

Install Environment and NachOS

1. Download VirtualBox and install: <https://www.virtualbox.org/wiki/Downloads>
2. Download **Ubuntu 14.04 LTS 32-bit** image: <https://releases.ubuntu.com/14.04/>

Ubuntu 14.04.6 LTS (Trusty Tahr)

Select an image

Ubuntu is distributed on two types of images described below.

Desktop image

The desktop image allows you to try Ubuntu without changing your computer at all, and at your option to install it permanently later. This type of image is what most people will want to use. You will need at least 384MiB of RAM to install from this image.

64-bit PC (AMD64) desktop image

Choose this if you have a computer based on the AMD64 or EM64T architecture (e.g., Athlon64, Opteron, EM64T Xeon, Core 2). If you have a non-64-bit processor made by AMD, or if you need full support for 32-bit code, use the i386 images instead. Choose this if you are at all unsure.

32-bit PC (i386) desktop image

For almost all PCs. This includes most machines with Intel/AMD/etc type processors and almost all computers that run Microsoft Windows, as well as newer Apple Macintosh systems based on Intel processors.

3. VirtualBox VM Settings



Memory Size Setting (depend on your host PC)

← 建立虛擬機器

記憶體大小

選取配置到虛擬機器的記憶體量 (RAM)，單位 MB。
建議的記憶體大小為 1024MB。

4 MB 16384 MB

4096 MB

下一個(N) 取消

Hard Disk Settings (10GB at least)

← 建立虛擬機器

硬碟

如果您希望能加入虛擬硬碟到新的機器。可以建立新的硬碟檔或從清單選取一個或使用資料夾圖示選取另一個位置。

如果需要更多複雜存放裝置設定，可以略過此步驟，並在機器建立時進行變更機器設定。

建議硬碟的大小為 10.00 GB。

☐ 不加入虛擬硬碟(D)
☒ 立即建立虛擬硬碟(C)
☐ 使用現有虛擬硬碟檔案(U)

空的

建立 取消

← 建立虛擬硬碟

硬碟檔類型

請選擇新的虛擬硬碟希望使用的檔案類型。如果不需要用在其它虛擬化軟體，您可以保留這個設定不變更。

☒ VDI (VirtualBox 磁碟映像)
☐ VHD (虛擬硬碟)
☐ VMDK (虛擬機器磁碟)

專家模式(E) 下一個(N) 取消

← 建立虛擬硬碟

存放裝置在實體硬碟

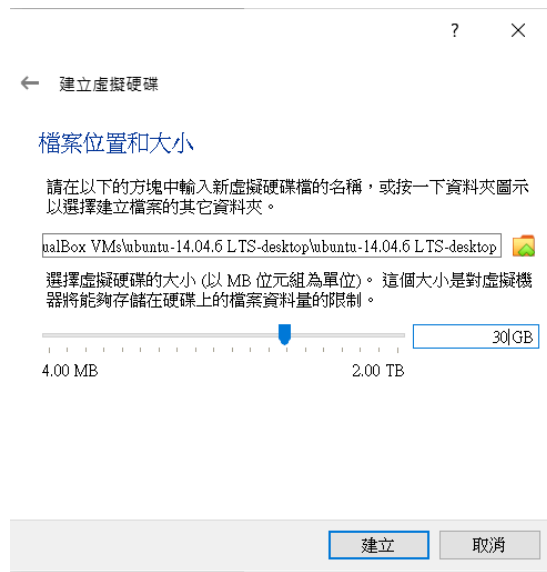
請選擇新的虛擬硬碟檔是否應根據使用來成長 (動態分配)，或建立為其最大大小 (固定大小)。

動態分配的硬碟檔將只在填滿時使用實體硬碟的空間 (直到最大的固定大小)，儘管它的空間釋放時不會再次自動縮小。

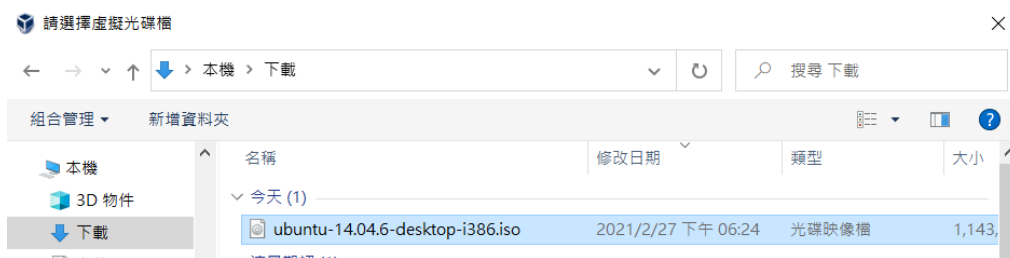
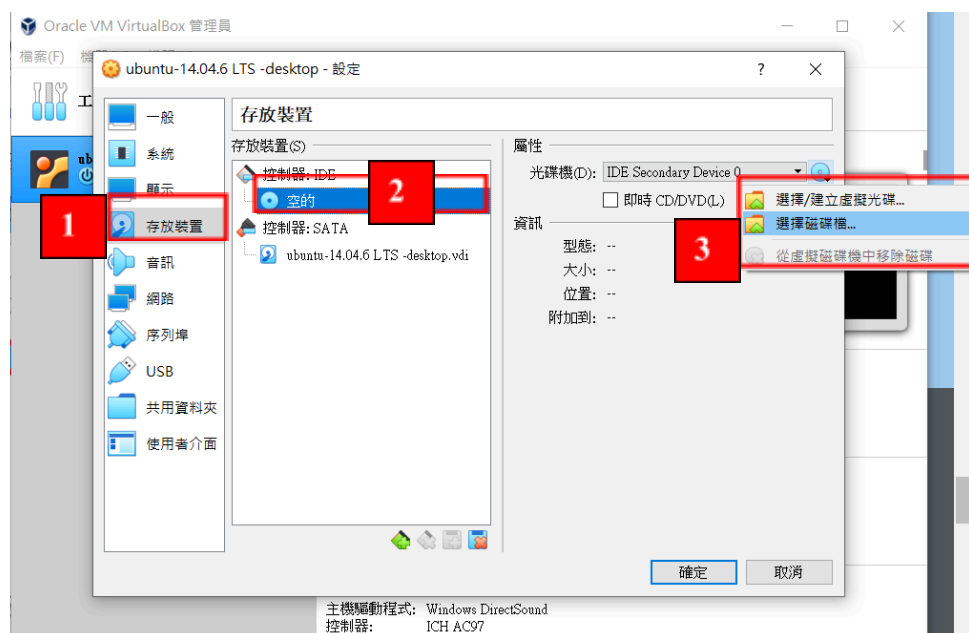
固定大小硬碟檔在某些系統需要比較長的時間建立，但通常用起來比較快。

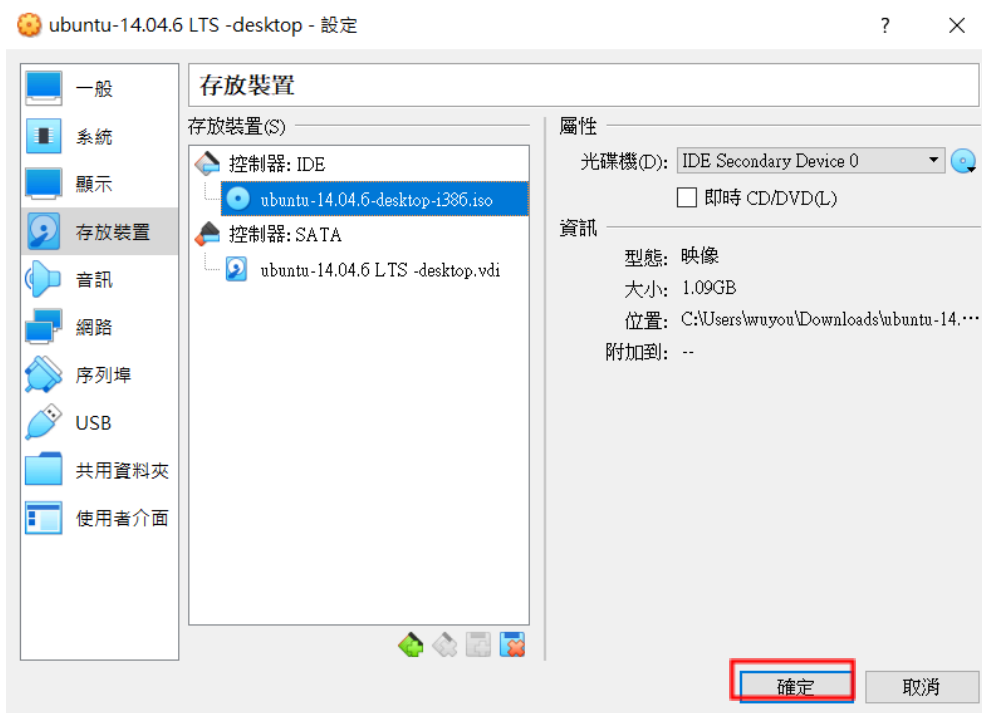
☒ 動態分配(D)
☐ 固定大小(F)

下一個(N) 取消



Choose the downloaded image .iso and start.





4. Install Ubuntu



(Skip below)

5. Install NachOS and dependency
 - I. Open a terminal (ctrl + alt + t), it should be at home directory (cd ~).
 - II. Install C-Shell and g++
 - `sudo apt-get install csh`
 - `sudo apt-get install g++`
 - III. Download nachos and cross compiler on github
 - `cd ~/Desktop`
 - `git clone https://github.com/joshhsieh1999/2024_OS_Final.git`
 - IV. Unzip nachos and cross compiler
 - `cd ~/Desktop/2024_OS_Final`
 - `sudo tar -xzf nachos-4.0-final.tar.gz`
 - `sudo tar -xzf mips-decstation.linux-xgcc.tar.gz`
 - V. Move cross compiler to /usr/local
 - `mv ~/Desktop/2024_OS_Final/usr/local/nachos /usr/local`
 - VI. Test cross compiler by compiling "test" directory
 - `cd ~/Desktop/2024_OS_Final/nachos-4.0-final/code/test`
 - `make clean` (You have to add "clean" command into Makefile)
 - `make`

* Please **DON'T** carry out stress testing on our server. **Download the files only once and keep them!**

6. Compile (nachos won't be able to correctly compile until you finish some functions within. Refer to the error messages during compiling)
 - `cd ~/nachos-master-nachos-4.0-final/nachos-4.0-final/code`
 - `make clean`
 - `make`
7. Test (This is the example for official version of nachos. Our project won't be able to successfully build before implementing some functions!)
 - `cd userprog`
 - `./nachos -e ../test/test1`

```
you-shiuan@youshiuan-VirtualBox: ~/nachos-4.0/code/userprog
you-shiuan@youshiuan-VirtualBox:~/nachos-4.0/code/userprog$ ./nachos -e ../test/test1
Total threads number is 1
Thread ../test/test1 is executing.
Print integer:9
Print integer:8
Print integer:7
Print integer:6
return value:0
No threads ready or runnable, and no pending interrupts.
Assuming the program completed.
Machine halting!

Ticks: total 200, idle 66, system 40, user 94
Disk I/O: reads 0, writes 0
Console I/O: reads 0, writes 0
Paging: faults 0
Network I/O: packets received 0, sent 0
```

- `./nachos -e ../test/test2`

```
shiuan@shiuan-VirtualBox: ~/nachos-4.0/code
shiuan@shiuan-VirtualBox:~/nachos-4.0/code$ userprog/nachos -e test/test2
Total threads number is 1
Thread test/test2 is executing.
Print integer:20
Print integer:21
Print integer:22
Print integer:23
Print integer:24
Print integer:25
return value:0
No threads ready or runnable, and no pending interrupts.
Assuming the program completed.
Machine halting!

Ticks: total 200, idle 32, system 40, user 128
Disk I/O: reads 0, writes 0
Console I/O: reads 0, writes 0
Paging: faults 0
Network I/O: packets received 0, sent 0
shiuan@shiuan-VirtualBox:~/nachos-4.0/code$
```

Success!