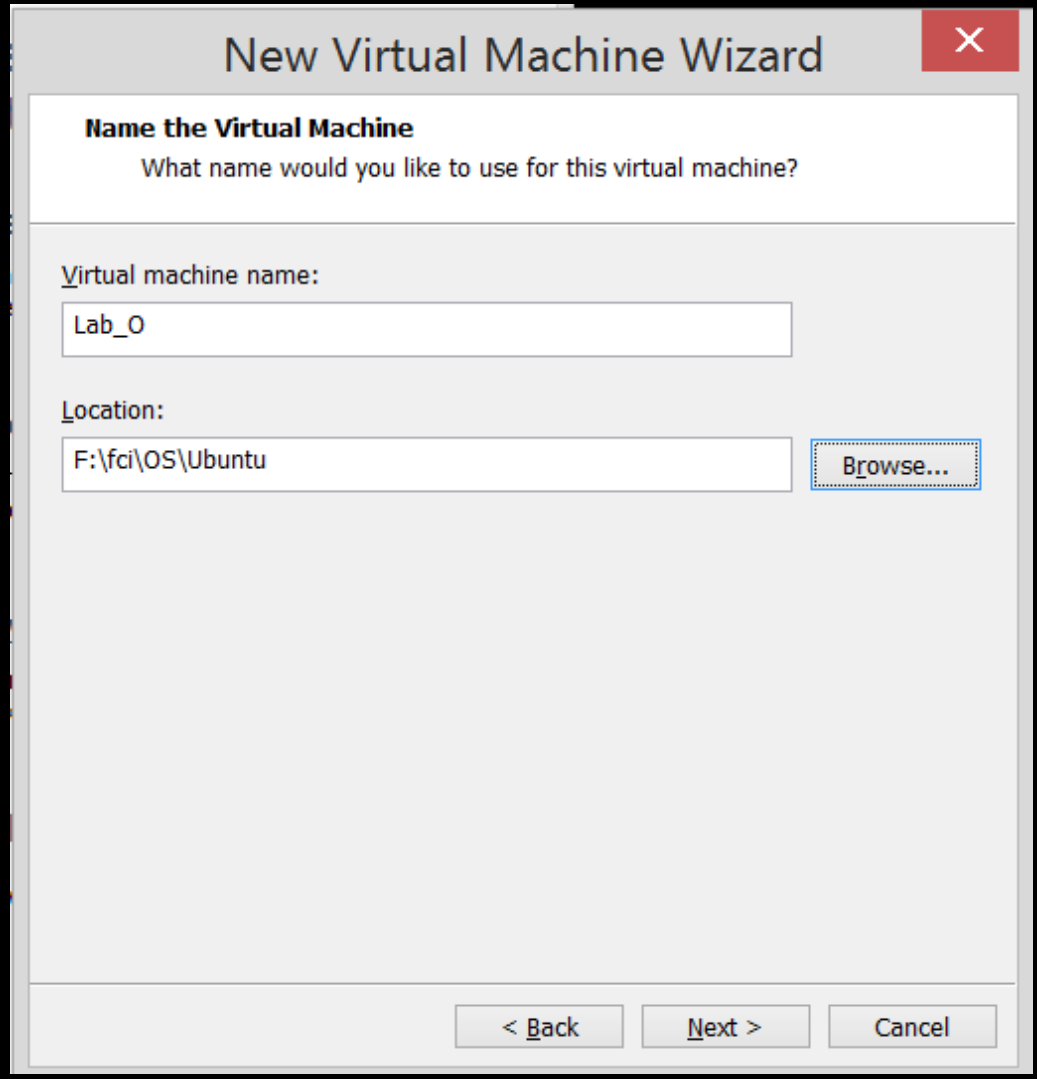
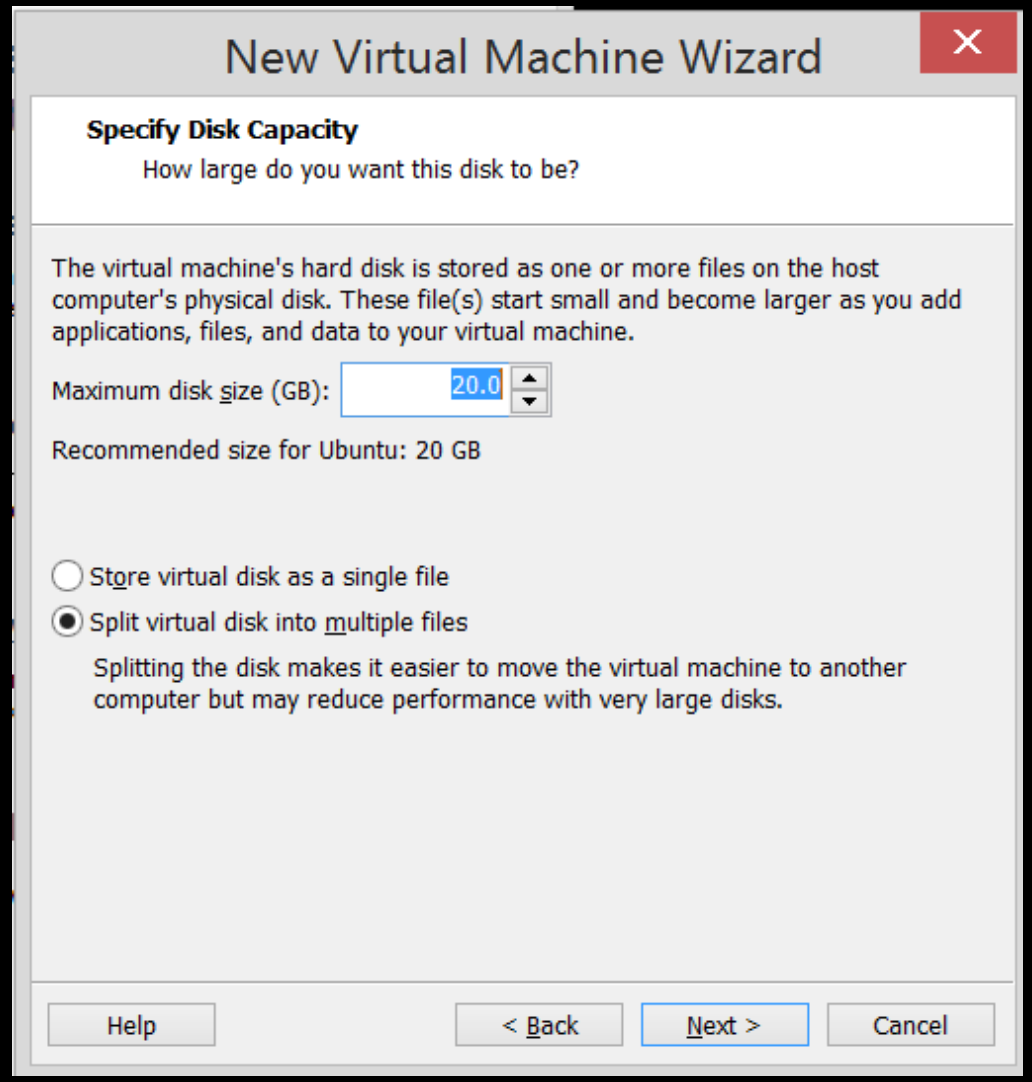


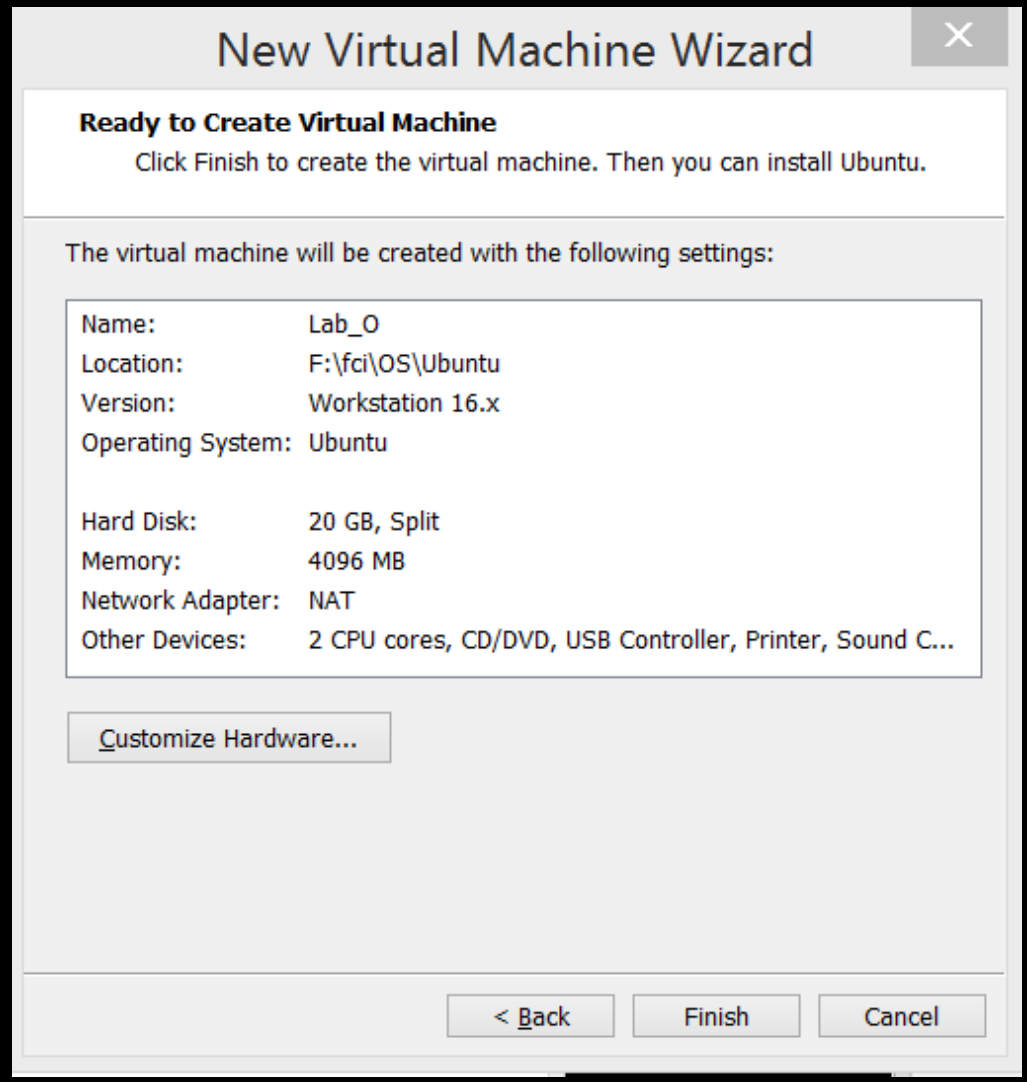
Environment Setup

- Leave the default settings.
- Click Next.



Environment Setup

- This window shows the settings of the machine including memory capacity and CPU.
- To modify the settings, click Customize Hardware.
- Click Finish.



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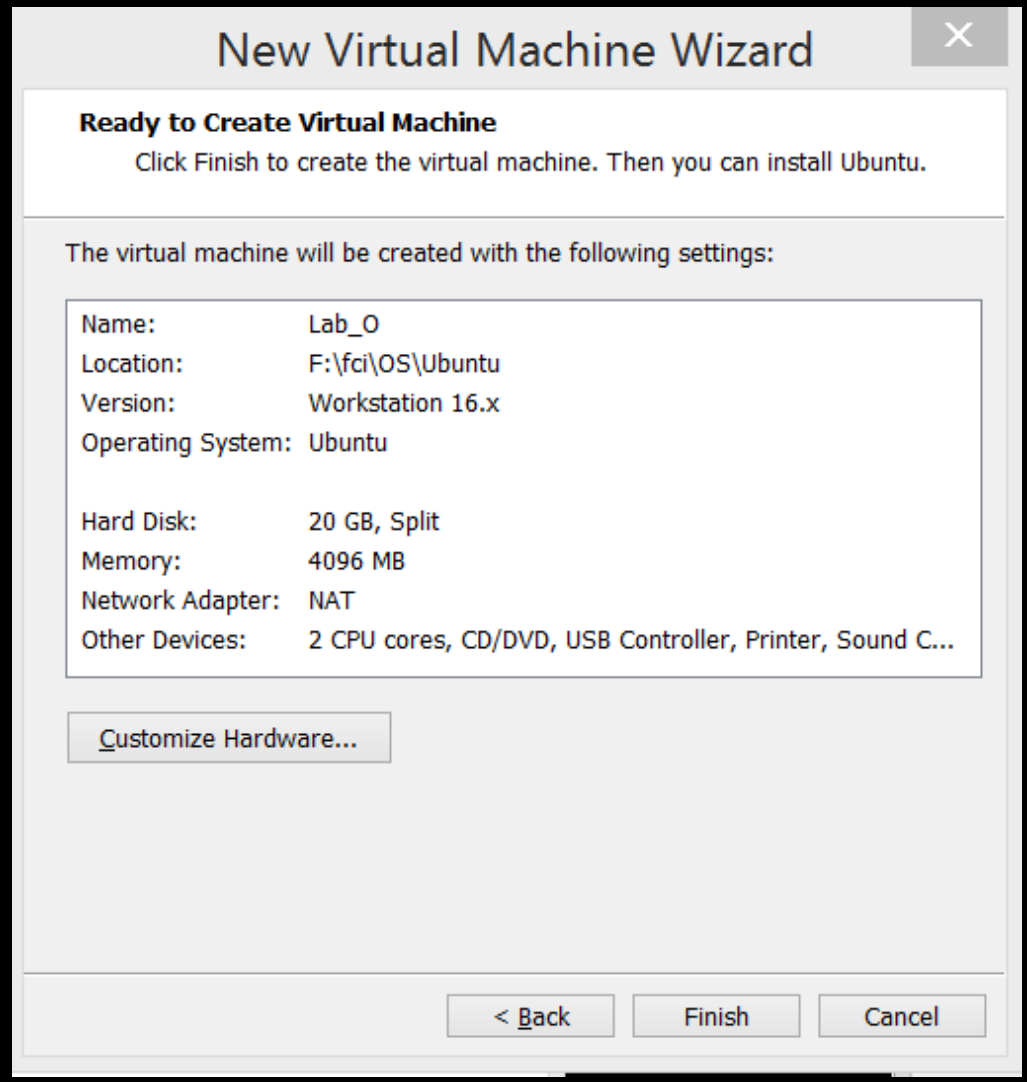
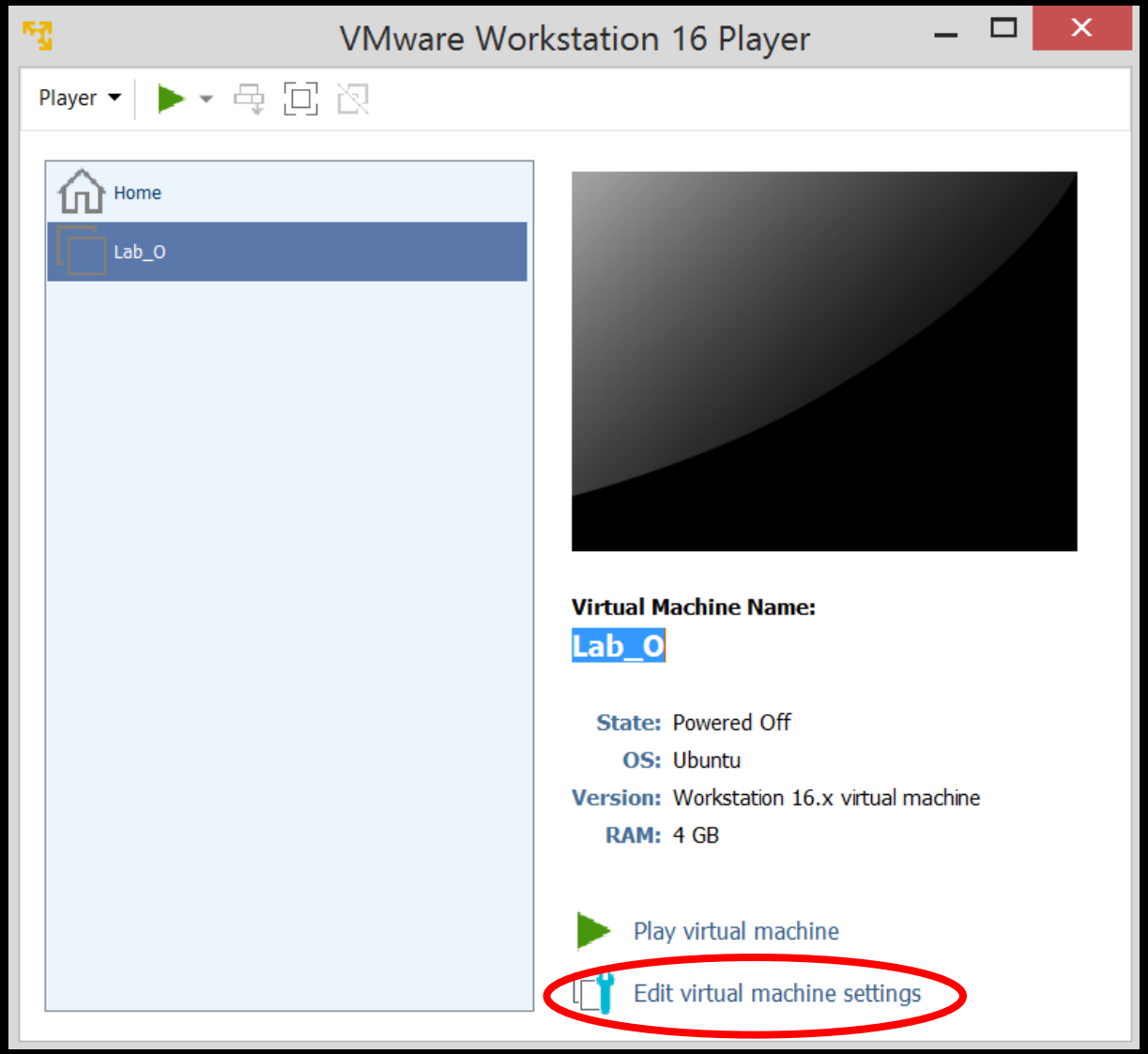


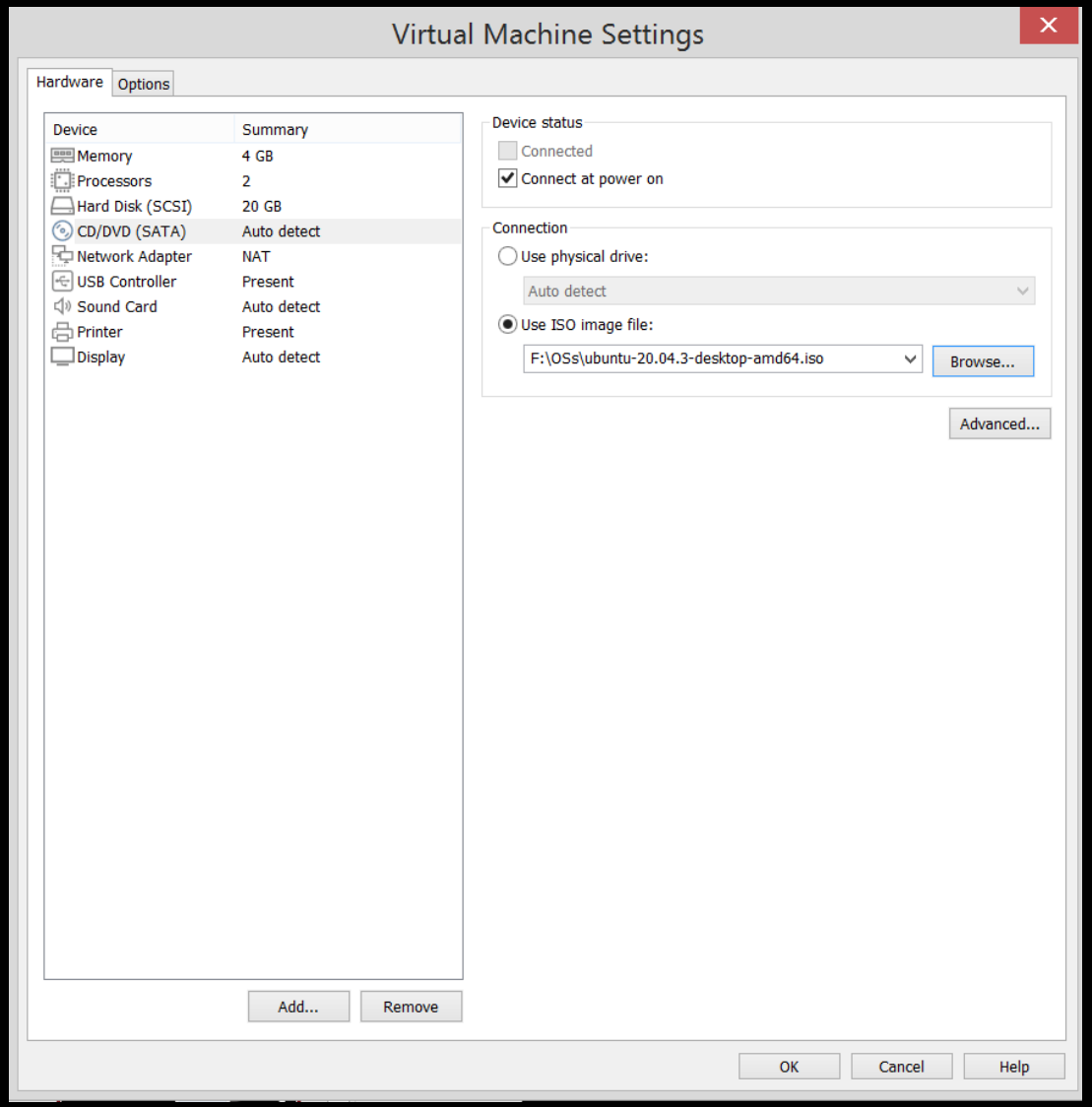
Environment Setup

- From home window, select the machine and click Edit



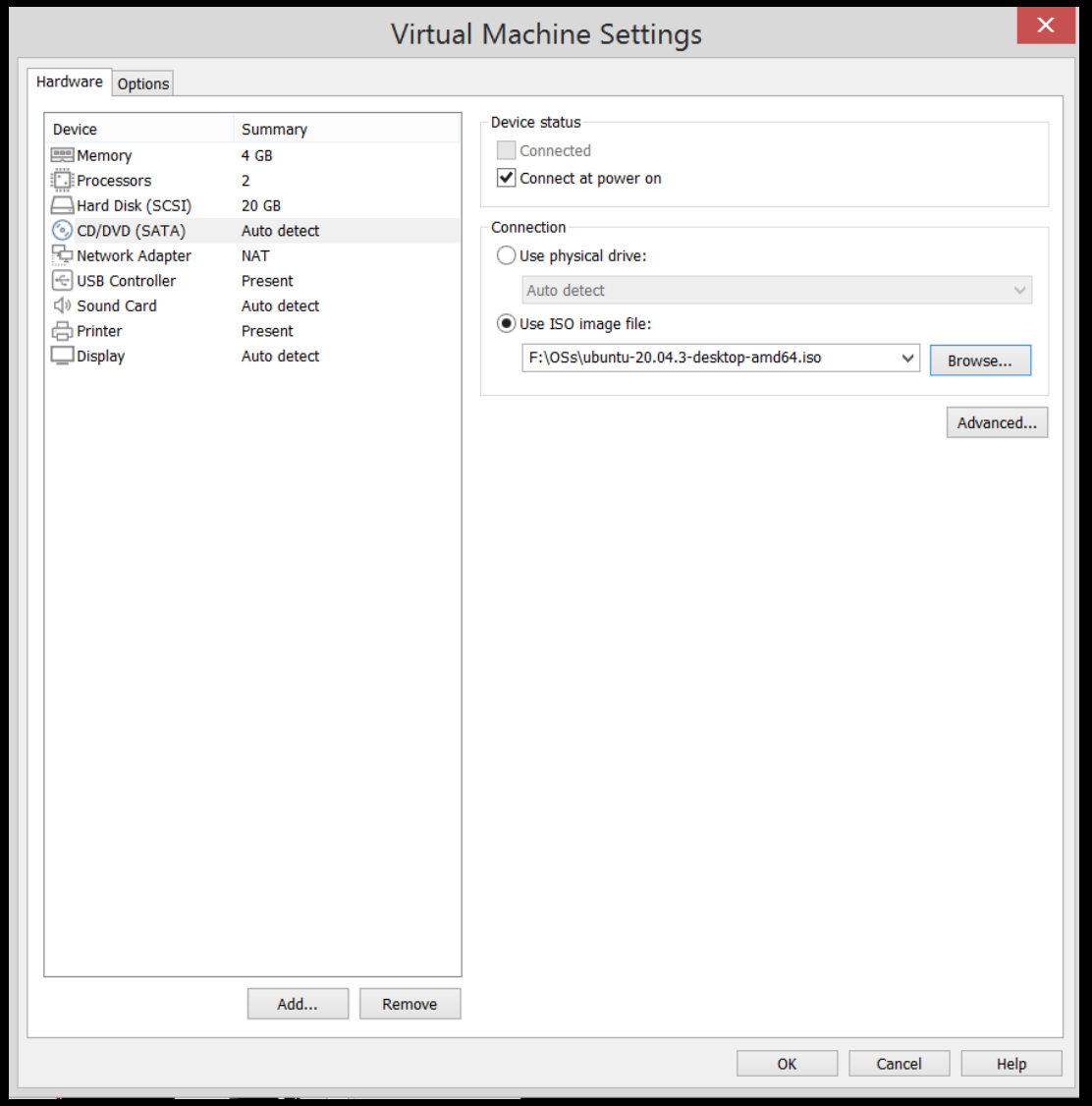
Environment Setup

- From left menu, select CD/DVD (SATA)
- Select Use ISO image File.
- Click browse, select the iso ubuntu file.
- Click OK.
- Run the VM.

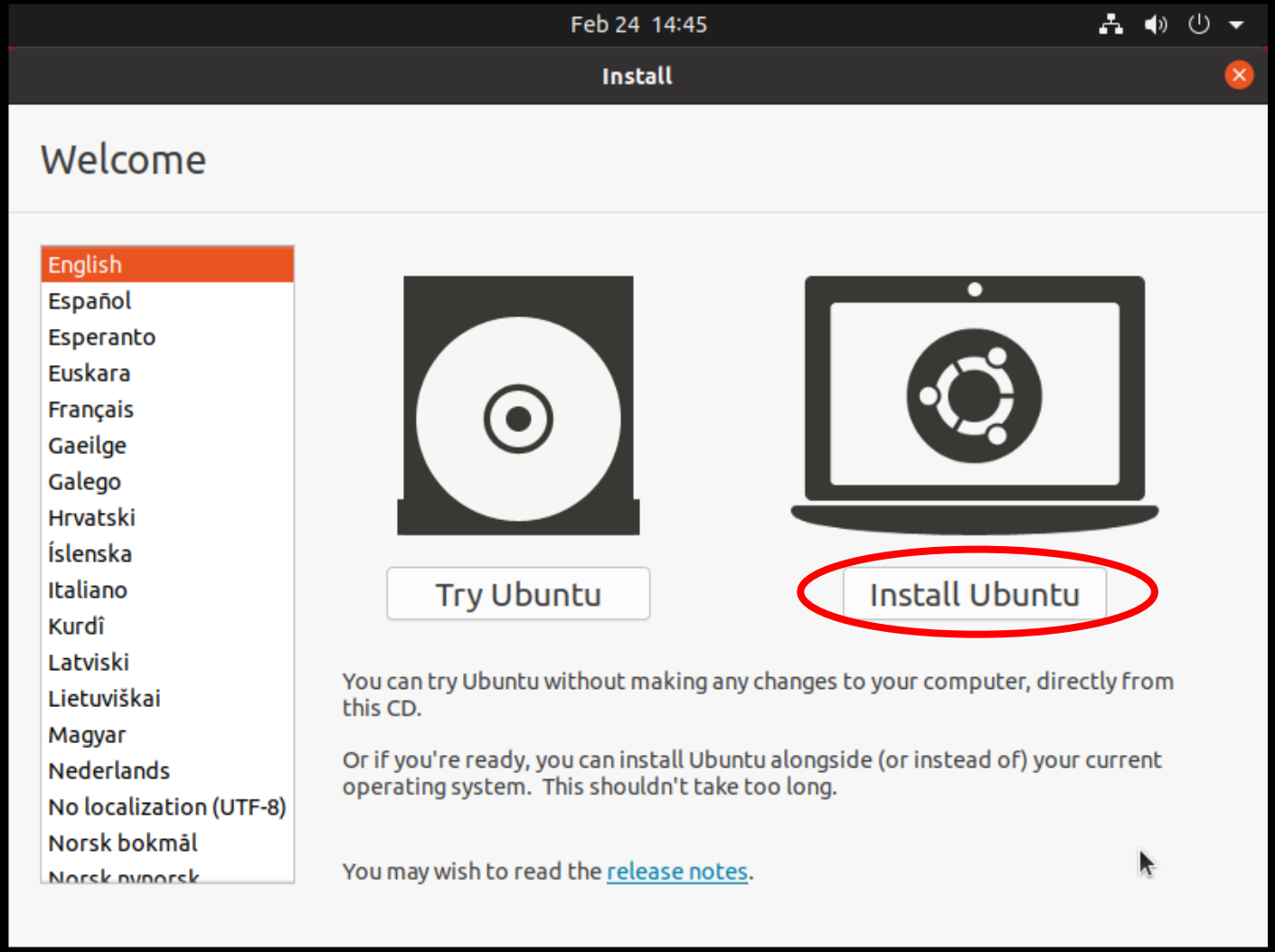


Environment Setup

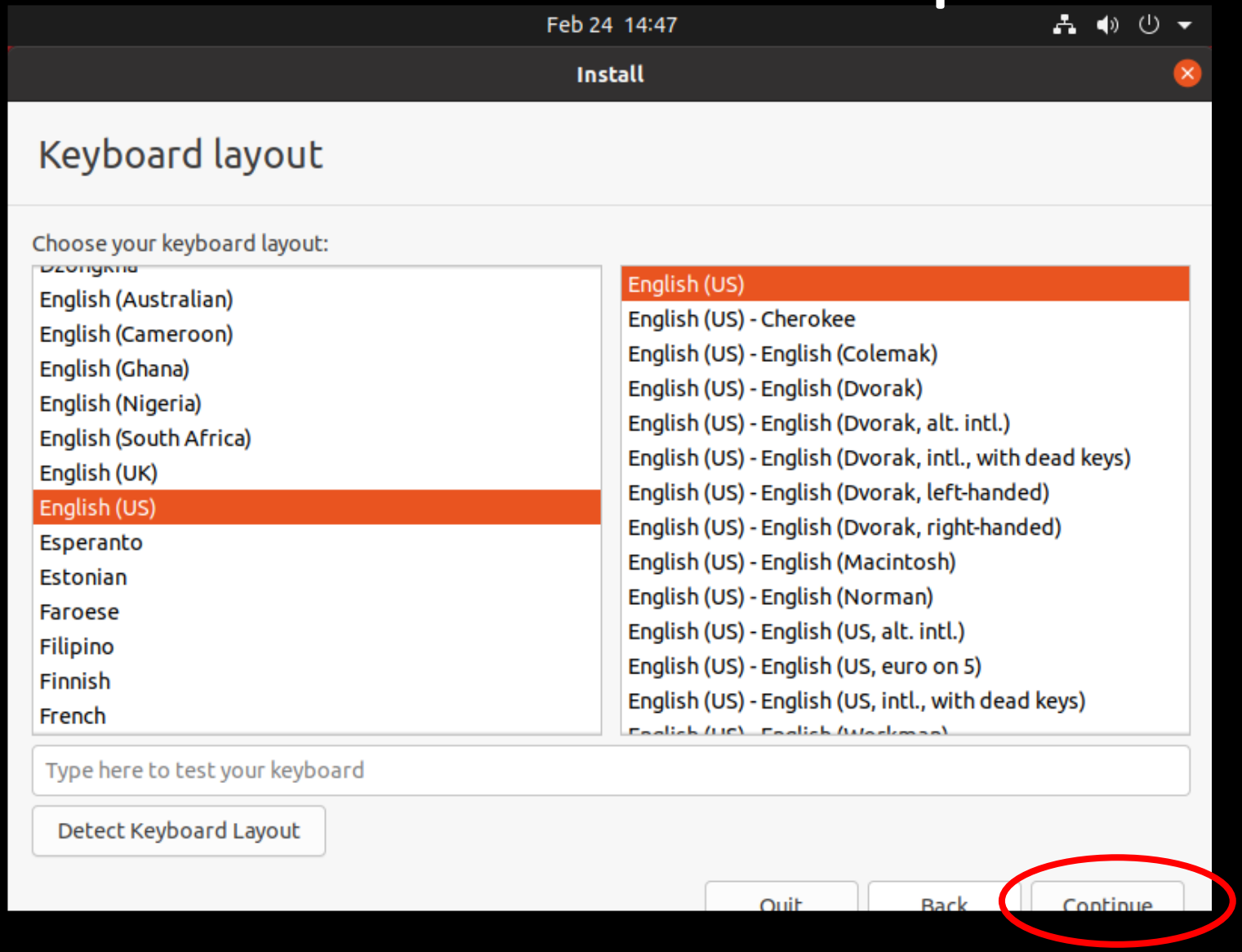
- From left menu, select CD/DVD (SATA)
- Select Use ISO image File.
- Click browse, select the iso ubuntu file.
- Click OK.
- Run the VM.



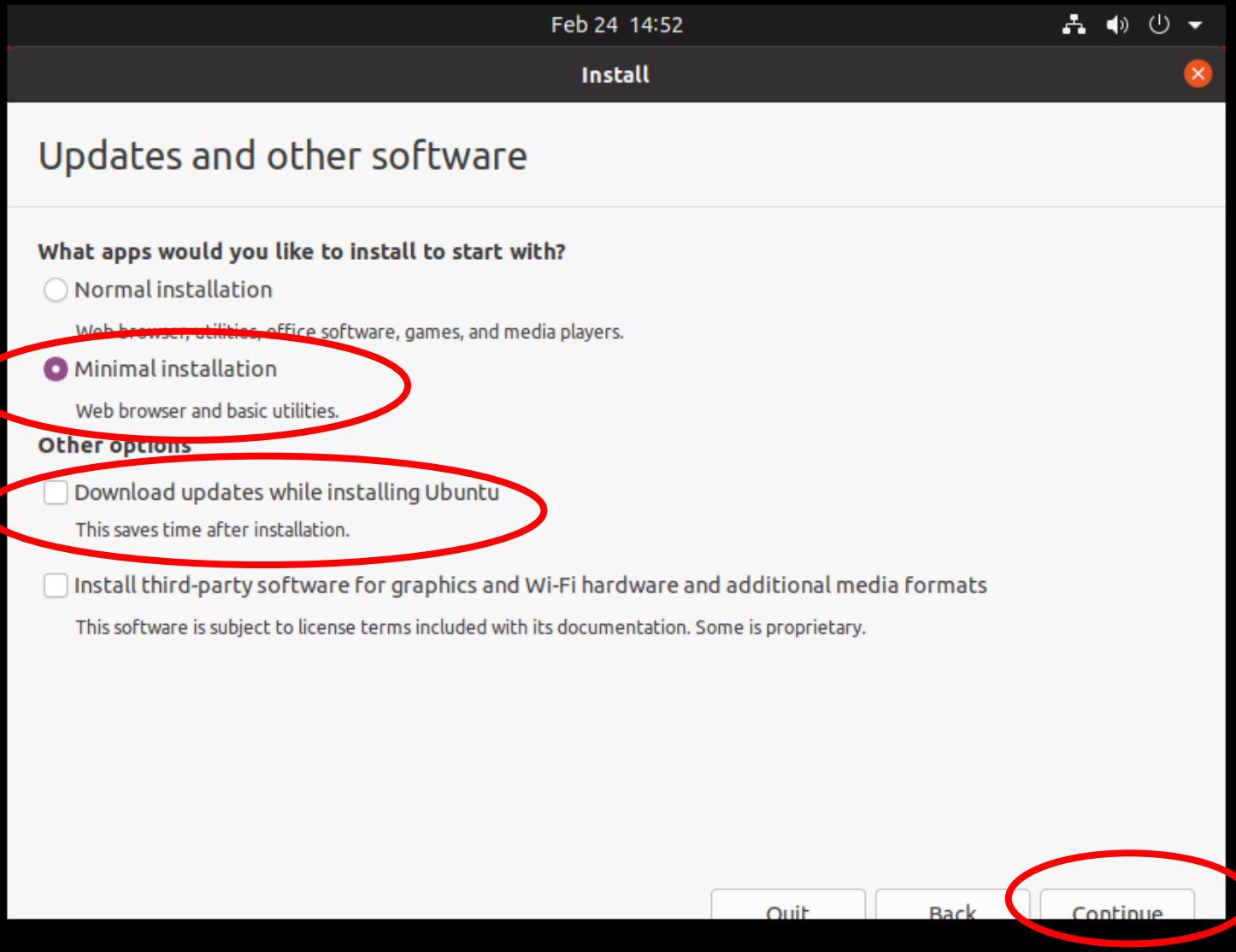
Environment Setup



Environment Setup

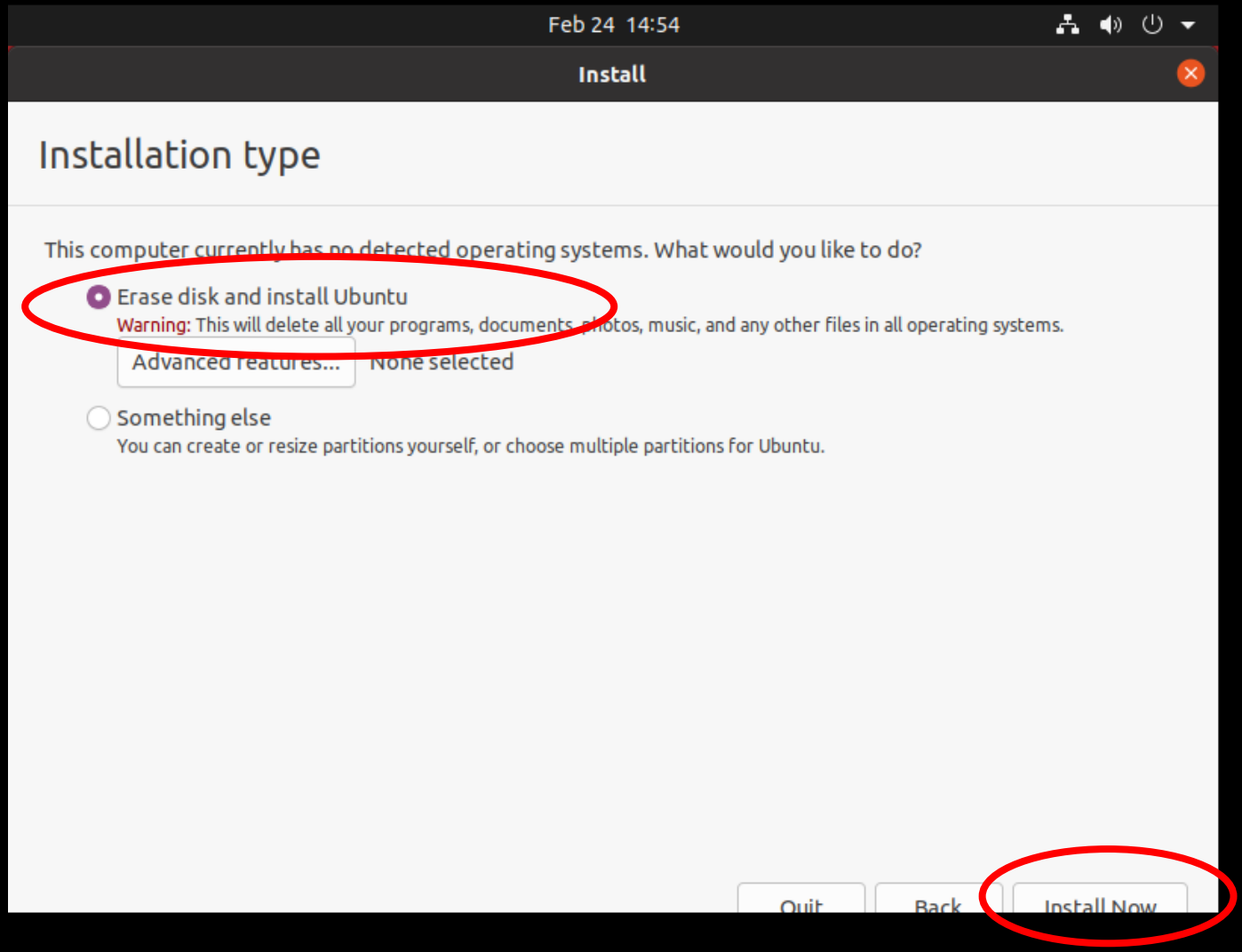


Environment Setup



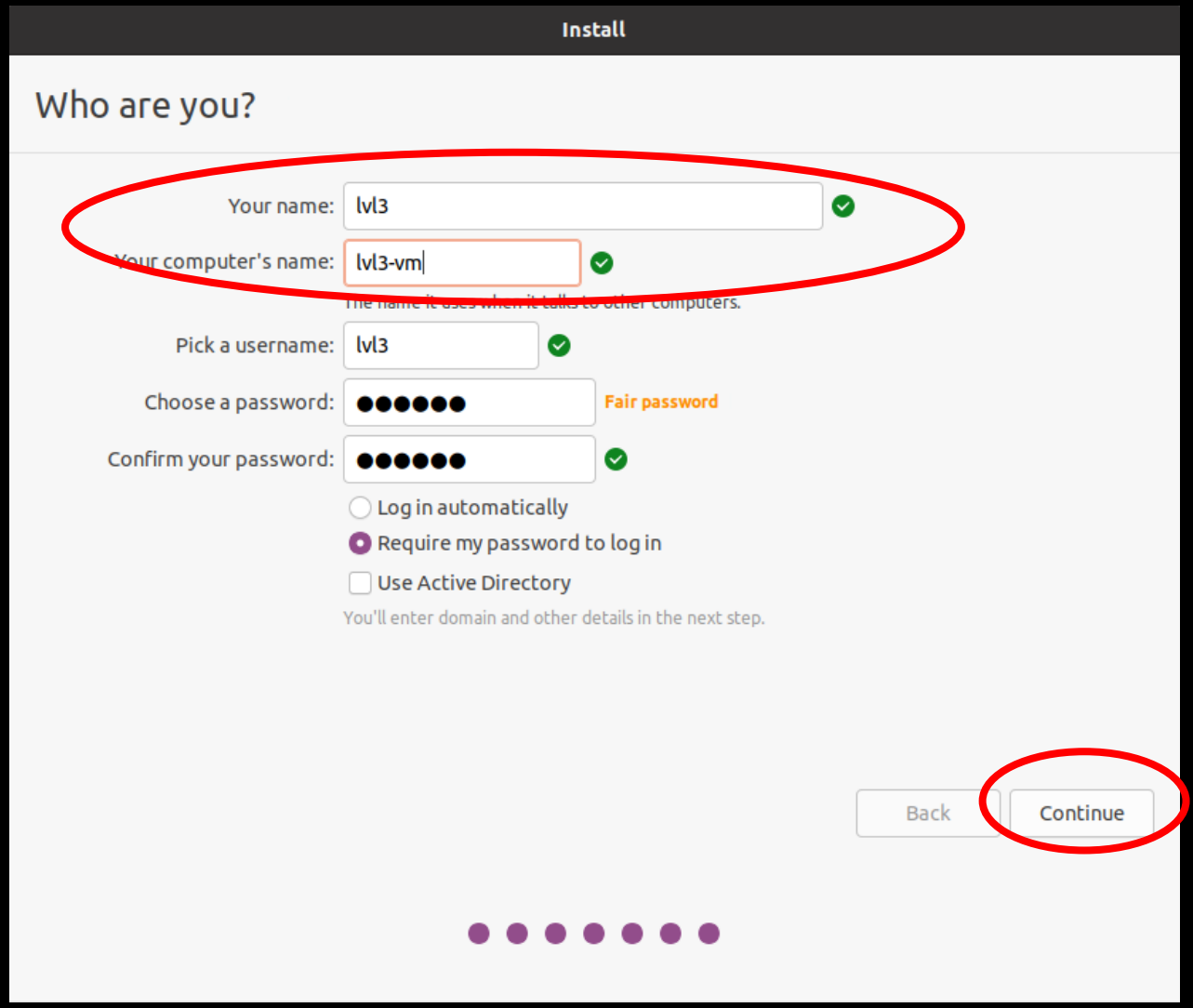
Environment Setup

- When installing the OS on a new machine, select Erase disk and install Ubuntu.
- If you are installing two OSs on the same disk, select Something else.
- Click Install now, then click continue.



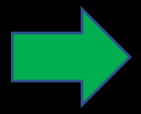
Environment Setup

- Set the name to lvl3.
- Set computer’s name to lvl3-vm.
- Set the password to “asd123”
- DO NOT CHANGE THE NAME OR PASSWORD.
- Click continue.



Content

Content
Environment Setup
Introduction to Ubuntu
Navigation

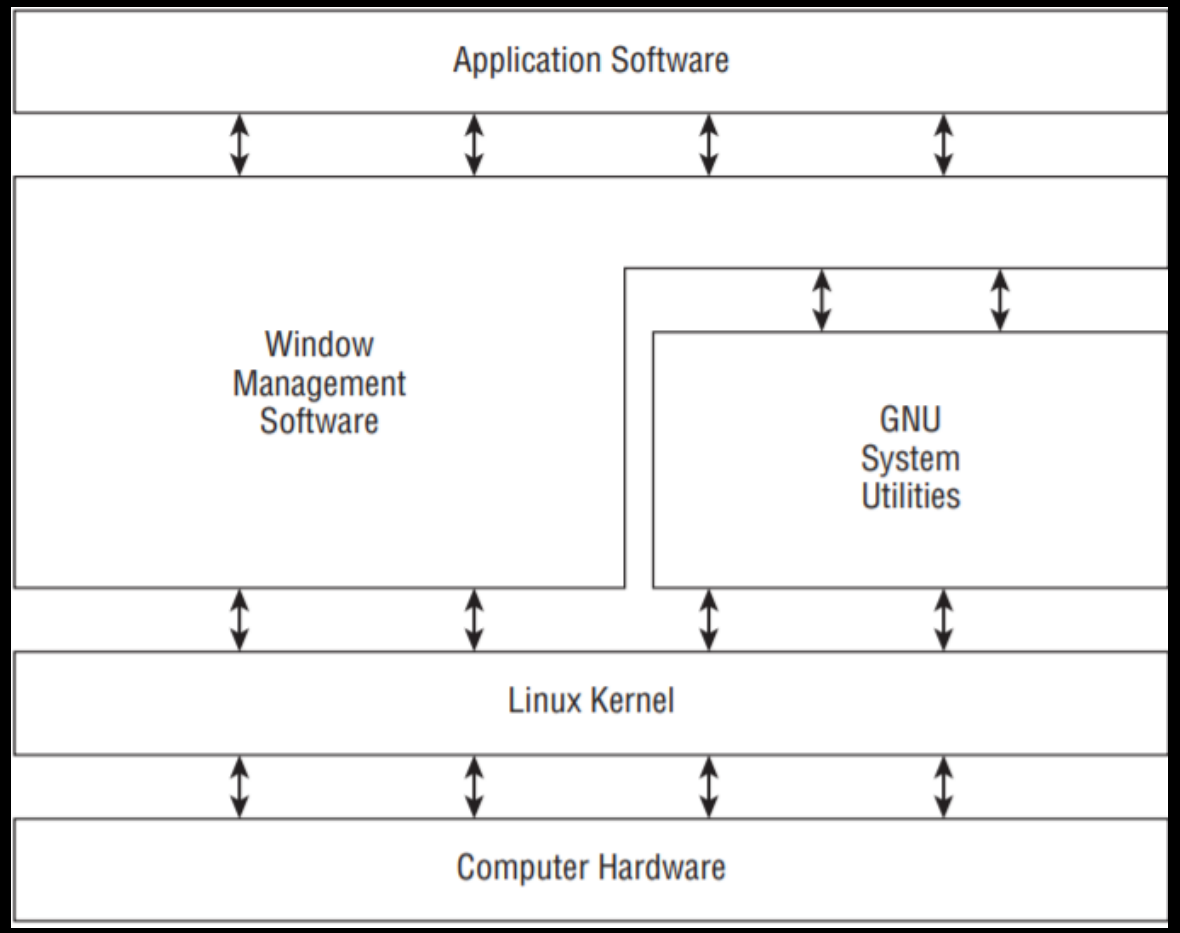


Introduction to Ubuntu

- Ubuntu is a Linux distribution based on Debian and composed mostly of free and open-source software.
- Ubuntu is officially released in three editions: Desktop, Server, and Core for Internet of things devices and robots.

Introduction to Ubuntu

- Four main parts make up a Linux system:
  - The Linux kernel
  - The GNU utilities
  - A graphical desktop environment
  - Application software

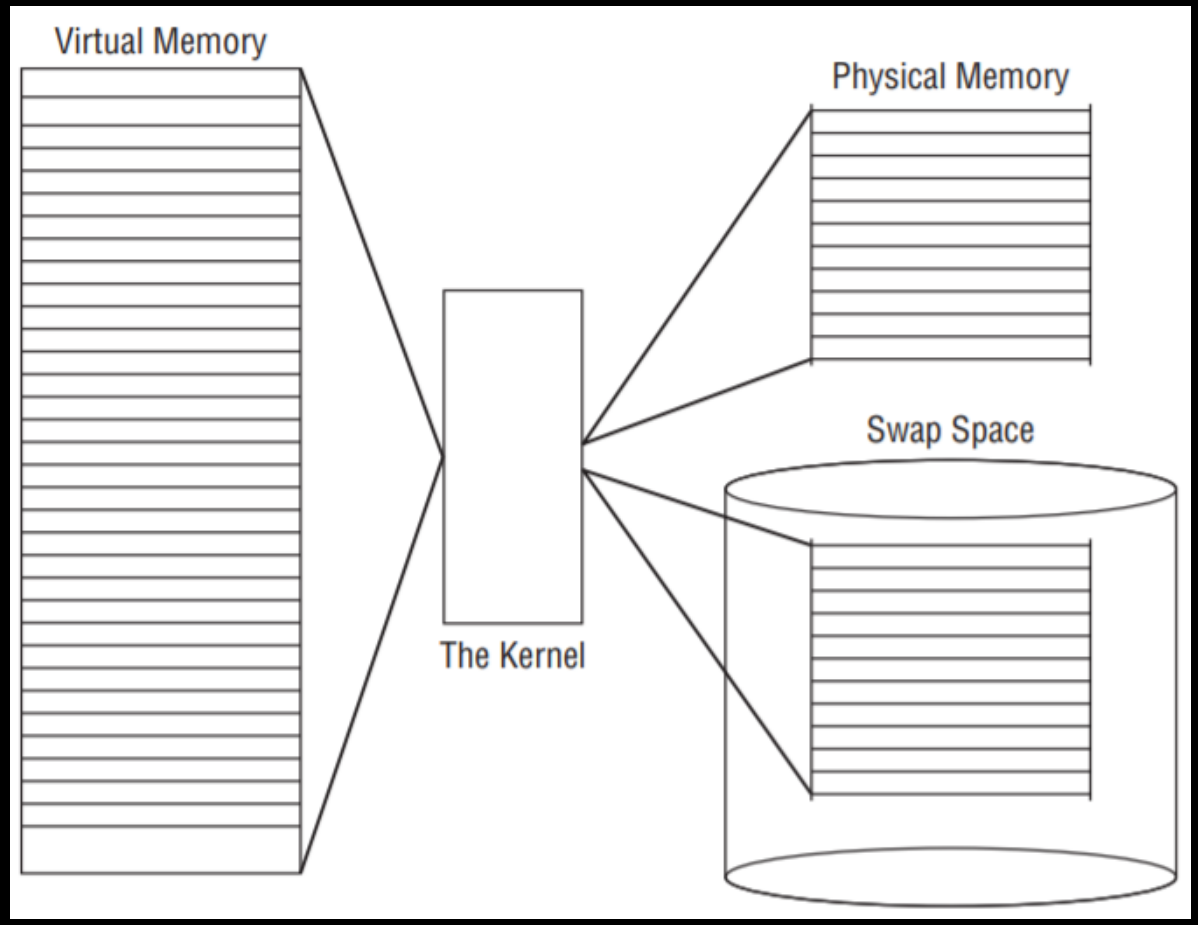


Introduction to Ubuntu

- The kernel is the core of the Linux system.
  - Controls all the hardware and software on the computer system, allocating hardware when necessary and executing software when required.
- The kernel is responsible for four main functions:
  - System memory management
  - Software program management
  - Hardware management
  - Filesystem management

Introduction to Ubuntu

- The kernel manages the physical memory:
  - Linux supports virtual memory, that is, using a disk as an extension of RAM so that the effective size of usable memory grows correspondingly.
  - The part of the hard disk that is used as virtual memory is called the swap space.



Introduction to Ubuntu

- The GNU Utilities, perform standard functions, such as controlling fi les and programs.
- The GNU package consists of three parts:
  - Utilities for handling fi les
  - Utilities for manipulating text
  - Utilities for managing processes
- The shell is a GNU utility.

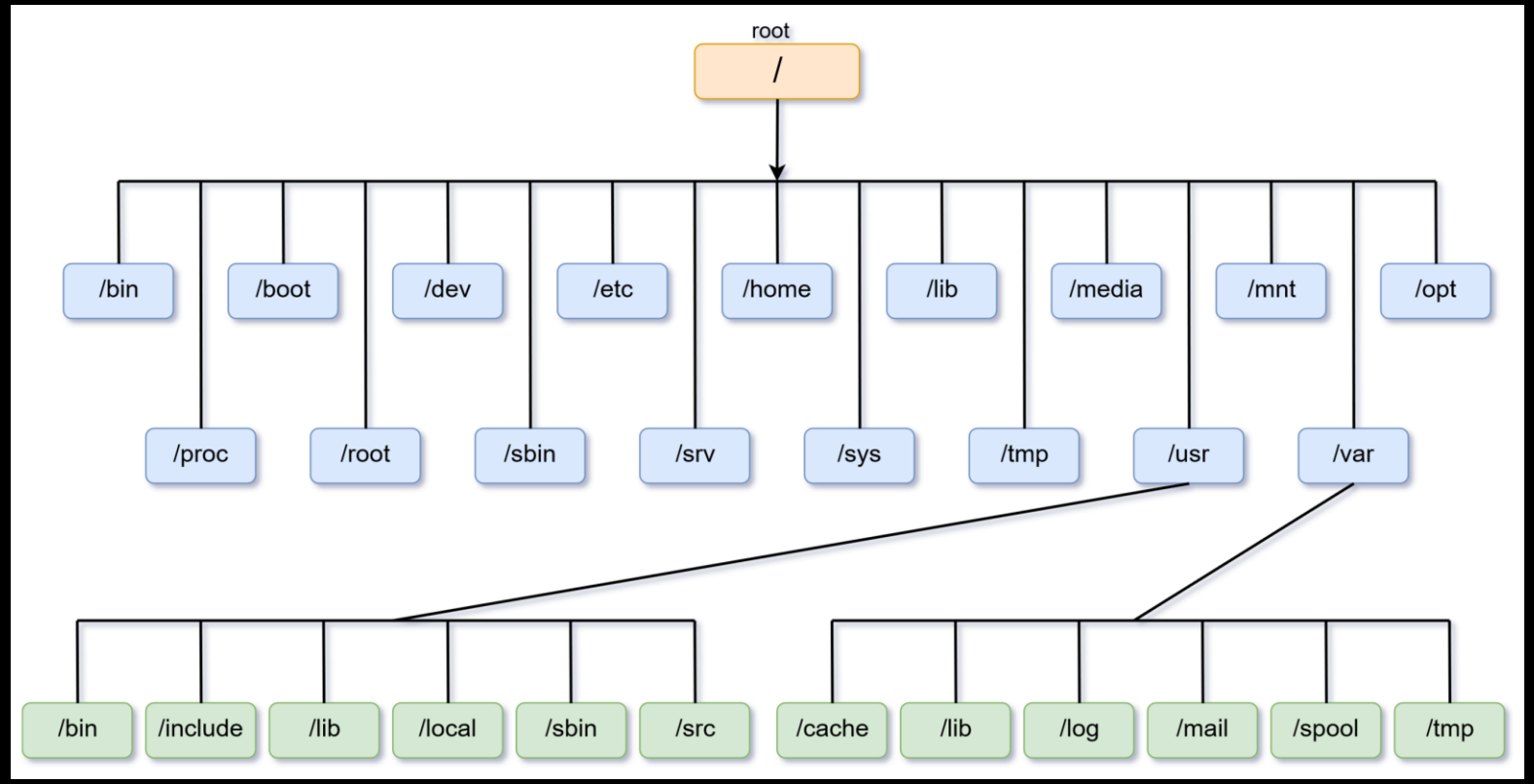
Introduction to Ubuntu

- Standard file systems that a Linux system can use to read and write data.

Filesystem	Description
ext	Linux Extended filesystem — the original Linux filesystem
ext2	Second extended filesystem, provided advanced features over ext
ext3	Third extended filesystem, supports journaling
ext4	Fourth extended filesystem, supports advanced journaling
hpfs	OS/2 high-performance filesystem
jfs	IBM's journaling filesystem
iso9660	ISO 9660 filesystem (CD-ROMs)
minix	MINIX filesystem
msdos	Microsoft FAT16
ncp	Netware filesystem
nfs	Network File System
ntfs	Support for Microsoft NT filesystem
proc	Access to system information
ReiserFS	Advanced Linux filesystem for better performance and disk recovery

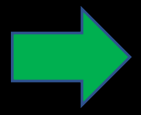
Introduction to Ubuntu

- Linux organizes its files in a hierarchical directory structure.
- The first directory in the file system is called the root directory.



Content

Content
Environment Setup
Introduction to Ubuntu
Navigation



Navigation

- The *shell prompt* has the form $username@machinename:currnetDir$
  - If the last character is a (“#”), the terminal session has superuser (root) privileges.
- Navigating the file system on our Linux system.
  - pwd – Print name of current working directory
  - cd – Change directory
  - ls – List directory contents
  - $date$ – Display the current time and date
  - cal – Display a calendar of the current month
  - df – Get a full summary of available and used disk space usage of the file system.
  - $free$ – Display amount of free memory

Navigation

- pwd: display the current working directory (print working directory).

```
lvl3@lvl3-vm:~/Desktop$ pwd
/home/lvl3/Desktop
```

- When we first log in to our system (or start a terminal emulator session) our current working directory is set to our home directory.
- Each user account is given its own home directory and it is the only place a regular user is allowed to write files.

Navigation

- cd: change directory
  - $cd\ pathname$
- We can specify pathnames as:
  - Absolute pathnames: begins with the root directory and follows the tree branch by branch until the path to the desired directory or file is completed.
  - Relative pathnames: starts from the current directory
    - “.”: refers to the working directory
    - “..”: refers to the working directory's parent directory.

Navigation

- change the working directory to $/usr/bin$.

```
lvl3@lvl3-vm:~/Desktop$ cd /usr/bin
lvl3@lvl3-vm:/usr/bin$ pwd
/usr/bin
```

- Now let's change the working directory to the parent of $/usr/bin$ which is $/usr$.
  - Absolute pathname

```
lvl3@lvl3-vm:/usr/bin$ cd /usr
lvl3@lvl3-vm:/usr$ pwd
/usr
```

  - Relative pathname

```
lvl3@lvl3-vm:/usr/bin$ cd ..
lvl3@lvl3-vm:/usr$ pwd
/usr
```

Navigation

- Likewise, we can change the working directory from $/usr$ to $/usr/bin$
  - Absolute pathname

```
lvl3@lvl3-vm:/usr$ cd /usr/bin
lvl3@lvl3-vm:/usr/bin$ pwd
/usr/bin
```

  - Relative pathname

```
lvl3@lvl3-vm:/usr$ cd ./bin
lvl3@lvl3-vm:/usr/bin$ pwd
/usr/bin
```

    - We can ignore "."

```
lvl3@lvl3-vm:/usr$ cd /bin
lvl3@lvl3-vm:/bin$ pwd
/bin
```

Navigation

- *cd* shortcuts

Shortcut	Result
`cd`	Changes the working directory to your home directory.
`cd -`	Changes the working directory to the previous working directory.
`cd ~user_name`	Changes the working directory to the home directory of *user_name*. For example, `cd ~bob` will change the directory to the home directory of user "bob."

```
lvl3@lvl3-vm:/bin$ cd ~lvl3
lvl3@lvl3-vm:~$ pwd
/home/lvl3
```

Navigation

- ls: list the files and directories in the current working directory

```
lvl3@lvl3-vm:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos
```

- $date$: display current date and time

```
lvl3@lvl3-vm:~/Desktop$ date
24 2022 فبر, EET 07:34:06 م
```

- cal: display the calendar

```
lvl3@lvl3-vm:~/Desktop$ cal
    2022 فبراير
 س ج  خ  ر  ث  ن  ح
          1  2  3  4  5
 6  7  8  9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28
```

Navigation

- df: display disk space used by file system

```
lvl3@lvl3-vm:~/Desktop$ df
Filesystem     1K-blocks    Used Available Use% Mounted on
udev             1957892       0   1957892   0% /dev
tmpfs             398272    1600    396672   1% /run
/dev/sda5       19992176 6725308  12228276  36% /
tmpfs            1991360       0   1991360   0% /dev/shm
tmpfs               5120       4      5116   1% /run/lock
tmpfs            1991360       0   1991360   0% /sys/fs/cgroup
/dev/loop0         56832   56832         0 100% /snap/core18/2128
/dev/loop1        224256  224256         0 100% /snap/gnome-3-34-1804/72
/dev/loop2         66688   66688         0 100% /snap/gtk-common-themes/1515
/dev/loop3         52224   52224         0 100% /snap/snap-store/547
/dev/loop4         33152   33152         0 100% /snap/snapd/12704
/dev/sda1         523248       4    523244   1% /boot/efi
tmpfs             398272      76    398196   1% /run/user/1000
```

- $free$: display the amount of free memory

```
lvl3@lvl3-vm:~/Desktop$ free
               total        used        free      shared  buff/cache   available
Mem:         3982720      891580     2087120        2856     1004020     2852884
Swap:         945416           0      945416
```

Exercises

- Open a new terminal
- Go to the home (~) directory
- List the files in the ~ directory
- Go to Documents directory
- Go to Desktop directory in one step
- Go to previous directory
- Print current working directory
- Go to parent directory

Exercises

• Open a new terminal	
• Go to the home (~) directory	cd ~
• List the files in the ~ directory	ls
• Go to Documents directory	cd Documents/
• Go to Desktop directory in one step	cd ~/Desktop/
• Go to previous directory	cd -
• Print current working directory	pwd
• Go to parent directory	cd ..

Summary

- pwd
- cd
- ls
- $date$
- cal
- df
- $free$

TASK

- What is NAT in virtual machines?
- What is /bin, /home, and /etc directories used for in Linux?
- What is the command to clear the terminal?
- What is the command to close the terminal?