

## Ubuntu 9.10 (Karmic Koala)

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This directory contains the most frequently downloaded Ubuntu images. Other images, including DVDs and source CDs, may be available on the [cdimage server](#). See also the [list of download mirrors](#).

### Select an image

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Ubuntu is distributed on five types of images described below.

#### Desktop CD

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The desktop CD allows you to try Ubuntu without changing your computer at all, and at your option to install it permanently later. This type of CD is what most people will want to use. You will need at least 256MB of RAM to install from this CD.

There are two images available, each for a different type of computer:

##### [PC \(Intel x86\) desktop CD](#)

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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. Choose this if you are at all unsure.

##### [64-bit PC \(AMD64\) desktop CD](#)

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Choose this to take full advantage of computers 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 Intel x86 images instead.

連線至 <http://free.nchc.org.tw/ubuntu-cd/karmic/>  
下載 Ubuntu 9.10PC (Intel x86) desktop CD

PieTTY (pputty): piaip's reimplementation of PuTTY - Mozilla Firefox

http://ntu.csie.org/~piaip/pietty/

RELATED SITES: Official PuTTY | My personal website |

# pietty

{ piaip's PieTTY Project }

» **Download 下載** | Donate! | Contact | PuTTY

## PieTTY/pputty/PuTTY 是什麼?

PuTTY 是個小巧方便的 Telnet/SSH 安全遠端連線程式，但用於非英語系文字時有非常多的問題，而且它對於初學者來說過於複雜的使用界面也為人詬病已久。PieTTY 則是源自於 PuTTY，修正與完整支援亞洲等多國語系字元，並在使用界面上大幅改進、易學易用的版本。



PieTTY is a free SSH client based on PuTTY and dedicated to multilingual (especially CJK) environments, accessibility, and simpler user interface.

PieTTY 使用 MIT License, 是免費而可自由重新散佈的。更詳細的歷史或是使用上有問題請見 [FAQ](#)。關於 PieTTY 為何要支援「Unicode 補完計畫」請見 [FAQ](#)。

## Downloads 下載

Stable Release: 06/14/2005

PieTTY 0.3.27

MD5:

1533c60d6a9fda4715eaf88d89c05dc0

Known Issue 已知問題:

- 第一次使用 PieTTY 時，若直接選 PuTTY 舊設定會連線失敗。請先隨便手動打入某些 IP 並建立連線後即可正常使用。
- Esc[1;11m" 這樣的 ANSI 控制碼(關鍵在 m 後面直接加 ") 在 Big5 mode 不開 Internal UCS 會導致中文全部被折開來成 ASCII 處理 (PuTTY 也命) 不致

完成

連線至 <http://ntu.csie.org/~piaip/pietty/>  
下載 PieTTY (SSH Client)

WinSCP :: 介紹 - Mozilla Firefox

http://winscp.net/eng/docs/lang:cht

# WinSCP

Free SFTP, FTP and SCP client for Windows

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Protocols Requirements Scripting F.A.Q. Awards Screenshots Translations

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## 介紹

- 取得與安裝WinSCP
- 特色
- 檔案操作
- 遠端主機連線
- 程式操作介面

WinSCP 是在Windows中使用SSH的開放原始碼的圖形化SFTP用戶端。WinSCP同時也支援SCP通訊協定。它主要的功能是安全的在電腦間傳輸檔案。

這是一個給正體中文讀者閱讀的介紹網頁。大部分的WinSCP文件都僅提供英文；在這裡有許多連結連到這些英文說明。

取得與安裝WinSCP [Edit](#)

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### Donate

DONATE

完成

連線至 <http://winscp.net>  
下載 WinSCP (SFTP Client)

連線至 <http://www.virtualbox.org/wiki/Downloads>  
下載 VirtualBox 虛擬化工具



# VirtualBox

Settings Register  Help/Guide

## Download VirtualBox

Here, you will find links to VirtualBox binaries and its source code.

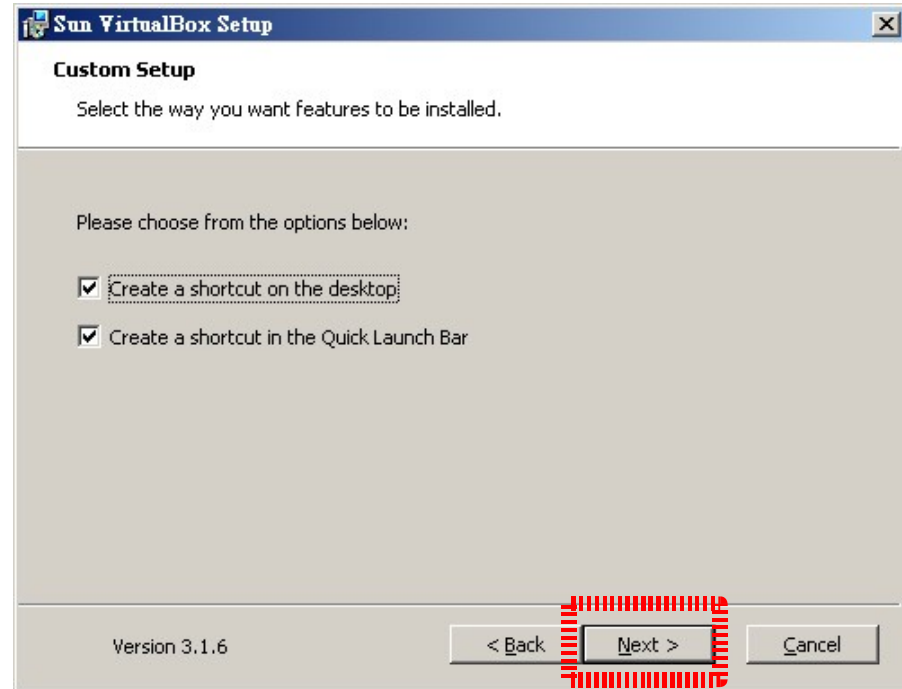
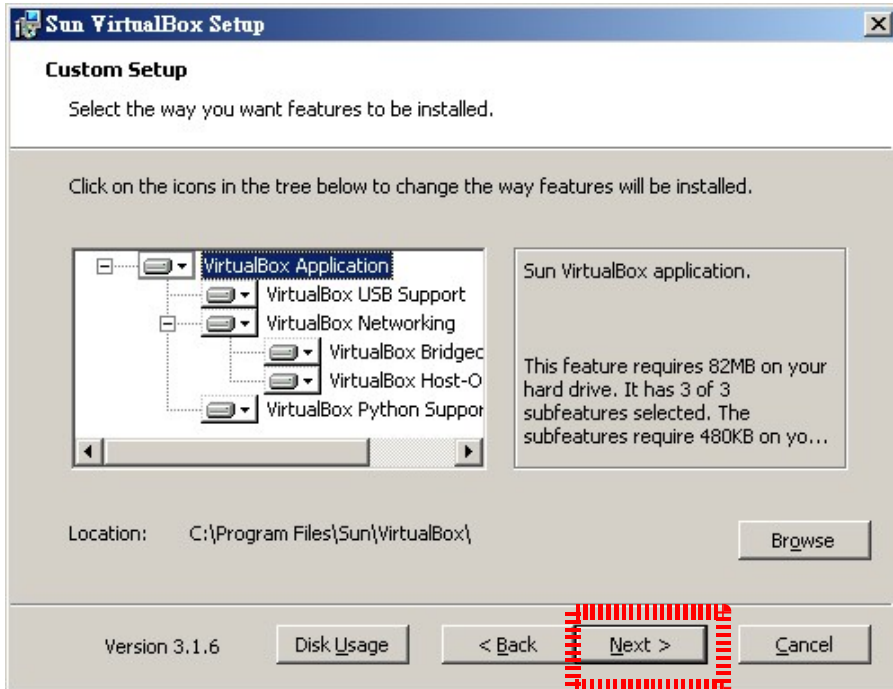
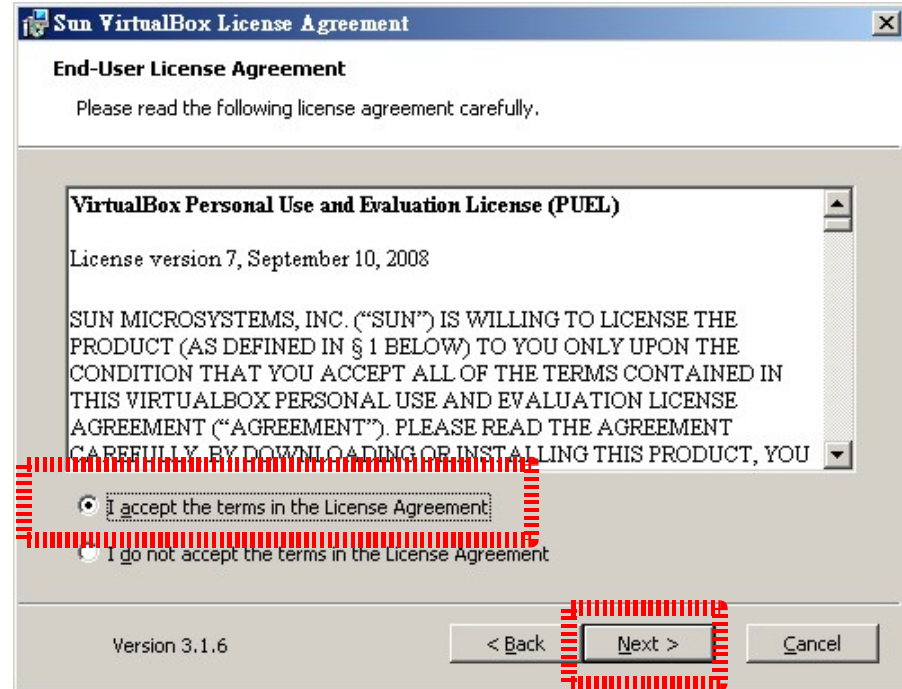
### VirtualBox binaries

The binaries in this section are all released under the [VirtualBox Personal Use and Evaluation License \(PUEL\)](#). By downloading, you agree to the terms and conditions of that license.

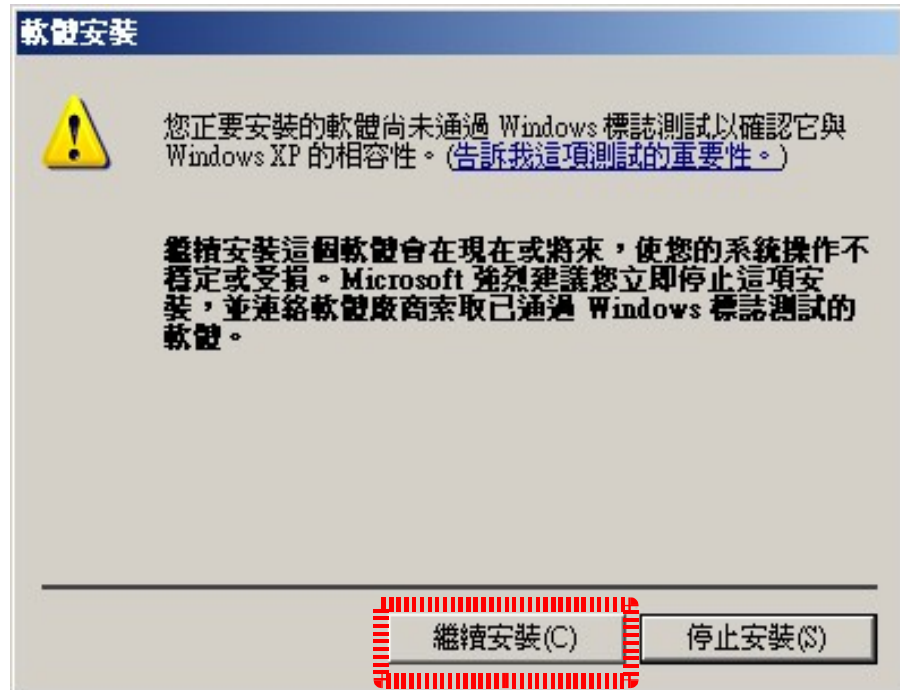
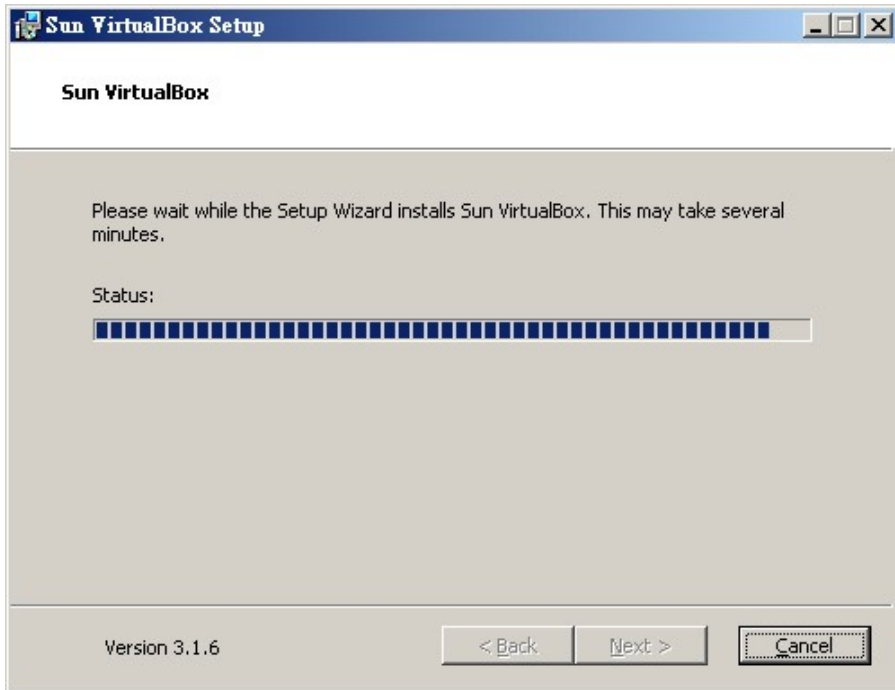
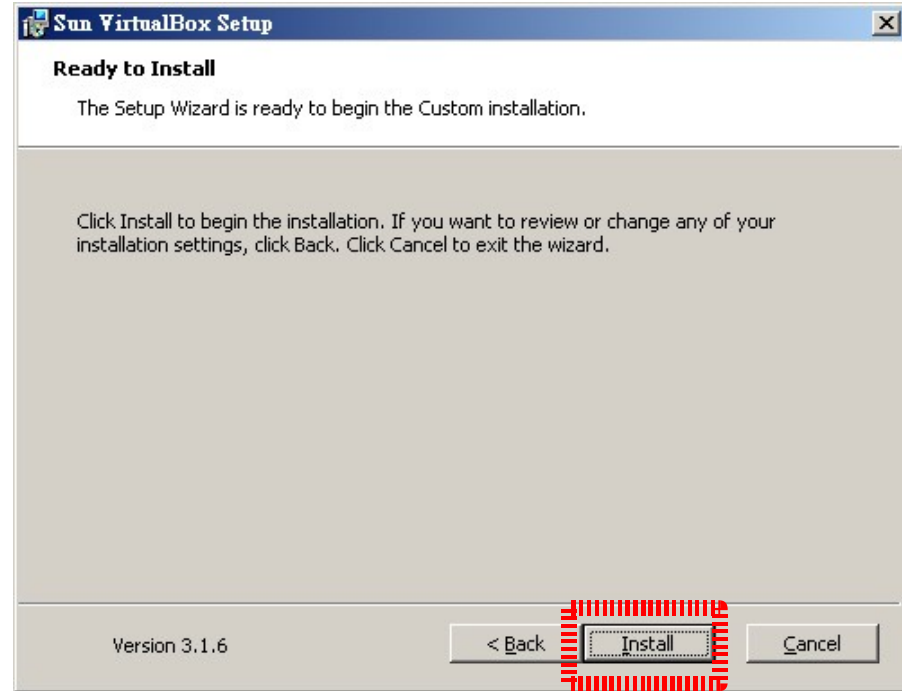
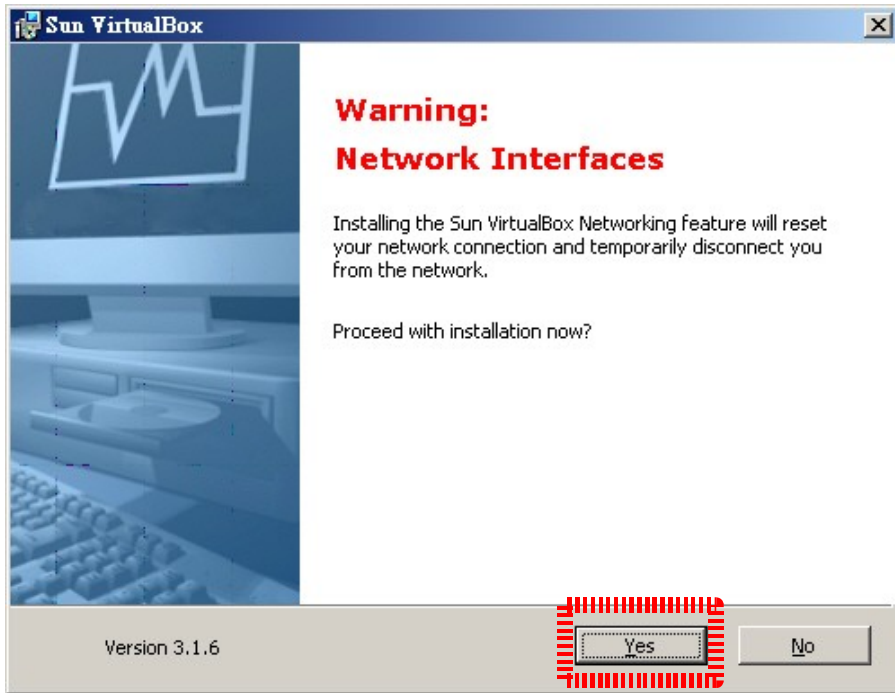
- **VirtualBox 3.1.6 for Windows hosts** [⇨ x86/amd64](#)
- **VirtualBox 3.1.6 for OS X hosts** [⇨ Intel Macs](#)  
*Due to an accident the original 3.1.6 Mac OS X package (build 59338) was broken. Please install the fixed package if you installed the broken package. Sorry for the inconveniences!*
- **VirtualBox 3.1.6 for Linux hosts**
- **VirtualBox 3.1.6 for Solaris and OpenSolaris hosts** [⇨ x86/amd64](#)
- **VirtualBox 3.1.6 Software Developer Kit (SDK)** [⇨ All platforms](#) (registration required)

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    [Technical docs](#)  
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# 安裝 VirtualBox (1)



# 安裝 VirtualBox (2)



# 安裝 VirtualBox (3)

**硬體安裝**


 您正要為這個硬體安裝的軟體:  
VirtualBox Bridged Networking Driver Miniport

尚未通過 Windows 標誌測試以確認它與 Windows XP 的相容性。(告訴我這項測試的重要性。)

**繼續安裝這個軟體會在現在或將來，使您的系統操作不穩定或受損。Microsoft 強烈建議您立即停止這項安裝，並連絡硬體廠商索取已通過 Windows 標誌測試的軟體。**

**繼續安裝(C)**   **停止安裝(S)**

**硬體安裝**

 您正要為這個硬體安裝的軟體:  
VirtualBox Host-Only Ethernet Adapter

尚未通過 Windows 標誌測試以確認它與 Windows XP 的相容性。(告訴我這項測試的重要性。)

**繼續安裝這個軟體會在現在或將來，使您的系統操作不穩定或受損。Microsoft 強烈建議您立即停止這項安裝，並連絡硬體廠商索取已通過 Windows 標誌測試的軟體。**

**繼續安裝(C)**   **停止安裝(S)**

**Sun VirtualBox Setup**

**Sun VirtualBox installation is complete.**

Click the Finish button to exit the Setup Wizard.

Start Sun VirtualBox after installation

Version 3.1.6

**Finish**

**Sun VirtualBox**

檔案(F) 機器(M) 說明(H)

新增(N) 設定值(S) 啟動(T) 捨棄(L)

詳細資料(D) 快取(S) 描述(E)

**歡迎使用 VirtualBox !**

這個視窗的左側部分是在您電腦中的所有虛擬機器清單。清單現在是空的因為您尚未建立任何虛擬機器。

為了新建虛擬機器，在視窗上方位置的主工具列按下 **[新增]** 按鈕。

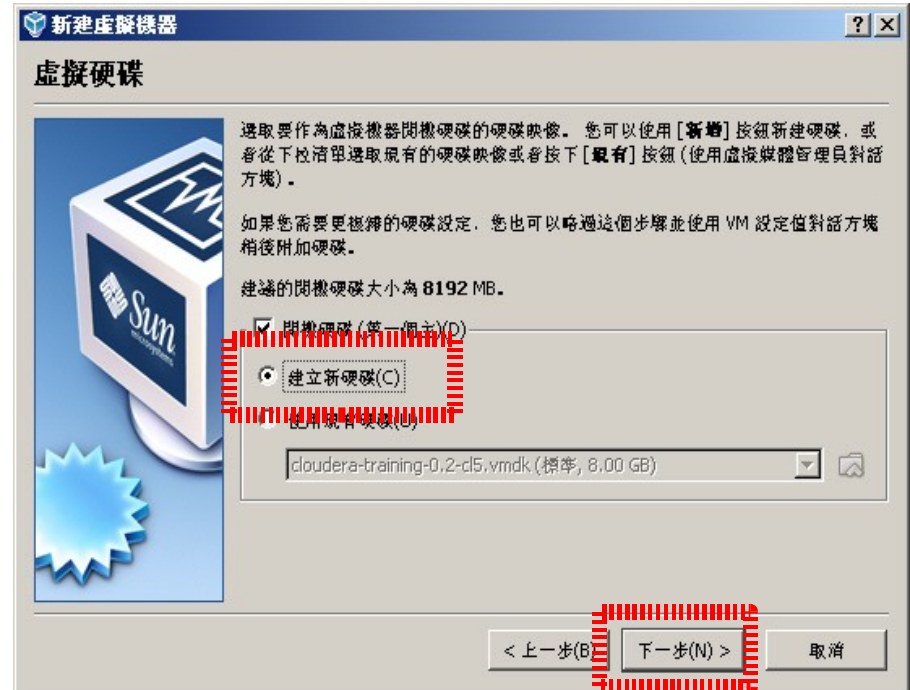
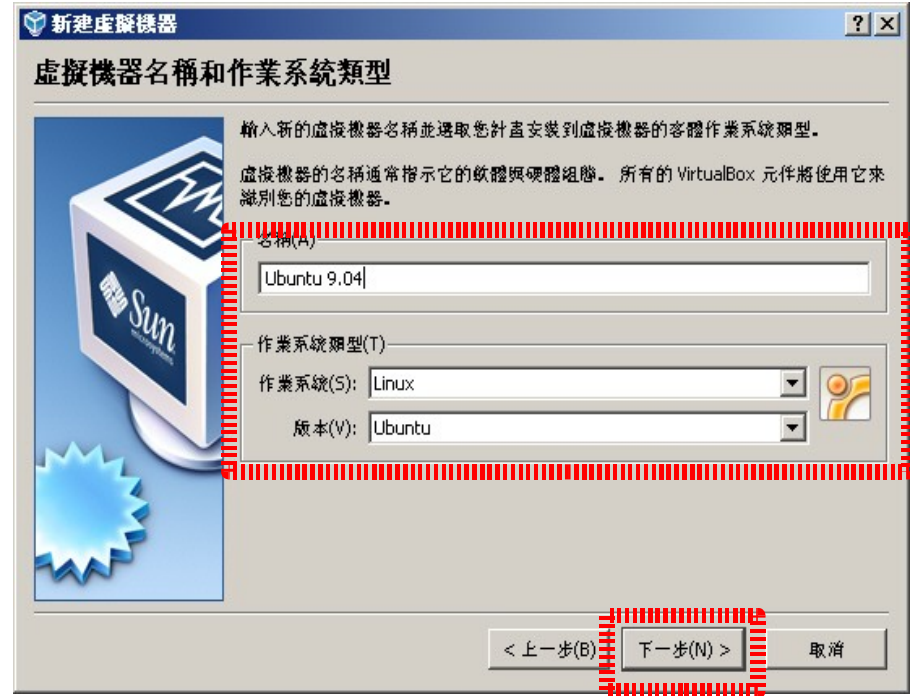
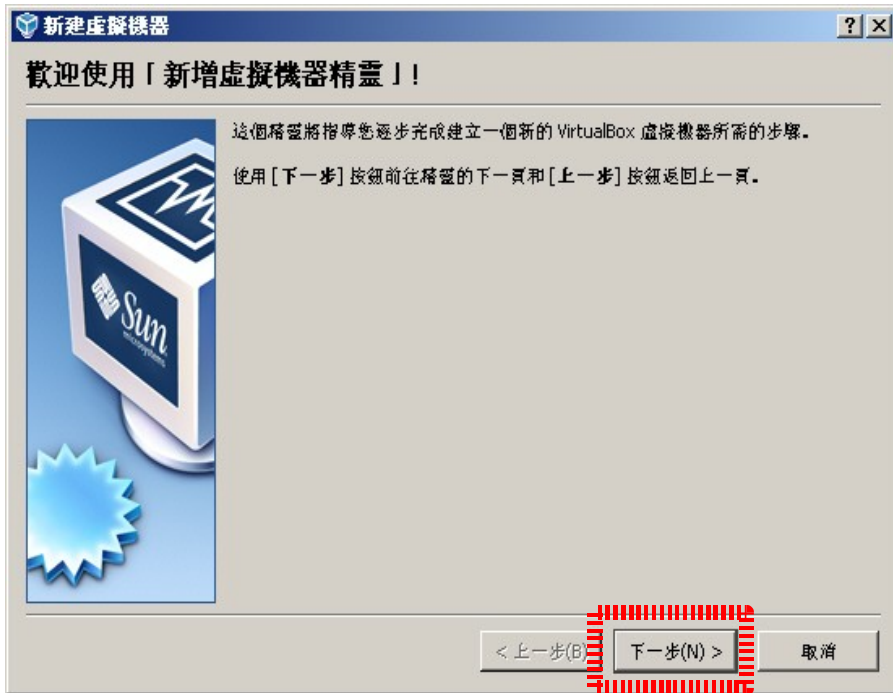
您可以按下 **[F1]** 按鍵取得即時說明，或訪問 [www.virtualbox.org](http://www.virtualbox.org) 取得最新資訊與新聞。

刪除選取的虛擬機器

# Lab 1 : 安裝 Ubuntu 9.10 GNU/Linux



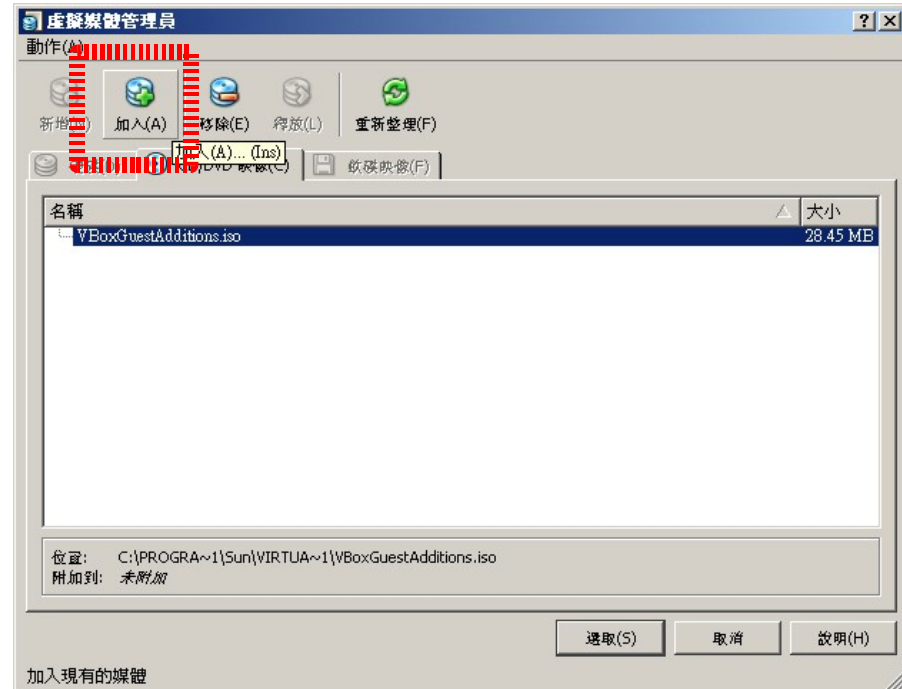
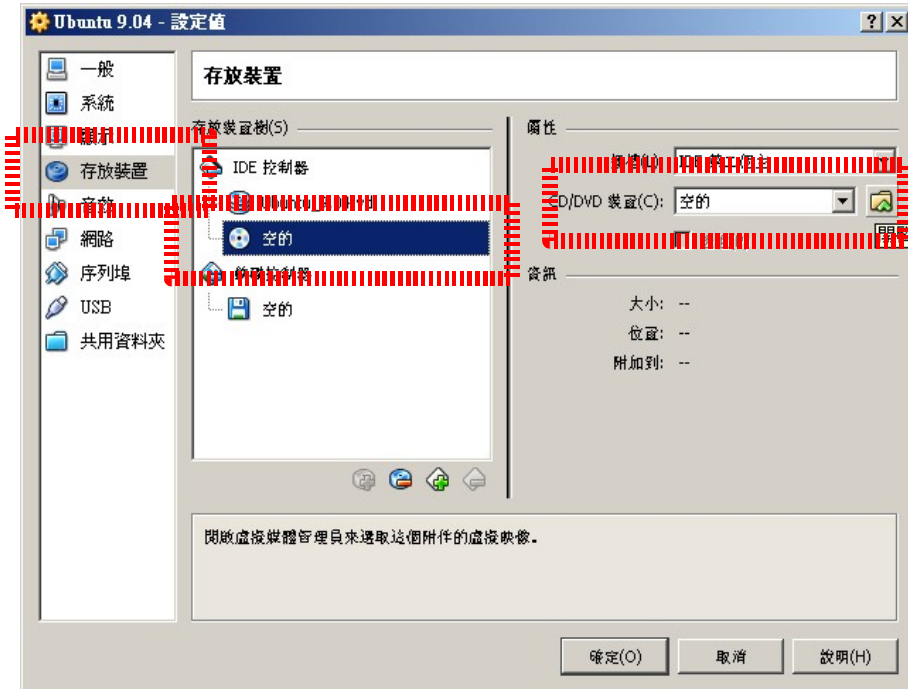
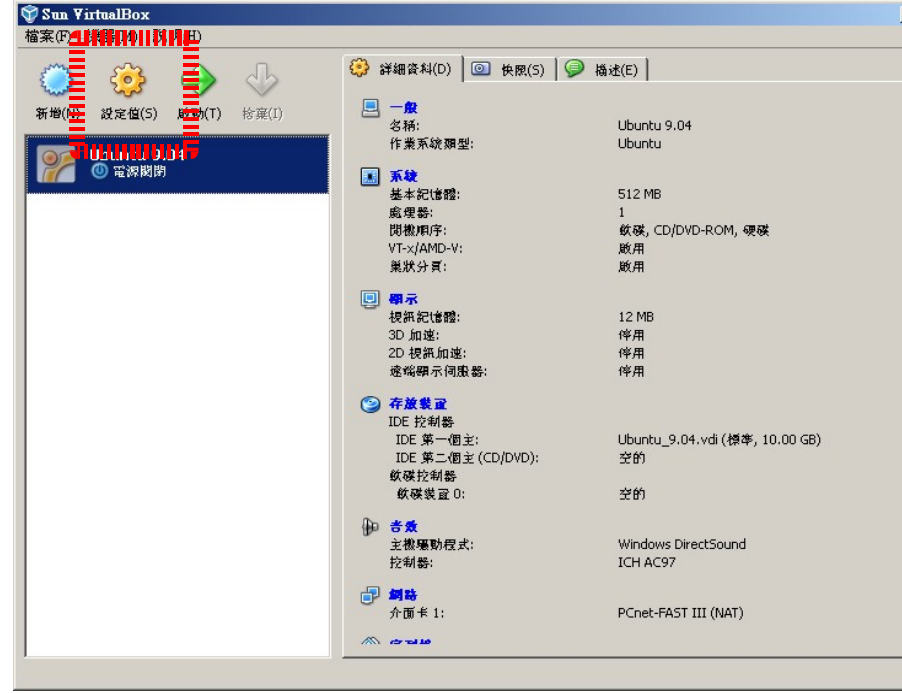
# 安裝 Ubuntu 9.10 (1)



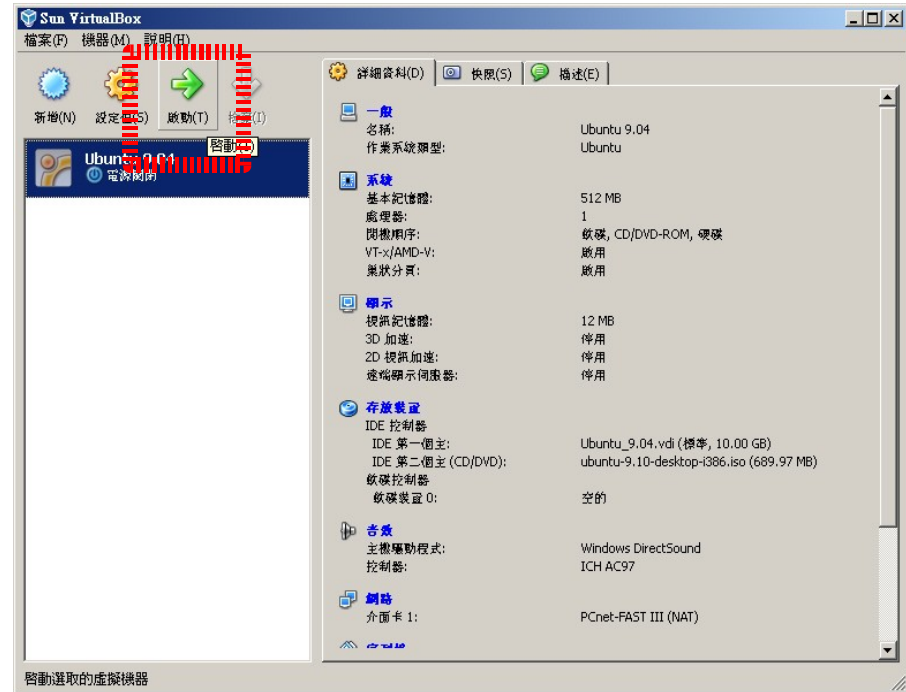
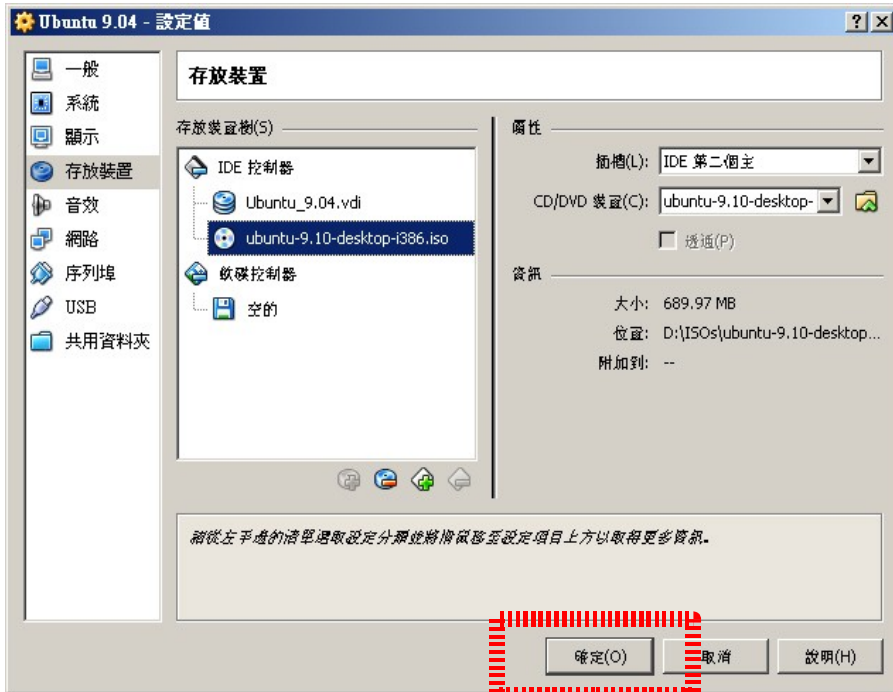
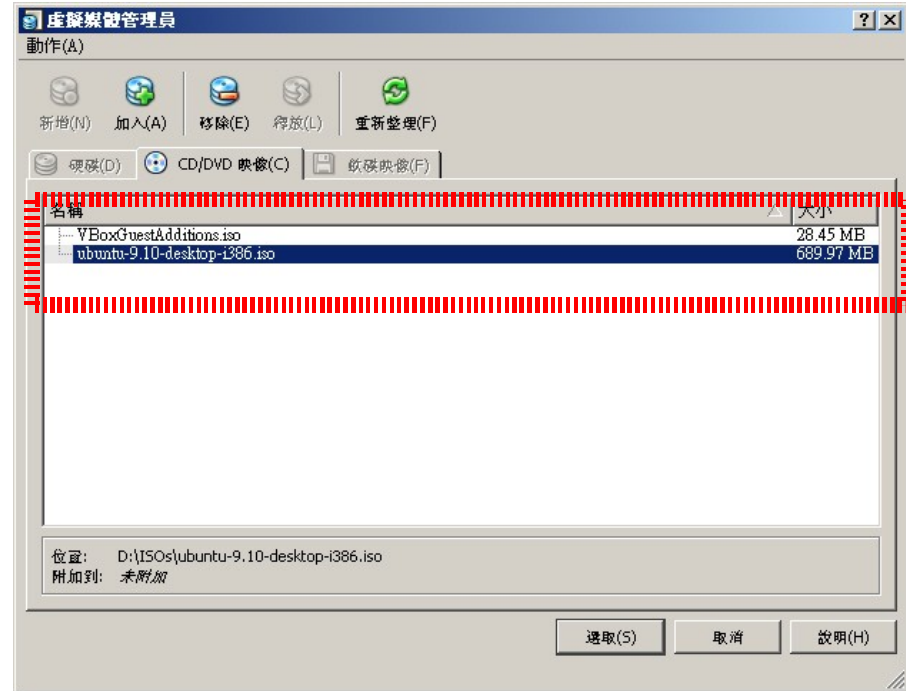
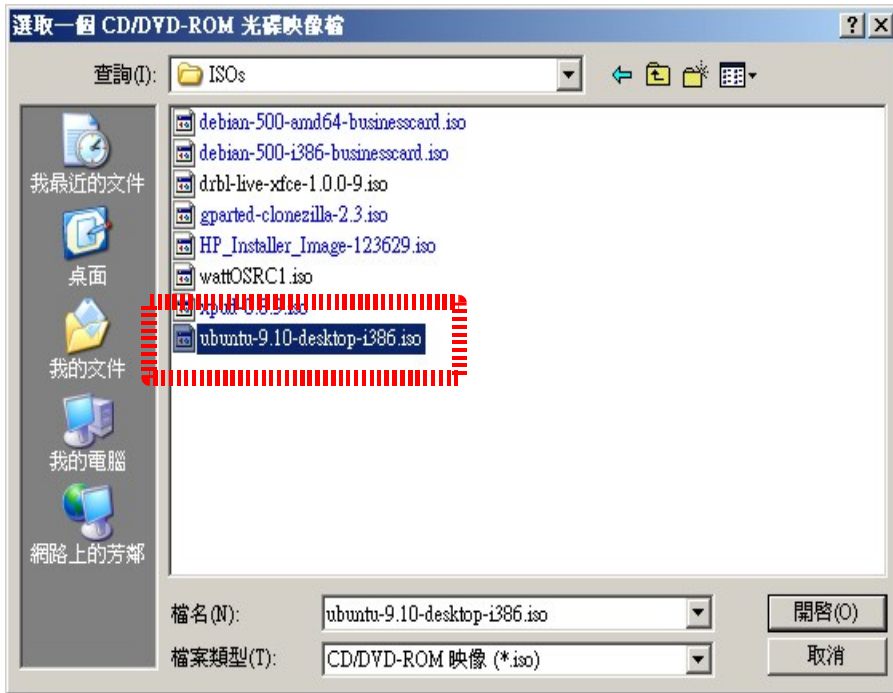
# 安裝 Ubuntu 9.10 (2)



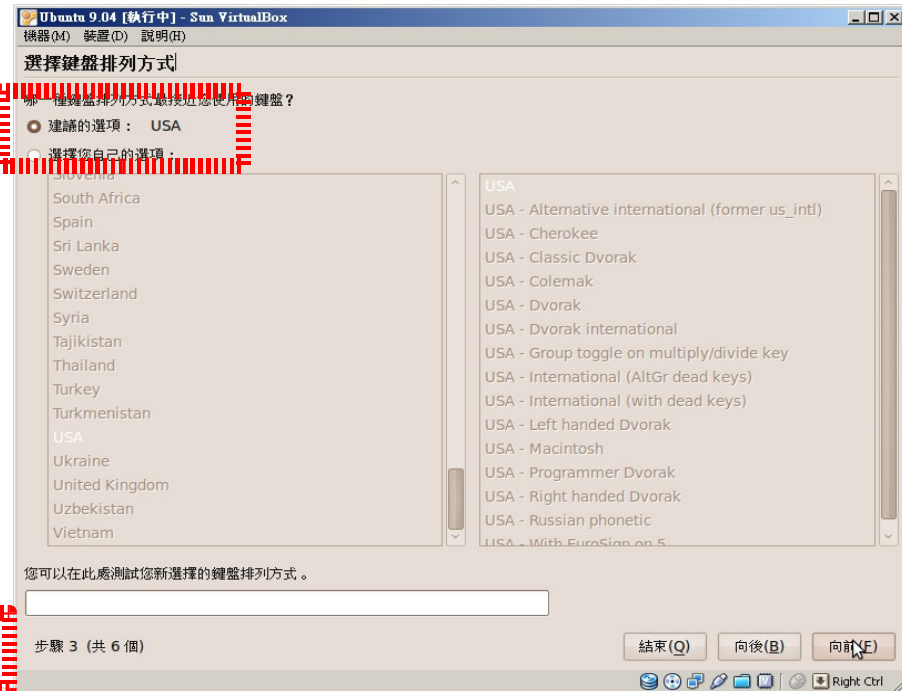
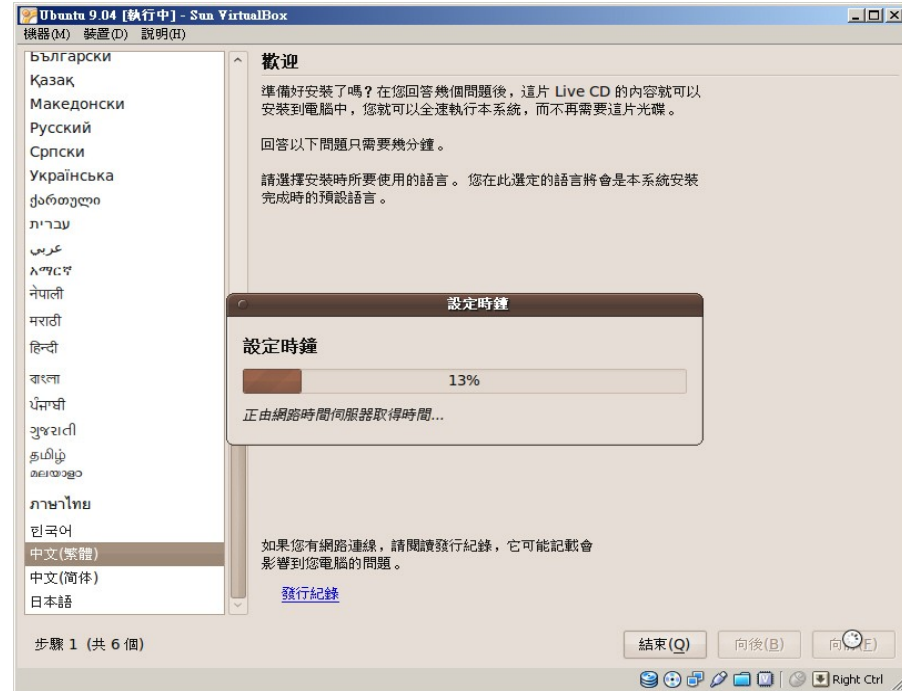
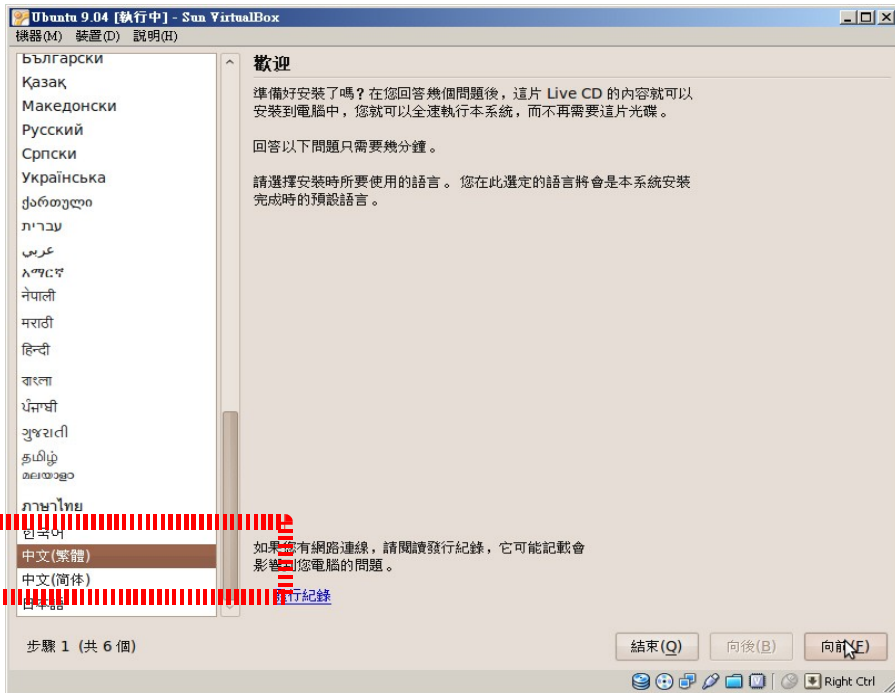
# 安裝 Ubuntu 9.10 (3)



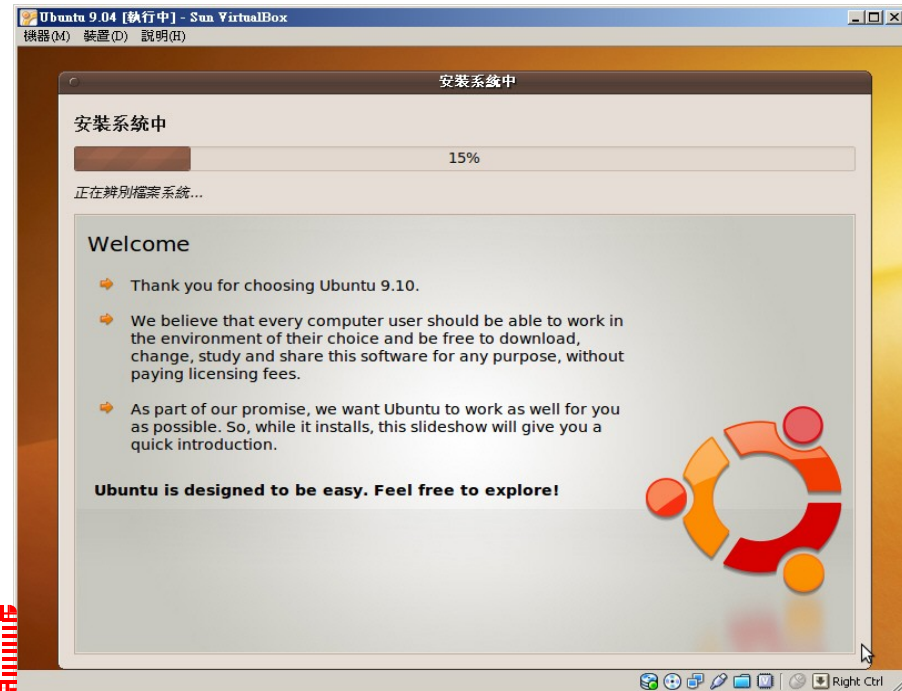
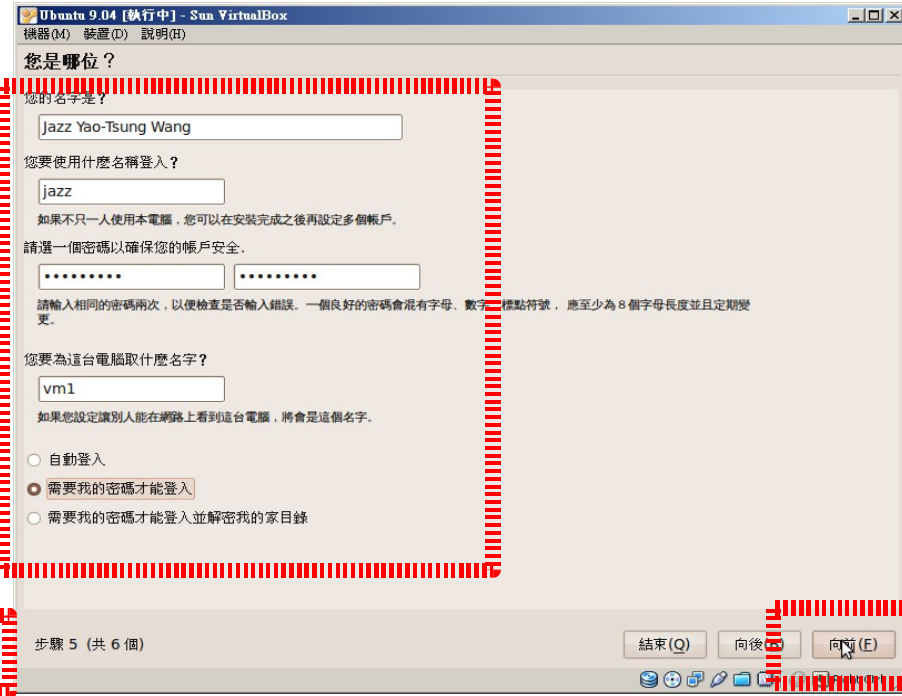
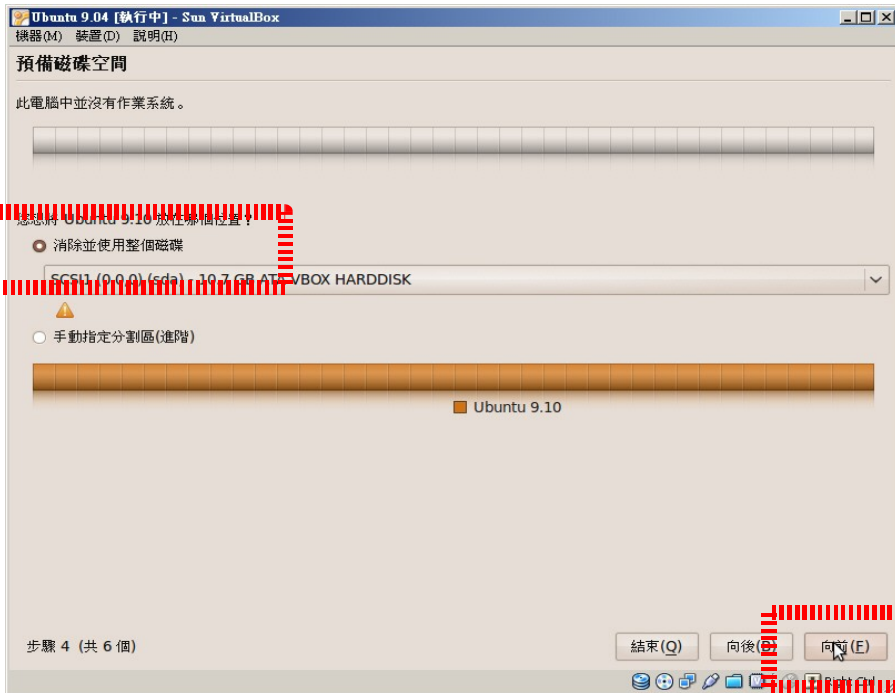
# 安裝 Ubuntu 9.10 (4)



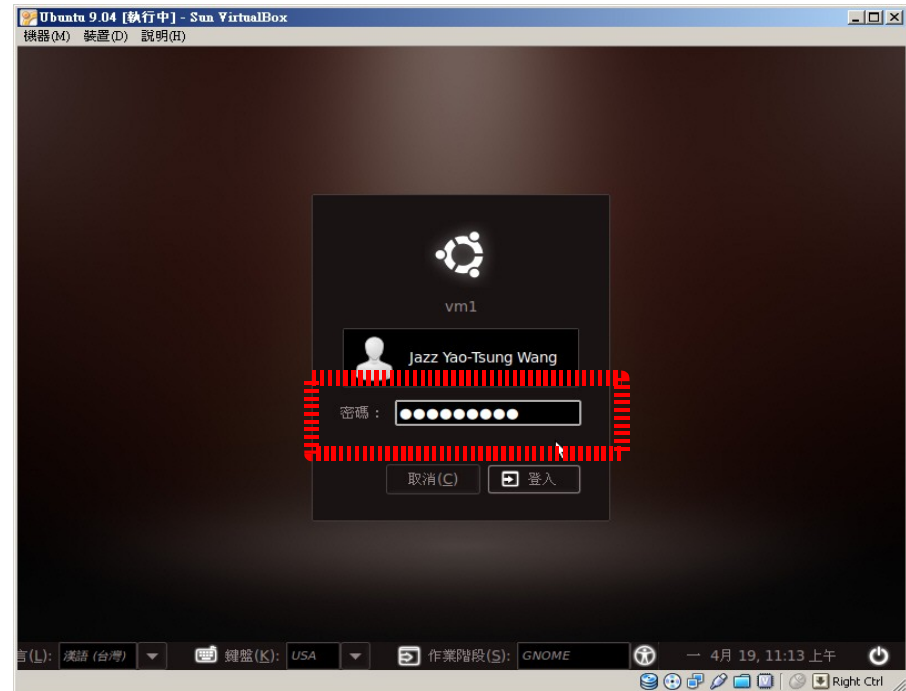
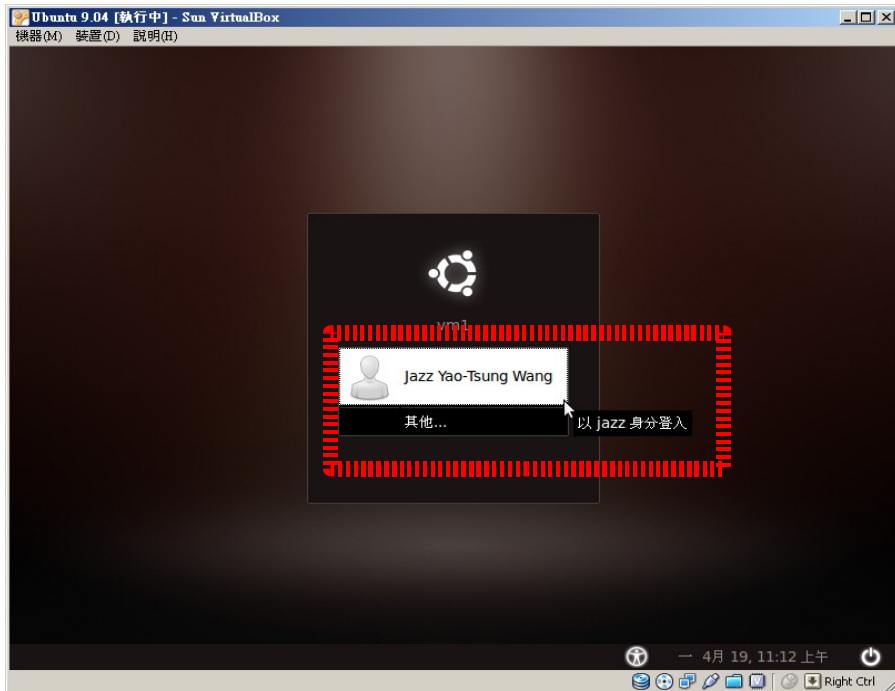
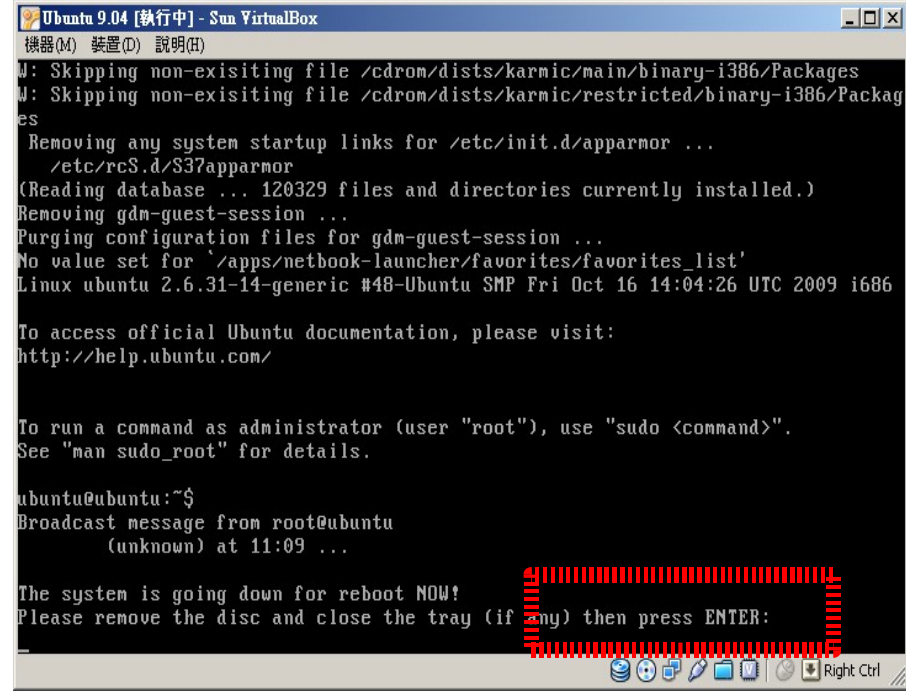
# 安裝 Ubuntu 9.10 (5)



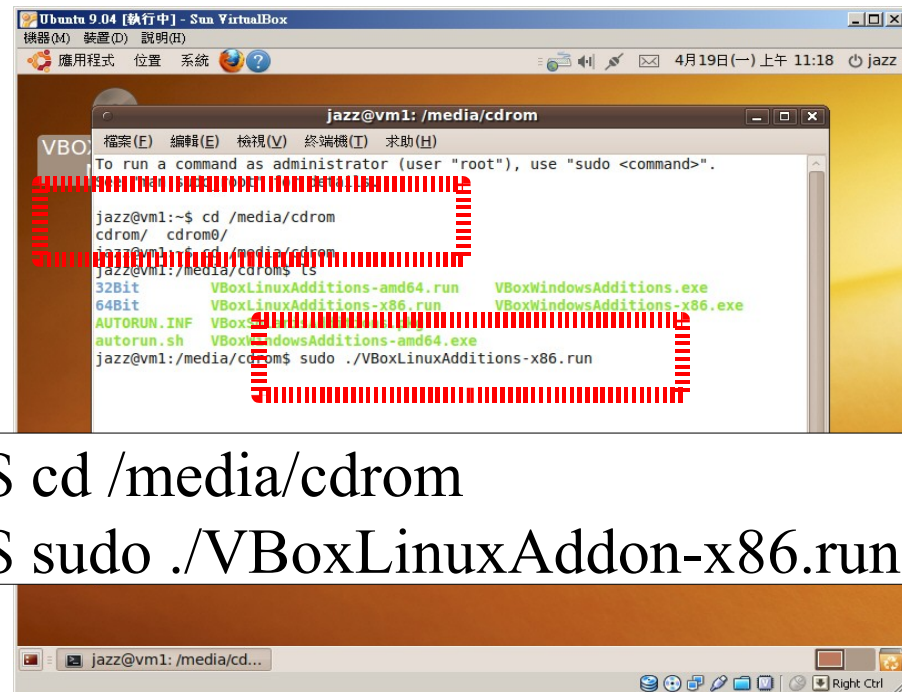
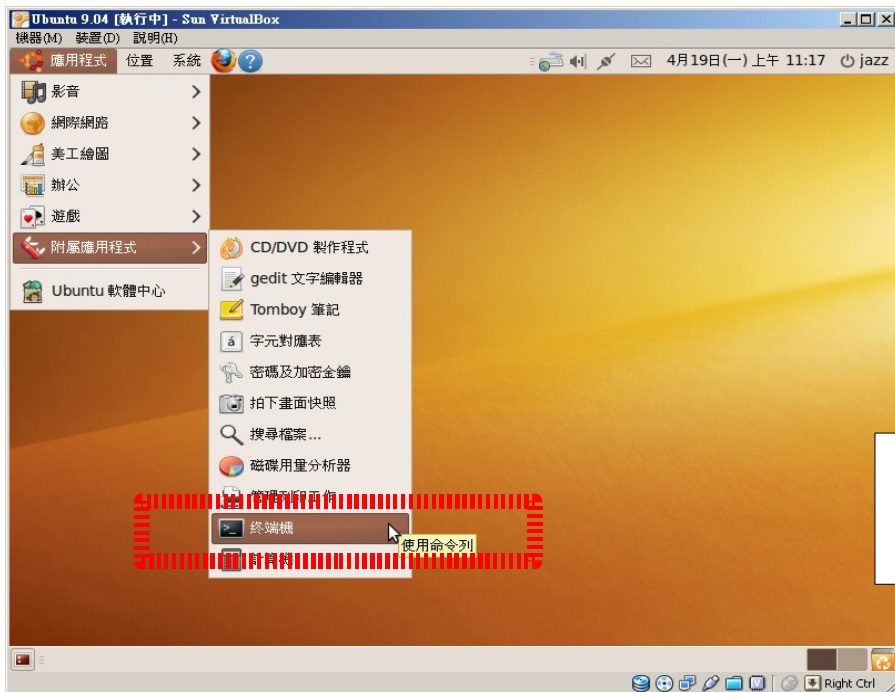
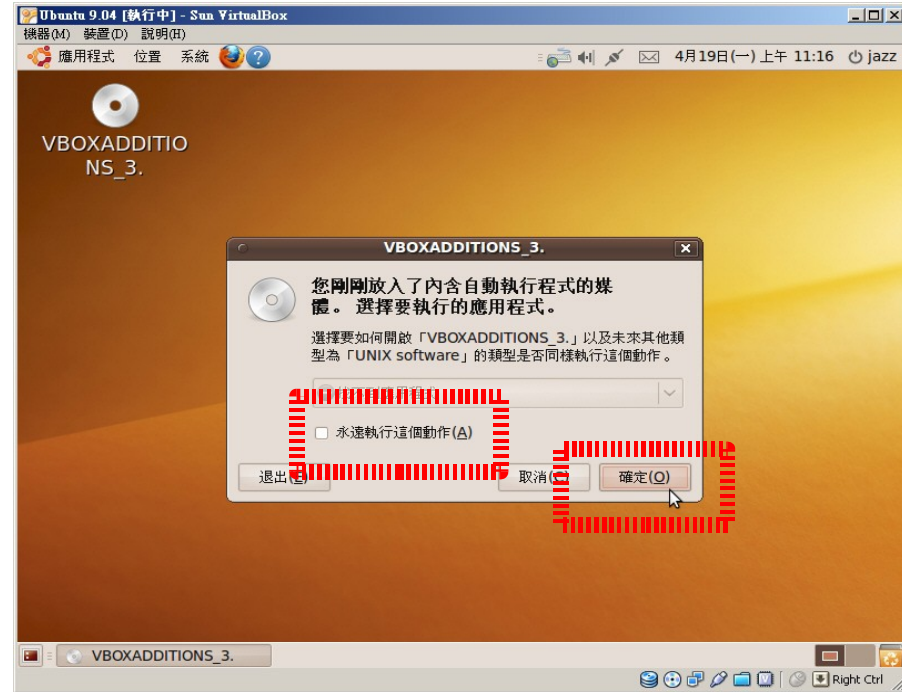
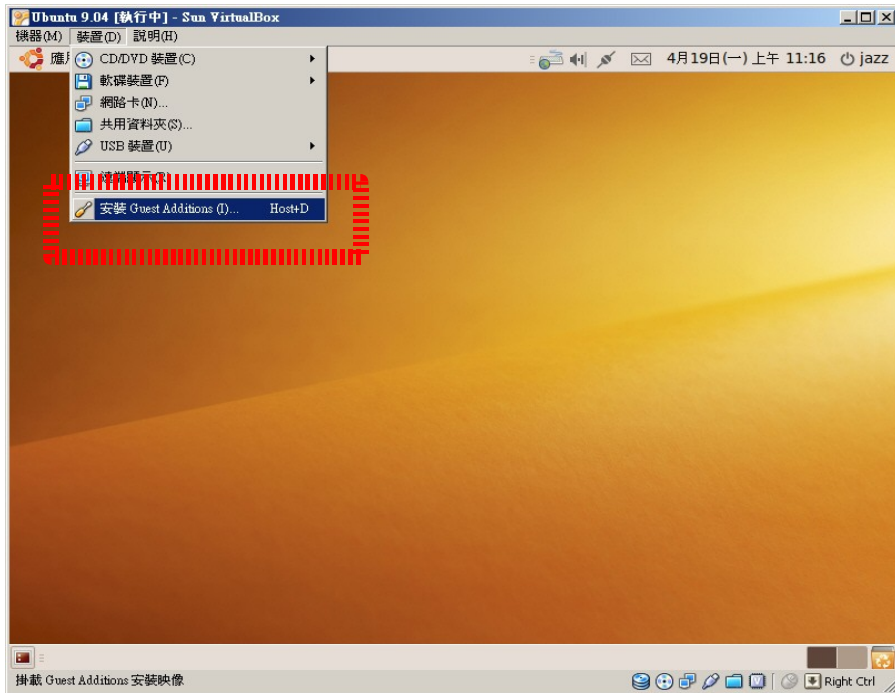
# 安裝 Ubuntu 9.10 (6)



# 安裝 Ubuntu 9.10 (7)



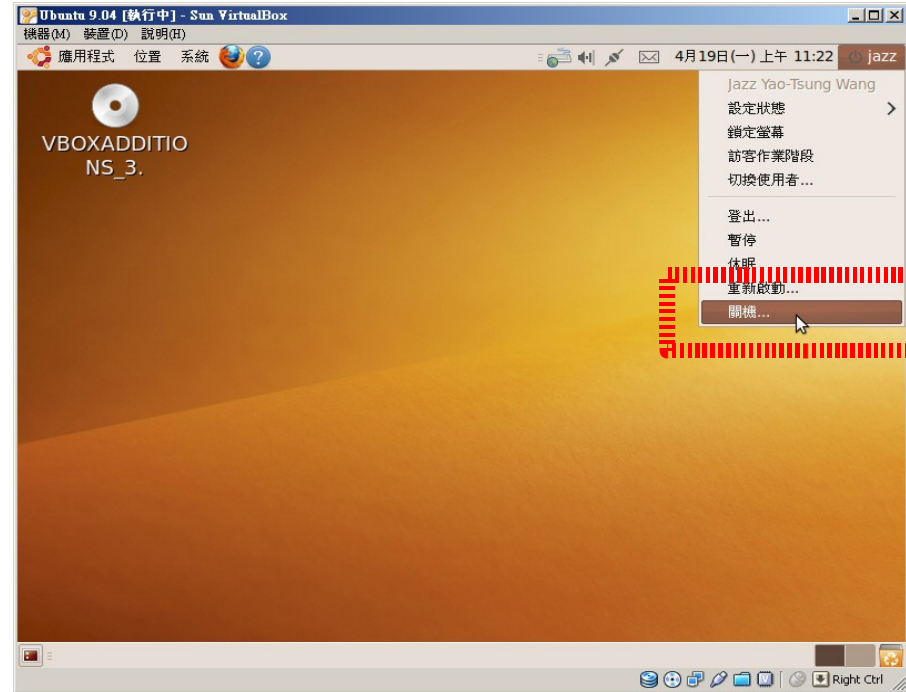
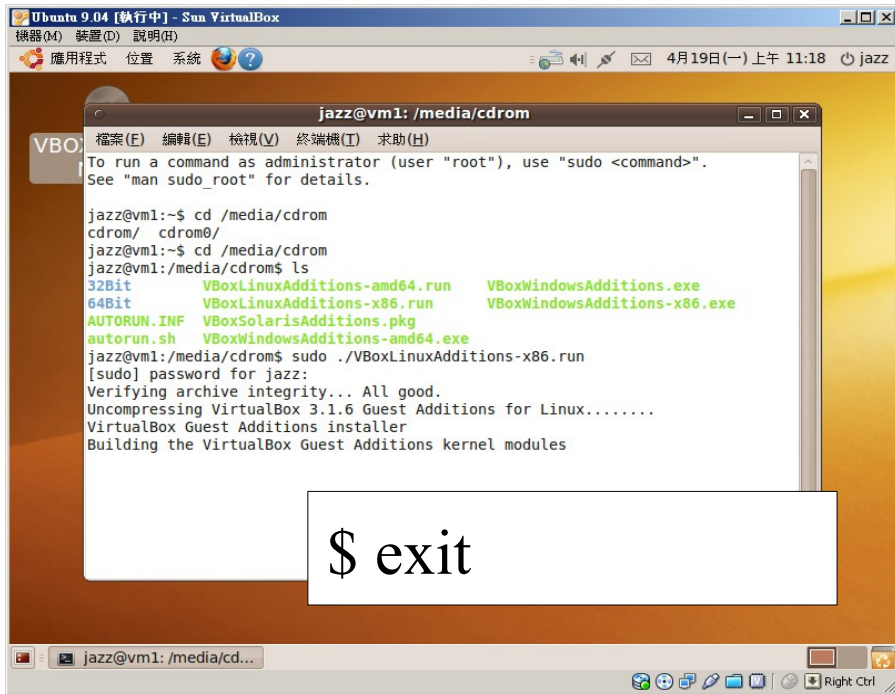
# 安裝 Ubuntu 9.10 (8)



\$ cd /media/cdrom  
\$ sudo ./VBoxLinuxAddon-x86.run



# 安裝 Ubuntu 9.10 (9)



一個令人哭笑不得的說法



學習使用免費的 Linux ，  
除非你的時間也是免費的！！

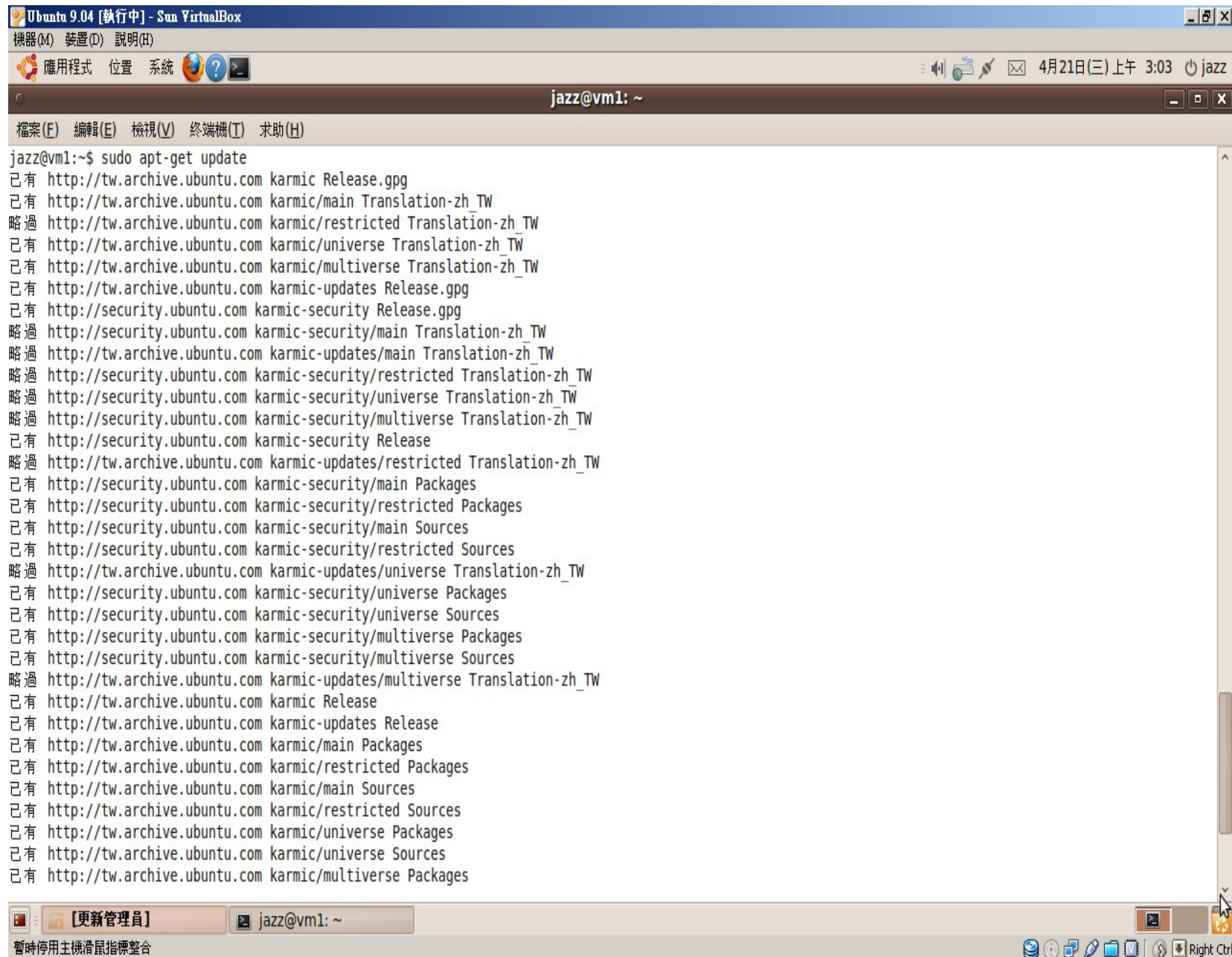
# Linux 入門資源

時間可以存起來嘛？把作過的事情紀錄下來吧！  
這部分的介紹，我 2001 年作過就請大家自己看了

[http://angkor.jazzbear.idv.tw/Linux\\_DivX/02.avi](http://angkor.jazzbear.idv.tw/Linux_DivX/02.avi)

- 如何找尋協助？
- Linux 基本指令操作
- Linux 管理者指令
- Linux 檔案系統簡介

# 基本管理篇 [1] 用 apt-get update 更新套件

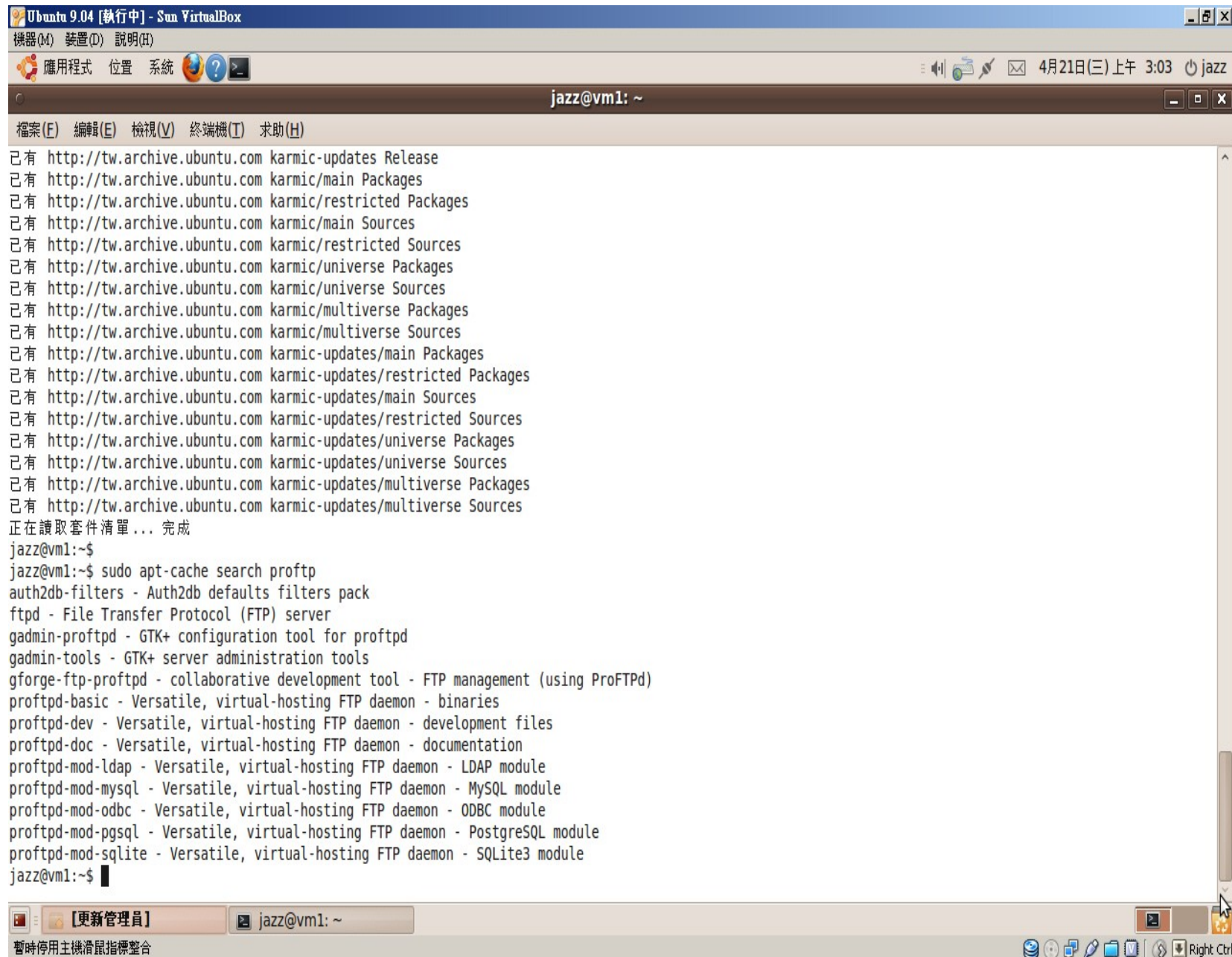


The screenshot shows a terminal window titled "jazz@vml: ~" within an Ubuntu 9.04 virtual machine. The terminal displays the output of the command "sudo apt-get update". The output lists various repository sources and their status, including translations, releases, and packages for different components like karmic, security, and universe. The status for each source is either "已有" (already present) or "略過" (skipped).

```
jazz@vml:~$ sudo apt-get update
已有 http://tw.archive.ubuntu.com karmic Release.gpg
已有 http://tw.archive.ubuntu.com karmic/main Translation-zh_TW
略過 http://tw.archive.ubuntu.com karmic/restricted Translation-zh_TW
已有 http://tw.archive.ubuntu.com karmic/universe Translation-zh_TW
已有 http://tw.archive.ubuntu.com karmic/multiverse Translation-zh_TW
已有 http://tw.archive.ubuntu.com karmic-updates Release.gpg
已有 http://security.ubuntu.com karmic-security Release.gpg
略過 http://security.ubuntu.com karmic-security/main Translation-zh_TW
略過 http://tw.archive.ubuntu.com karmic-updates/main Translation-zh_TW
略過 http://security.ubuntu.com karmic-security/restricted Translation-zh_TW
略過 http://security.ubuntu.com karmic-security/universe Translation-zh_TW
略過 http://security.ubuntu.com karmic-security/multiverse Translation-zh_TW
已有 http://security.ubuntu.com karmic-security Release
略過 http://tw.archive.ubuntu.com karmic-updates/restricted Translation-zh_TW
已有 http://security.ubuntu.com karmic-security/main Packages
已有 http://security.ubuntu.com karmic-security/restricted Packages
已有 http://security.ubuntu.com karmic-security/main Sources
已有 http://security.ubuntu.com karmic-security/restricted Sources
略過 http://tw.archive.ubuntu.com karmic-updates/universe Translation-zh_TW
已有 http://security.ubuntu.com karmic-security/universe Packages
已有 http://security.ubuntu.com karmic-security/universe Sources
已有 http://security.ubuntu.com karmic-security/multiverse Packages
已有 http://security.ubuntu.com karmic-security/multiverse Sources
略過 http://tw.archive.ubuntu.com karmic-updates/multiverse Translation-zh_TW
已有 http://tw.archive.ubuntu.com karmic Release
已有 http://tw.archive.ubuntu.com karmic-updates Release
已有 http://tw.archive.ubuntu.com karmic/main Packages
已有 http://tw.archive.ubuntu.com karmic/restricted Packages
已有 http://tw.archive.ubuntu.com karmic/main Sources
已有 http://tw.archive.ubuntu.com karmic/restricted Sources
已有 http://tw.archive.ubuntu.com karmic/universe Packages
已有 http://tw.archive.ubuntu.com karmic/universe Sources
已有 http://tw.archive.ubuntu.com karmic/multiverse Packages
```



# 基本管理篇 [3] 用 apt-cache search 搜尋



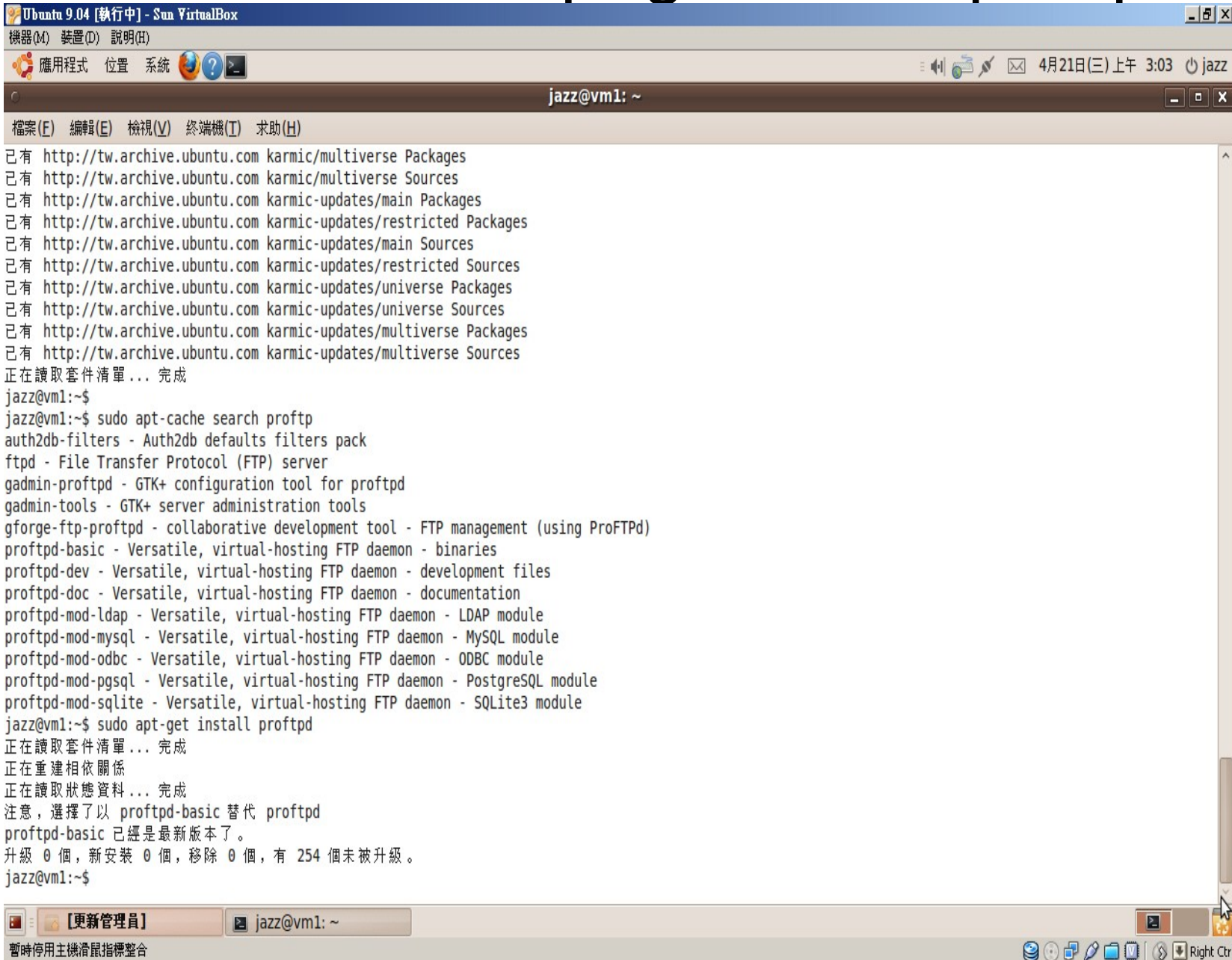
```
Ubuntu 9.04 [執行中] - Sun VirtualBox
機器(M) 裝置(D) 說明(H)
應用程式 位置 系統 4月21日(三)上午 3:03 jazz
jazz@vml: ~
檔案(E) 編輯(E) 檢視(V) 終端機(T) 求助(H)
已有 http://tw.archive.ubuntu.com karmic-updates Release
已有 http://tw.archive.ubuntu.com karmic/main Packages
已有 http://tw.archive.ubuntu.com karmic/restricted Packages
已有 http://tw.archive.ubuntu.com karmic/main Sources
已有 http://tw.archive.ubuntu.com karmic/restricted Sources
已有 http://tw.archive.ubuntu.com karmic/universe Packages
已有 http://tw.archive.ubuntu.com karmic/universe Sources
已有 http://tw.archive.ubuntu.com karmic/multiverse Packages
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已有 http://tw.archive.ubuntu.com karmic-updates/restricted Packages
已有 http://tw.archive.ubuntu.com karmic-updates/main Sources
已有 http://tw.archive.ubuntu.com karmic-updates/restricted Sources
已有 http://tw.archive.ubuntu.com karmic-updates/universe Packages
已有 http://tw.archive.ubuntu.com karmic-updates/universe Sources
已有 http://tw.archive.ubuntu.com karmic-updates/multiverse Packages
已有 http://tw.archive.ubuntu.com karmic-updates/multiverse Sources
正在讀取套件清單... 完成
jazz@vml:~$
jazz@vml:~$ sudo apt-cache search proftpd
auth2db-filters - Auth2db defaults filters pack
ftpd - File Transfer Protocol (FTP) server
gadmin-proftpd - GTK+ configuration tool for proftpd
gadmin-tools - GTK+ server administration tools
gforge-ftp-proftpd - collaborative development tool - FTP management (using ProFTPD)
proftpd-basic - Versatile, virtual-hosting FTP daemon - binaries
proftpd-dev - Versatile, virtual-hosting FTP daemon - development files
proftpd-doc - Versatile, virtual-hosting FTP daemon - documentation
proftpd-mod-ldap - Versatile, virtual-hosting FTP daemon - LDAP module
proftpd-mod-mysql - Versatile, virtual-hosting FTP daemon - MySQL module
proftpd-mod-odbc - Versatile, virtual-hosting FTP daemon - ODBC module
proftpd-mod-pgsql - Versatile, virtual-hosting FTP daemon - PostgreSQL module
proftpd-mod-sqlite - Versatile, virtual-hosting FTP daemon - SQLite3 module
jazz@vml:~$
```

【更新管理員】 jazz@vml: ~

暫時停用主機滑鼠指標整合 Right Ctrl

# 基本管理篇 [4] 用 apt-get install 安裝套件

## Ex. apt-get install proftpd



```
Ubuntu 9.04 [執行中] - Sun VirtualBox
機器(M) 裝置(D) 說明(H)
應用程式 位置 系統 4月21日(三) 上午 3:03 jazz
jazz@vm1: ~
檔案(E) 編輯(E) 檢視(V) 終端機(T) 求助(H)
已有 http://tw.archive.ubuntu.com karmic/multiverse Packages
已有 http://tw.archive.ubuntu.com karmic/multiverse Sources
已有 http://tw.archive.ubuntu.com karmic-updates/main Packages
已有 http://tw.archive.ubuntu.com karmic-updates/restricted Packages
已有 http://tw.archive.ubuntu.com karmic-updates/main Sources
已有 http://tw.archive.ubuntu.com karmic-updates/restricted Sources
已有 http://tw.archive.ubuntu.com karmic-updates/universe Packages
已有 http://tw.archive.ubuntu.com karmic-updates/universe Sources
已有 http://tw.archive.ubuntu.com karmic-updates/multiverse Packages
已有 http://tw.archive.ubuntu.com karmic-updates/multiverse Sources
正在讀取套件清單... 完成
jazz@vm1:~$
jazz@vm1:~$ sudo apt-cache search proftpd
auth2db-filters - Auth2db defaults filters pack
ftpd - File Transfer Protocol (FTP) server
gadmin-proftpd - GTK+ configuration tool for proftpd
gadmin-tools - GTK+ server administration tools
gforge-ftp-proftpd - collaborative development tool - FTP management (using ProFTPd)
proftpd-basic - Versatile, virtual-hosting FTP daemon - binaries
proftpd-dev - Versatile, virtual-hosting FTP daemon - development files
proftpd-doc - Versatile, virtual-hosting FTP daemon - documentation
proftpd-mod-ldap - Versatile, virtual-hosting FTP daemon - LDAP module
proftpd-mod-mysql - Versatile, virtual-hosting FTP daemon - MySQL module
proftpd-mod-odbc - Versatile, virtual-hosting FTP daemon - ODBC module
proftpd-mod-pgsql - Versatile, virtual-hosting FTP daemon - PostgreSQL module
proftpd-mod-sqlite - Versatile, virtual-hosting FTP daemon - SQLite3 module
jazz@vm1:~$ sudo apt-get install proftpd
正在讀取套件清單... 完成
正在重建相依關係
正在讀取狀態資料... 完成
注意，選擇了以 proftpd-basic 替代 proftpd
proftpd-basic 已經是最新版本了。
升級 0 個，新安裝 0 個，移除 0 個，有 254 個未被升級。
jazz@vm1:~$
```

【更新管理員】 jazz@vm1: ~

暫時停用主機滑鼠指標整合 Right Ctrl

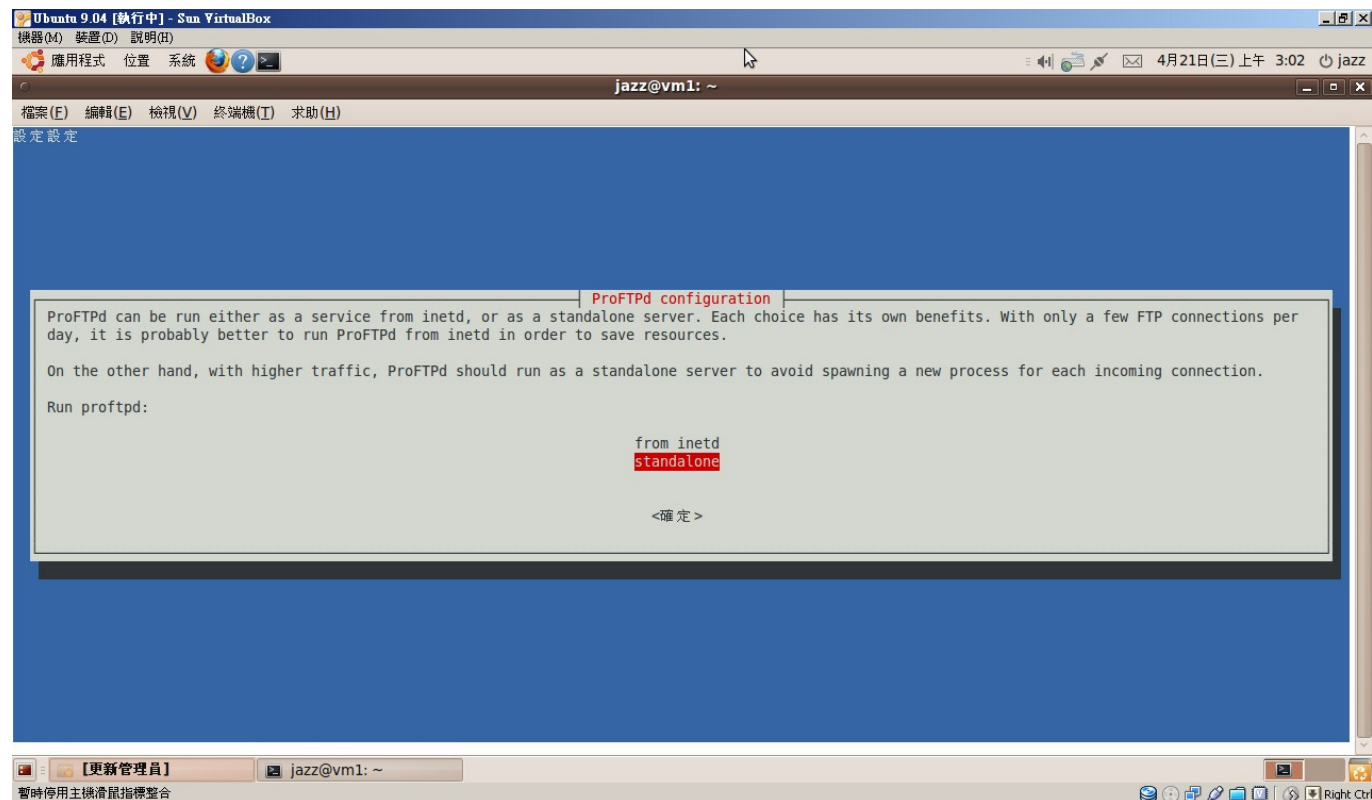
# 安裝 ProFTP

```
$ sudo apt-get install proftpd
```

```
$ sudo apt-get install ftp
```

- 測試

```
$ ftp localhost 21
```





# 安裝 SSH

```
$ sudo apt-get install ssh
```

```
$ ssh localhost
```



```
Ubuntu 9.04 [執行中] - Sun VirtualBox
機器(M) 裝置(D) 說明(H)
瀏覽及執行已安裝的程式
jazz@vm1: ~
檔案(E) 編輯(E) 檢視(V) 終端機(T) 求助(H)
jazz@vm1:~$ sudo apt-get install ssh
[sudo] password for jazz:
正在讀取套件清單... 完成
正在重建相依關係
正在讀取狀態資料... 完成
ssh 已經是最新版本了。
升級 0 個，新安裝 0 個，移除 0 個，有 254 個未被升級。
jazz@vm1:~$ ssh localhost
jazz@localhost's password:
Linux vm1 2.6.31-14-generic #48-Ubuntu SMP Fri Oct 16 14:04:26 UTC 2009 i686

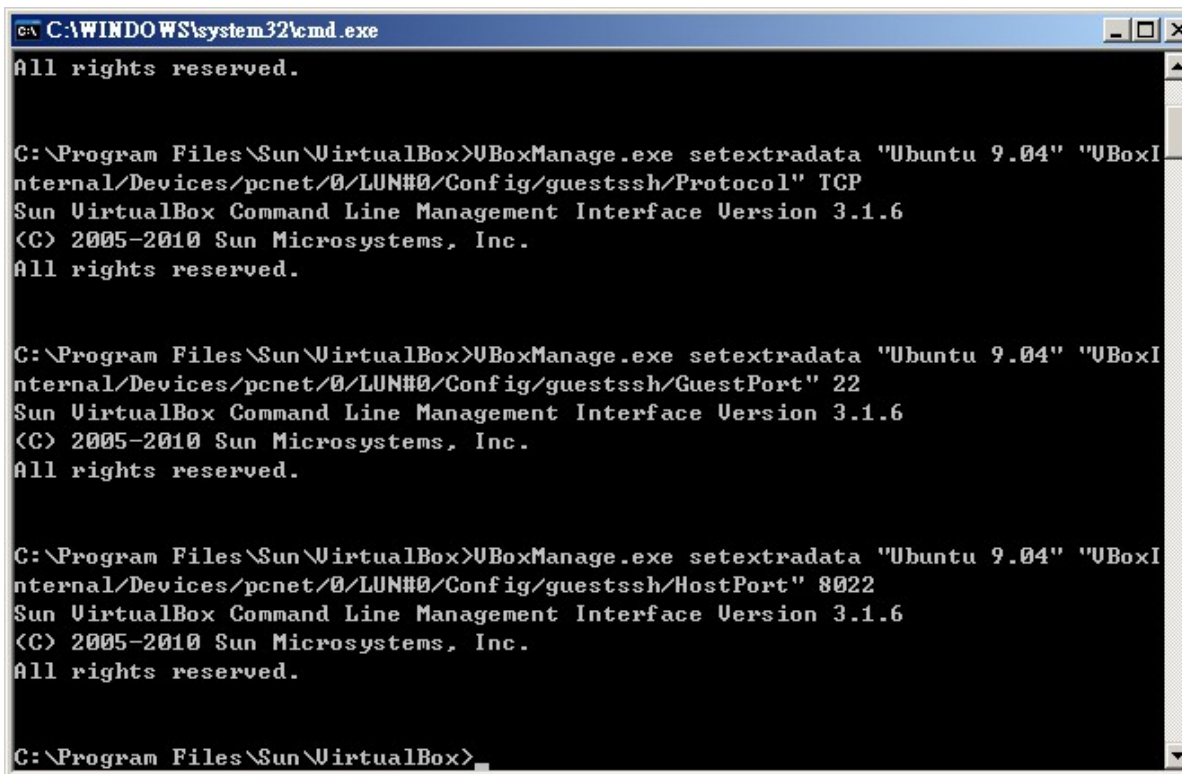
To access official Ubuntu documentation, please visit:
http://help.ubuntu.com/

259 packages can be updated.
106 updates are security updates.

Last login: Wed Apr 21 16:05:51 2010 from localhost
jazz@vm1:~$
```

# 讓 Windows 可以連到虛擬機器

- VBoxManage.exe setextradata "Ubuntu 9.04" "VBoxInternal/Devices/pcnet/0/LUN#0/Config/guestssh/Protocol" TCP
- VBoxManage.exe setextradata "Ubuntu 9.04" "VBoxInternal/Devices/pcnet/0/LUN#0/Config/guestssh/GuestPort" 22
- VBoxManage.exe setextradata "Ubuntu 9.04" "VBoxInternal/Devices/pcnet/0/LUN#0/Config/guestssh/HostPort" 8022



```
C:\WINDOWS\system32\cmd.exe
All rights reserved.

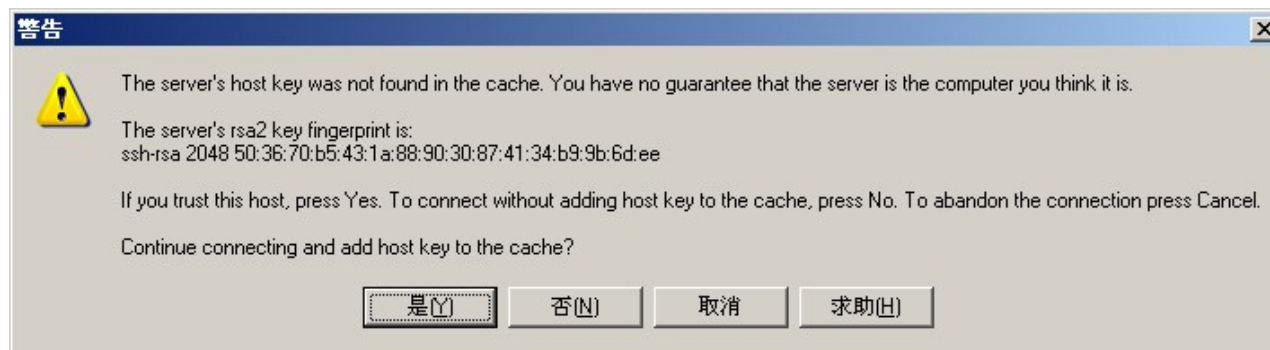
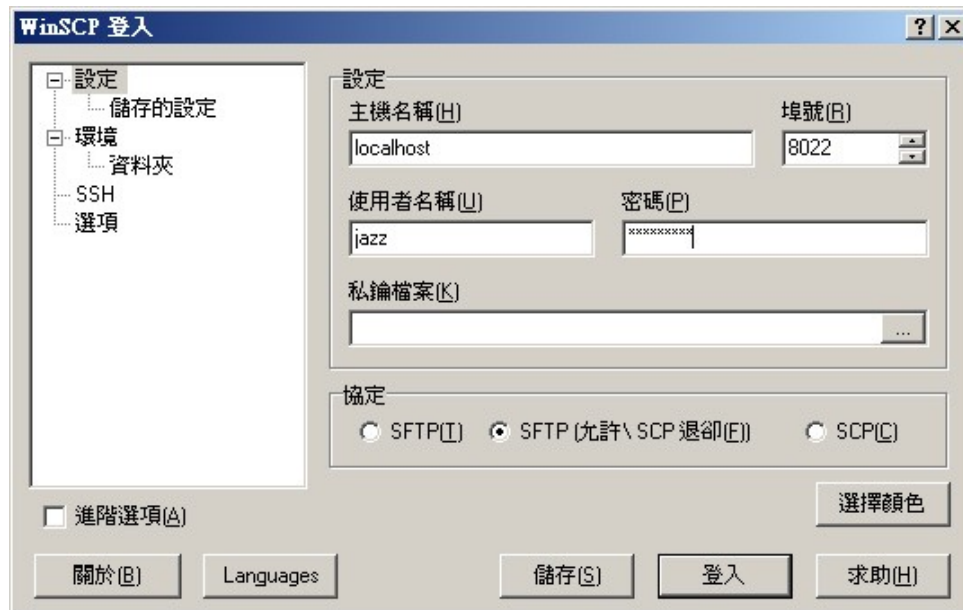
C:\Program Files\Sun\VirtualBox>VBoxManage.exe setextradata "Ubuntu 9.04" "VBoxInternal/Devices/pcnet/0/LUN#0/Config/guestssh/Protocol" TCP
Sun VirtualBox Command Line Management Interface Version 3.1.6
(C) 2005-2010 Sun Microsystems, Inc.
All rights reserved.

C:\Program Files\Sun\VirtualBox>VBoxManage.exe setextradata "Ubuntu 9.04" "VBoxInternal/Devices/pcnet/0/LUN#0/Config/guestssh/GuestPort" 22
Sun VirtualBox Command Line Management Interface Version 3.1.6
(C) 2005-2010 Sun Microsystems, Inc.
All rights reserved.

C:\Program Files\Sun\VirtualBox>VBoxManage.exe setextradata "Ubuntu 9.04" "VBoxInternal/Devices/pcnet/0/LUN#0/Config/guestssh/HostPort" 8022
Sun VirtualBox Command Line Management Interface Version 3.1.6
(C) 2005-2010 Sun Microsystems, Inc.
All rights reserved.

C:\Program Files\Sun\VirtualBox>
```

# 使用 WinSCP 上下傳檔案 (1)



# 使用 WinSCP 上下傳檔案 (2)

The screenshot displays the WinSCP interface with two panels. The left panel shows the local file system (C:\SYSTEM) with a list of folders and files. The right panel shows the remote file system (/home/jazz) with a list of folders and files. The bottom status bar indicates the transfer progress: 5,464 B transferred, 97 B remaining, using SFTP (v3) protocol, and a time of 0:00:49.

**Local File System (C:\SYSTEM)**

名稱	離開	大小	類型	Change
..			Parent directory	2010/4
Aptana Studio			File Folder	2009/1
Bluetooth			File Folder	2010/1
DataCardGKU			File Folder	2010/4
Downloads			File Folder	2009/1
etax			File Folder	2009/5
JPG files			File Folder	2008/8
MP3 files			File Folder	2008/8
My Music			File Folder	2009/1
My Pictures			File Folder	2010/2
My Videos			File Folder	2009/6
My Virtual Machines			File Folder	2009/7
TXT Files			File Folder	2008/8
我已接收的檔案			File Folder	2008/6
捷徑			File Folder	2007/3
ssh-key		601	檔案	2009/4
PAPER.DOT		23,552	Microsoft Word ...	2005/8
desktop.ini		90	Notepad++ Docu...	2008/1
我的共用資料夾.lnk		951	Shortcut	2009/2
ssh-key.pub		703	PHP 檔案	2009/4

**Remote File System (/home/jazz)**

名稱	離開	大小	類型	Changed
..			File Folder	2010/4/21 上午 03:02:53
?軟			File Folder	2010/4/19 上午 11:14:03
?單?			File Folder	2010/4/19 上午 11:14:03
? ?			File Folder	2010/4/19 上午 11:14:03
? 辣			File Folder	2010/4/19 上午 11:14:03
銼 ?			File Folder	2010/4/19 上午 11:14:03
隙梁?			File Folder	2010/4/19 上午 11:14:03
獠			File Folder	2010/4/19 上午 11:14:03
環上			File Folder	2010/4/19 上午 11:14:03
gstreamer-0.10			File Folder	2010/4/19 上午 11:14:22
cache			File Folder	2010/4/21 下午 04:05:37
config			File Folder	2010/4/19 上午 11:14:15
.dbus			File Folder	2010/4/19 上午 11:14:04
fontconfig			File Folder	2010/4/19 上午 11:14:08
gconf			File Folder	2010/4/21 下午 04:39:38
gconfd			File Folder	2010/4/21 下午 04:40:36
gnome2			File Folder	2010/4/21 下午 04:09:45
gnome2_private			File Folder	2010/4/19 上午 11:14:11
gnupg			File Folder	2010/4/21 下午 04:39:37
outfs			File Folder	2010/4/21 下午 04:39:37

**Status Bar:** 5,464 B | 97 B | aes | SFTP (v3) | 0:00:49



# 企鵝龍與再生龍

***Jazz Wang***  
***Yao-Tsung Wang***  
***jazz@nchc.org.tw***





**PART 1 :**

# 開發背景簡介

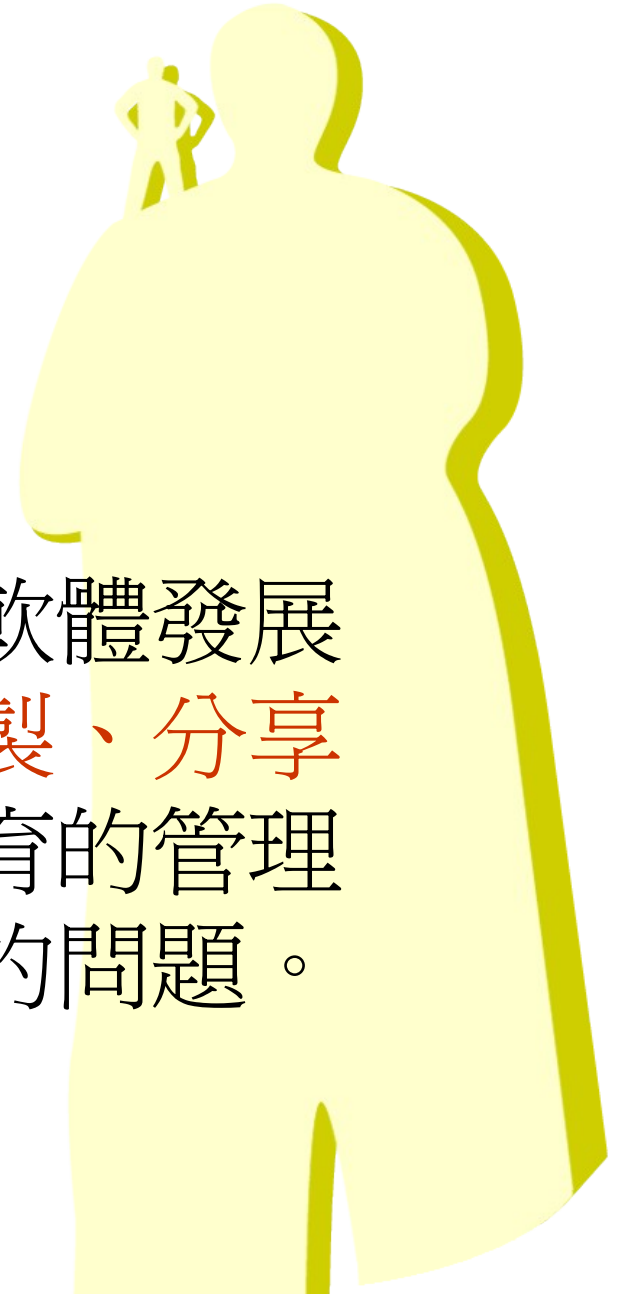
***Jazz Wang***  
***Yao-Tsung Wang***  
***jazz@nchc.org.tw***



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## 自由軟體 (Free Software)

站在巨人的肩膀上，是自由軟體發展的理念。其靈活、可自由複製、分享的價值，將有效解決資訊教育的管理成本及商業軟體高成本負擔的問題。



# 降低資訊教育管理成本

需要「化繁為簡」的解決方案！



一般國內小學的電腦教室

## ☑ 人力、時間成本高

教師 1 人維護管理多組設備  
教學同時分派或收集作業

## ☑ 設備維護成本高

需分別處理設定 (每班約 40 台)  
如：電腦中毒、環境設定  
系統操作問題、開關機、  
備份還原等



# 平衡商業軟體與知識教育

知識和軟體都需要讓孩子「帶著走」！



## ☑ 商業軟體授權高成本

在校學習，也需回家複習  
學校每台 (平均) 2 萬  
學生家用 (平均) 4 萬

## ☑ 知識與法治的學習

教育知識，也需教育尊重  
尊重智財權觀念

# 國網中心自由軟體開發

## 多元化資訊教學的新選擇！

以個人叢集電腦 (PC Cluster) 經驗發展 DRBL&Clonezilla



### 企鵝龍 DRBL

(Diskless Remote Boot in Linux)

適合將整個電腦教室轉  
換成純自由軟體環境



### 再生龍 Clonezilla

Clonezilla

適用完整系統備份、裸機  
還原或災難復原

### 是自由！不是免費…

分送、修改、存取、使用軟體的自由。免費是附加價值。

# 企鵝龍 DRBL & 再生龍 Clonezilla

## 電腦教室管理的新利器！

■ 以每班 40 台電腦為估算單位

DRBL&Clonezilla	未使用	使用
管理簡化	分別管理40台	管理 <b>1台</b> 伺服器
硬體設備成本	每台都需配備周邊硬體	伺服器控制，節約每台學生機之周邊硬體
軟體授權成本	40台:3000*40= <b>120,000</b> (MS Windows授權1台電腦之授權費NT\$3,000)	軟體授權 <b>NT\$0</b>
合法複製、分享	需負擔授權費	複製合法 <b>NT\$0</b>
多元化電腦教學	不同系統無法並存	<b>Linux 與MS Windows可並存</b>

# 降低成本，提升形象



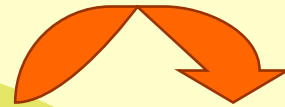
教育單位採用 DRBL

高速計算研究  
資料儲存備援

降低管理維護成本  
帶動自由軟體使用  
節樽軟體授權成本 (估計)

**NT. 98,595,000 元**

以某商業獨家軟體每機 3000 元授權費  
計，每班 35 台電腦 (3000\*35\*939)

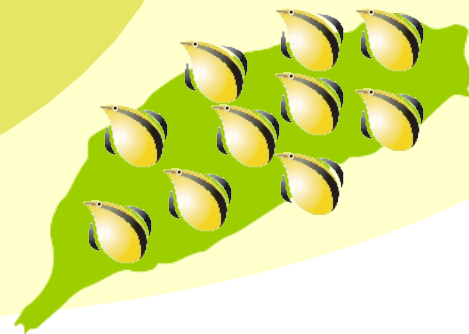


擴至全國各單位

節省龐大軟體授權費

降低台灣盜版率

提升台灣形象





**PART 2 :**

# 企鵝龍的開機原理

***Jazz Wang***  
***Yao-Tsung Wang***  
***jazz@nchc.org.tw***



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**1st, We install Base System of **GNU/Linux** on **Management Node**. You can choose:**

**Redhat, Fedora, CentOS, Mandriva, Ubuntu, Debian, ...**

**GNU Libc**



**Kernel Module**

**Linux Kernel**

**Boot Loader**

**2nd, We install *DRBL* package and  
configure it as *DRBL Server*.**

**There are lots of service needed:  
*SSH*, *DHCP*, *TFTP*, *NFS* Server,  
*NIS* Server, *YP* Server ...**

*Network Booting*

*Account Mgmt.*

***NFS***

***TFTP***

***DHCP***

***SSH***

***NIS***

***YP***

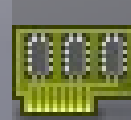
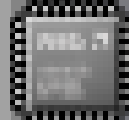
***Perl***

***Bash***

***GNU Libc***

***DRBL Server***

*based on existing  
Open Source and  
keep Hacking!*



***Kernel Module***

***Linux Kernel***

***Boot Loader***

After running **“drblsrv -i”** & **“drblpush -i”**, there will be **pxelinux**, **vmlinux-pex**, **initrd-pxe** in **TFTPROOT**, and different **configuration files** for each Compute Node in **NFSROOT**

**NFS**

**TFTPD**

**DHCPD**

**SSHD**

**NIS**

**YP**

**Config. Files**

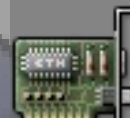
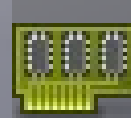
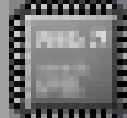
*Ex. hostname*

**initrd-pxe**

**vmlinux-pxe**

**pxelinux**

**GNU Libc**



**Kernel Module**

**Linux Kernel**

**Boot Loader**



**3nd, We enable *PXE* function in *BIOS* configuration.**

***BIOS PXE***

***BIOS PXE***

***BIOS PXE***

***BIOS PXE***

***NFS***

***TFTPD***

***DHCPD***

***SSHD***

***NIS***

***YP***

***Config. Files***

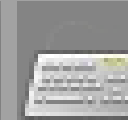
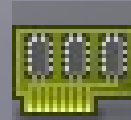
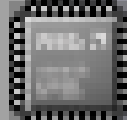
***Ex. hostname***

***initrd-pxe***

***vmlinuz-pxe***

***pxelinux***

***GNU Libc***



***Kernel Module***

***Linux Kernel***

***Boot Loader***

**While Booting, *PXE* will query IP address from *DHCPD*.**

***BIOS PXE***

***BIOS PXE***

***BIOS PXE***

***BIOS PXE***

***NFS***

***TFTPD***

***DHCPD***

***SSHD***

***NIS***

***YP***

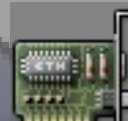
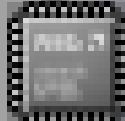
***Config. Files***  
***Ex. hostname***

***initrd-pxe***

***vmlinuz-pxe***

***pxelinux***

***GNU Libc***



***Kernel Module***

***Linux Kernel***

***Boot Loader***

**While Booting, *PXE* will query IP address from *DHCPD*.**

***IP 1***

***IP 2***

***IP 3***

***IP 4***

***NFS***

***TFTPD***

***DHCPD***

***SSHD***

***NIS***

***YP***

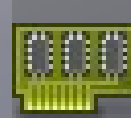
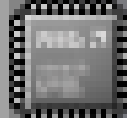
***Config. Files***  
***Ex. hostname***

***initrd-pxe***

***vmlinuz-pxe***

***pxelinux***

***GNU Libc***



***Kernel Module***

***Linux Kernel***

***Boot Loader***

**After PXE get its IP address, it will download booting files from **TFTPD**.**

**IP 1**

**IP 2**

**IP 3**

**IP 4**

**NFS**

**TFTPD**

**DHCPD**

**SSHD**

**NIS**

**YP**

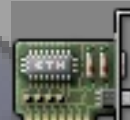
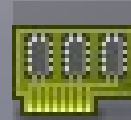
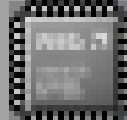
**Config. Files**  
**Ex. hostname**

**initrd-pxe**

**vmlinuz-pxe**

**pxelinux**

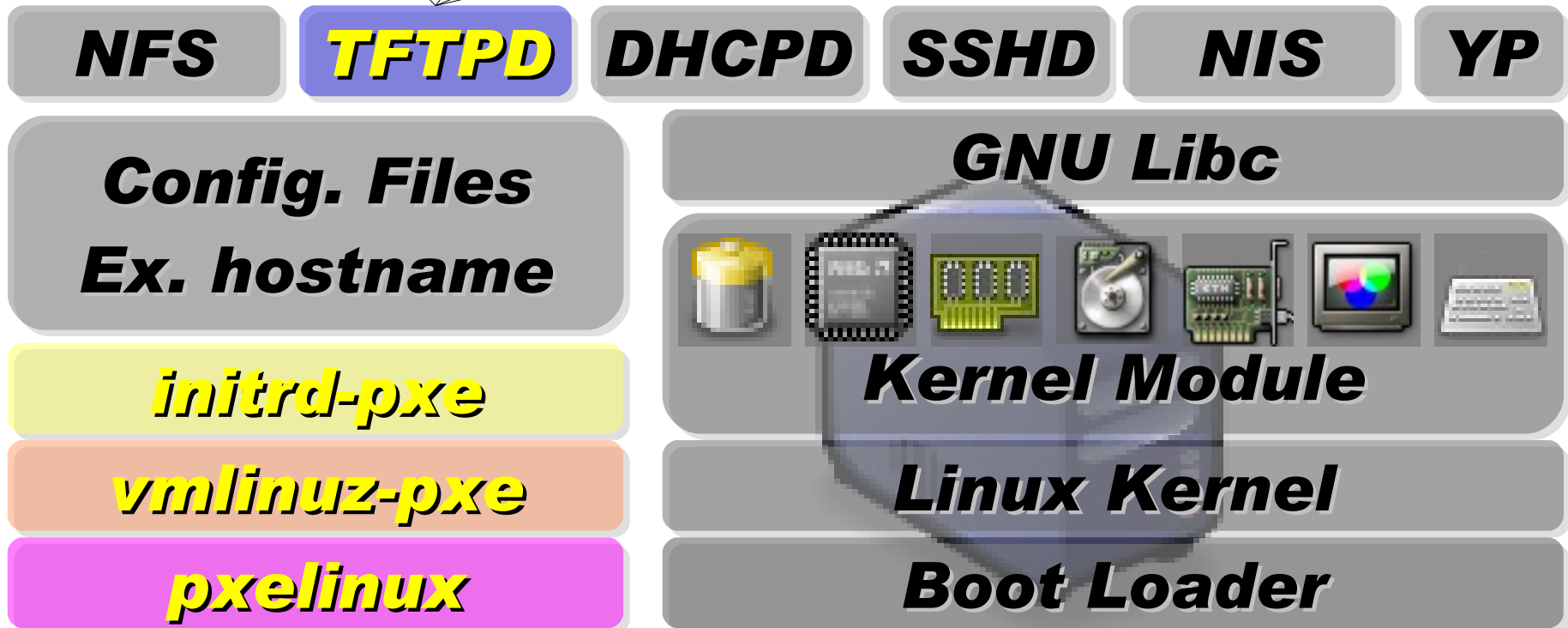
**GNU Libc**

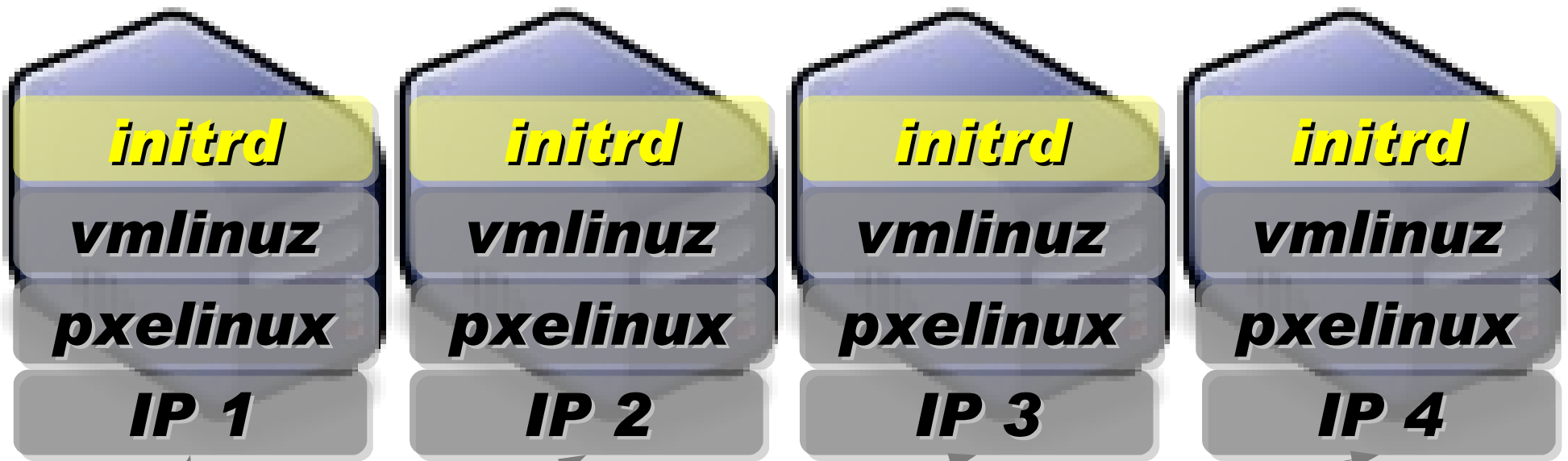


**Kernel Module**

**Linux Kernel**

**Boot Loader**



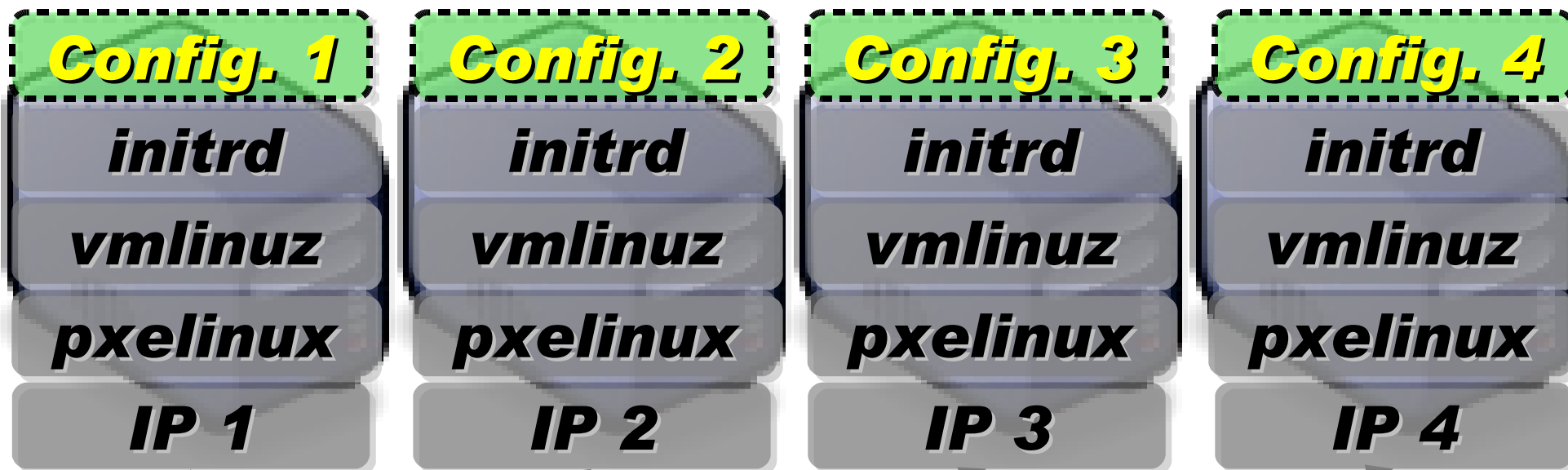


**NFS**   **TFTPD**   **DHCPD**   **SSHD**   **NIS**   **YP**

Config. Files   GNU Libc

**After downloading booting files, scripts in *initrd-pxe* will config **NFSROOT** for each Compute Node.**

**pxelinux**   **Boot Loader**



**NFS**   **TFTPD**   **DHCPD**   **SSHD**   **NIS**   **YP**

**Config. Files**  
*Ex. hostname*

**initrd-pxe**

**vmlinuz-pxe**

**pxelinux**

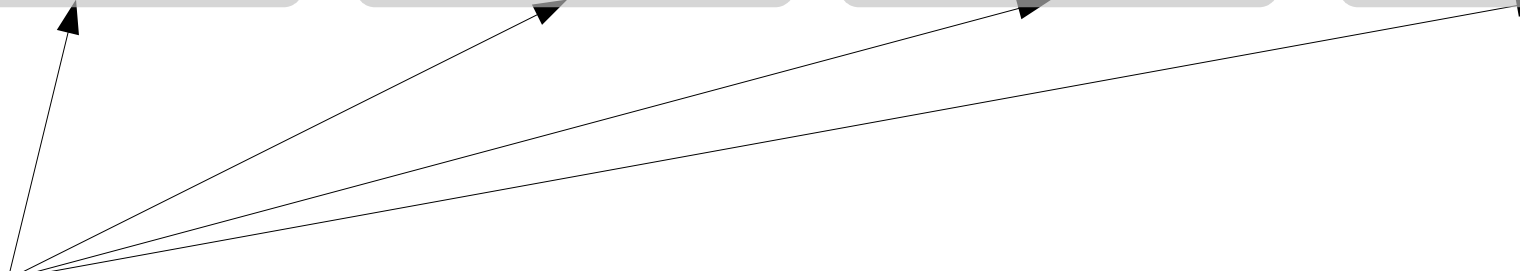
**GNU Libc**



**Kernel Module**

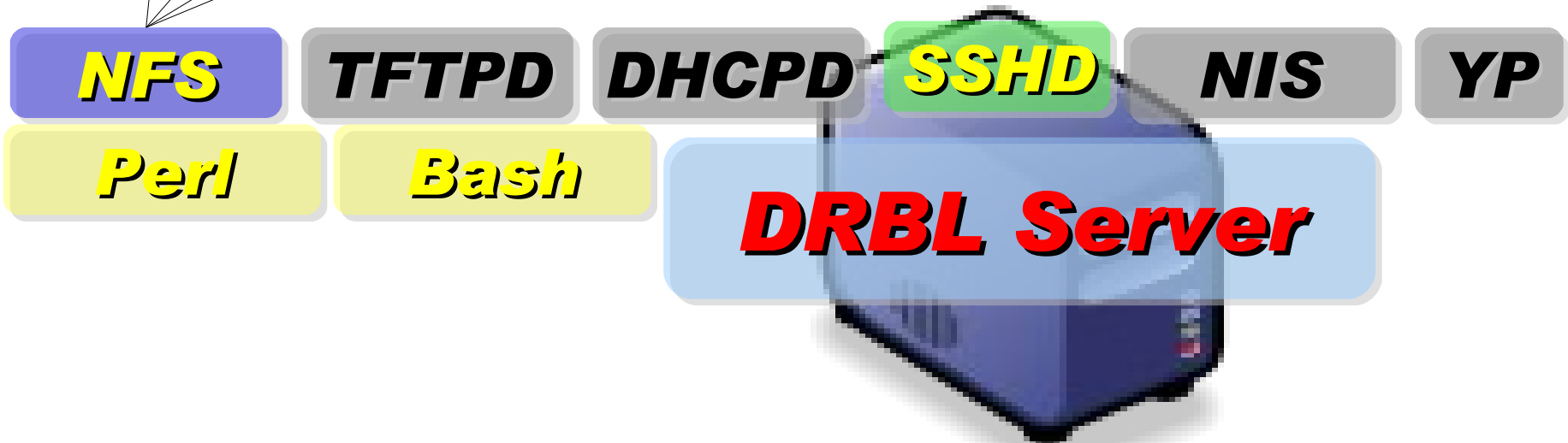
**Linux Kernel**

**Boot Loader**





**Applications and Services will also  
deployed to each Compute Node  
via **NFS** ....**







*With the help of **NIS** and **YP**,  
You can login each Compute Node  
with the **Same ID | PASSWORD**  
stored in **DRBL Server!***

**SSH Client**



**DRBL Server**





***Questions?***

***Jazz Wang***  
***Yao-Tsung Wang***  
***jazz@nchc.org.tw***



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