

Raspberry Pi 好好玩

- 安裝設定

台灣樹莓派 <sosorry@raspberrypi.com.tw>

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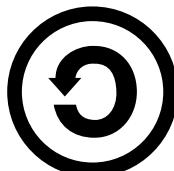
姓名標示 — 非商業性 — 相同方式分享



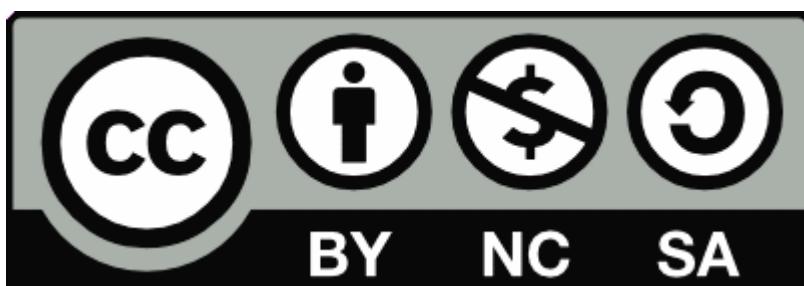
姓名標示 — 你必須給予 適當表彰、提供指向本授權條款的連結，以及 指出（本作品的原始版本）是否已被變更。你可以任何合理方式為前述表彰，但不得以任何方式暗示授權人為你或你的使用方式背書。



非商業性 — 你不得將本素材進行商業目的之使用。



相同方式分享 — 若你重混、轉換本素材，或依本素材建立新素材，你必須依本素材的授權條款來散布你的貢獻物。



關於我們

- Raspberry Pi 官方經銷商



Raspberry Pi 是什麼？

- 信用卡大小般的電腦

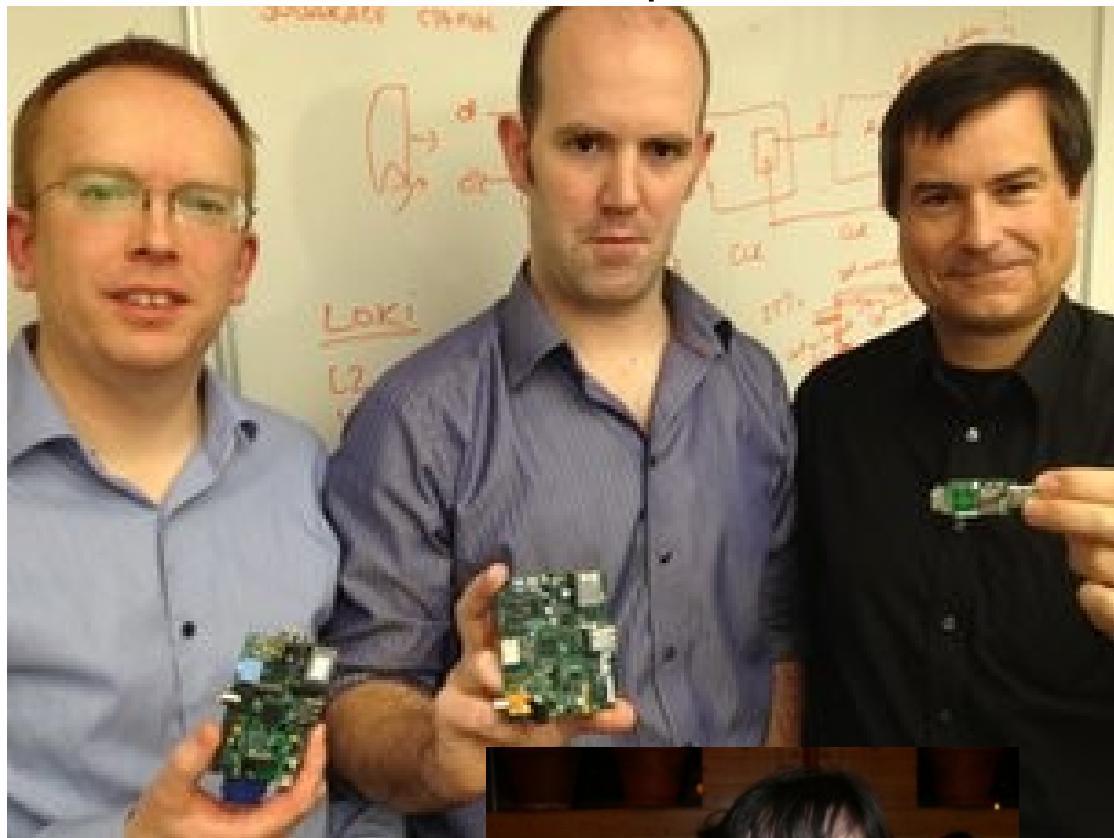


<http://www.flickr.com/photos/fotero/7697063016/>

Robert Mullins

Eben Upton

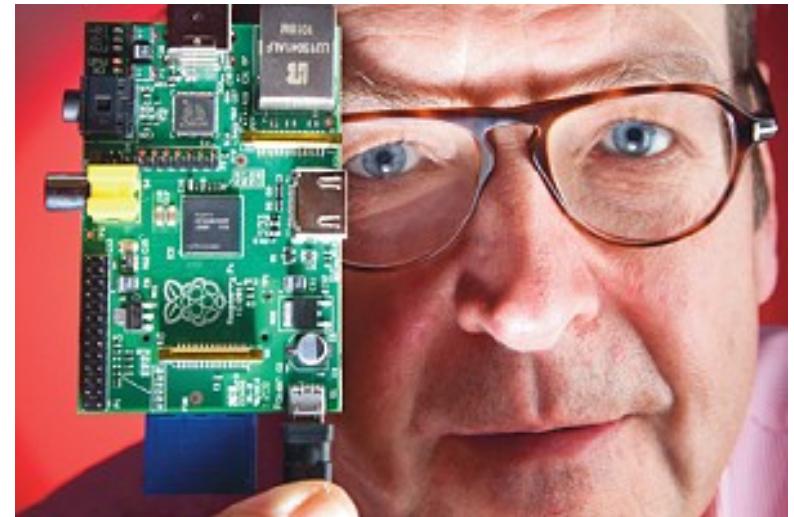
David Braben



Alan Mycroft



Liz



Jack Lang



A criação do Raspberry Pi - com Pete Lomas - Palco Principal - Campus Party Brasil - 01/02/2013 - Foto: Flávia de Quadros/indicefoto

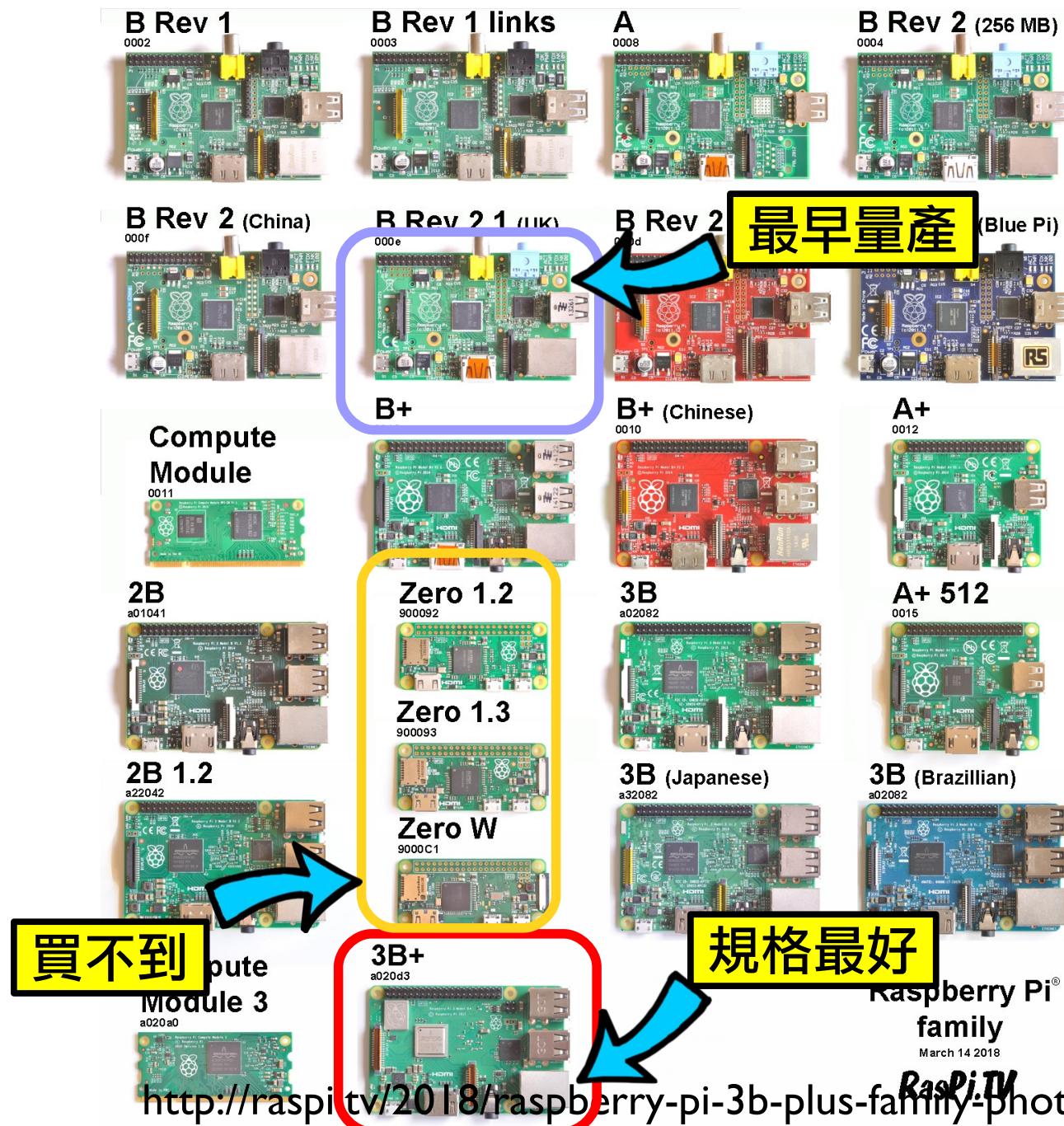
Pete Lomas

Raspberry Pi 是 ...

- RaspberryPi.org 基金會所設計開發
- 以低價硬體 & 自由軟體刺激電腦科學教育
- 公開的 datasheet & 線路圖 & 原始碼
- 由 Element14/RS Components 生產製造

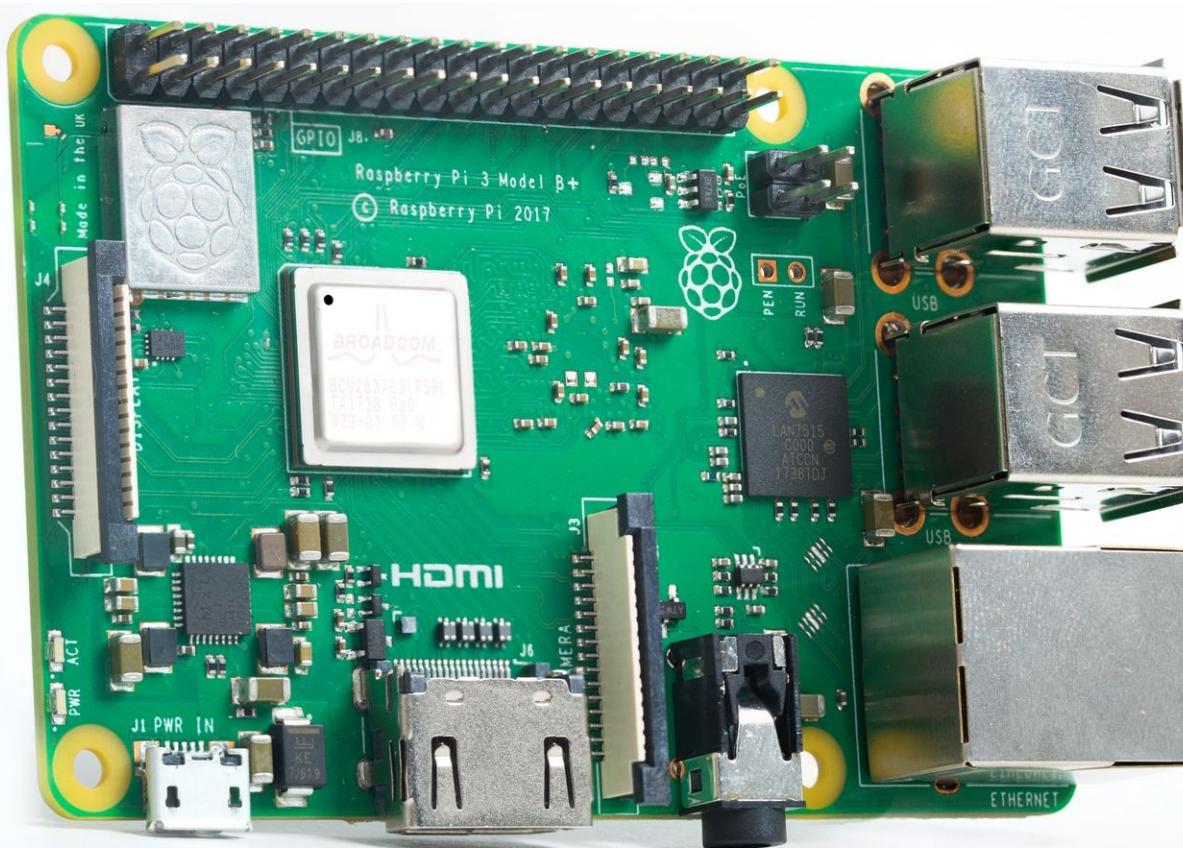


Raspberry Pi Family



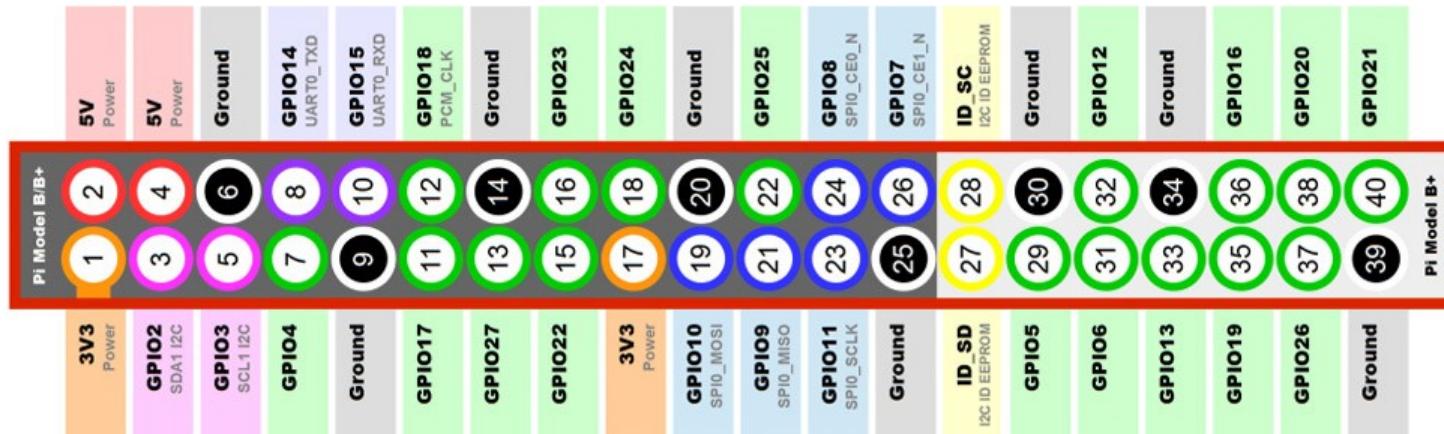
新版 Pi 3B+ 在 2018/3/14 釋出

- 更快 : CPU 從 1.2GHz 升級到 1.4GHz
- 雙頻 : WiFi 支援 5GHz , 藍牙支援 BT4.2



<http://www.flickr.com/photos/fotero/7697063016/>

Pi 3B+ 硬體規格與特色



Raspberry Pi 3 Model B+

GPIO 控制腳位

內建 WiFi 和 BT

Broadcom BCM2837B0, Cortex-A53
64-bit SoC @ 1.4GHz
with 1GB LPDDR2 SDRAM

Power over Ethernet (PoE) header
(requires separate PoE HAT)

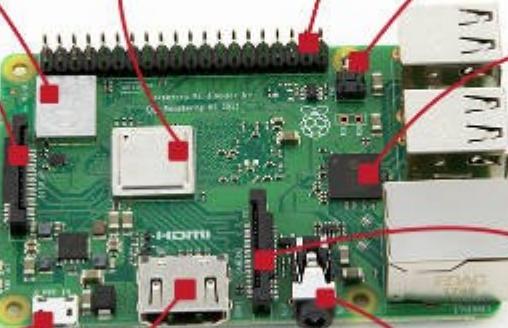
4 × USB 2.0 ports and
Faster Ethernet over USB 2.0
(maximum throughput 300Mbps)

可接相機模組

MPI-DSI display port

5W 2.5A DC via micro
USB connector

56mm

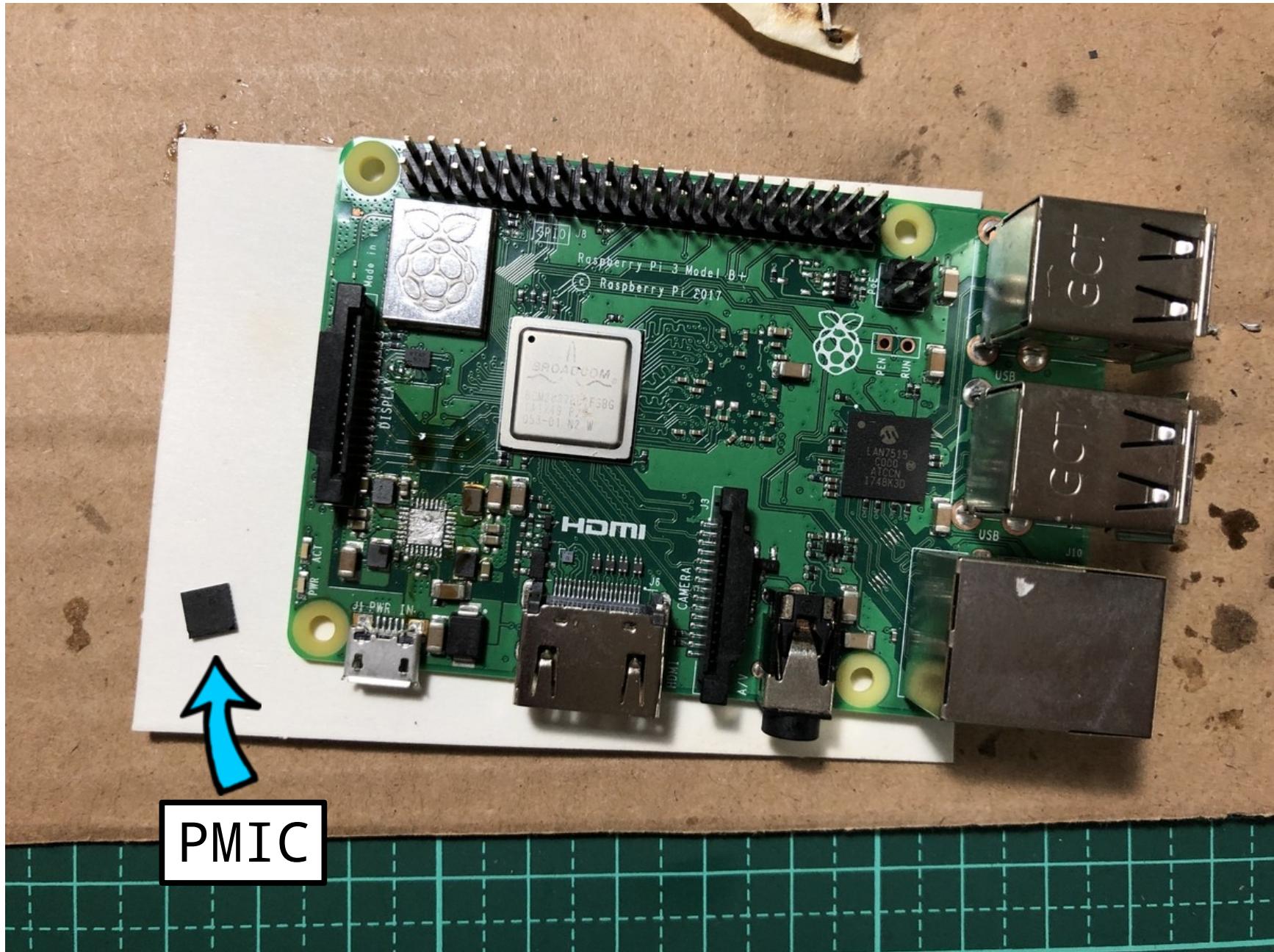


Full size HDMI

85mm

4 pole stereo output and composite video port

如果操作不良 Power IC 會被打壞



本投影片以 Pi 3B/3B+ 做為範例

今日環境

- 硬體 : Raspberry Pi 3B/3B+
- 作業系統 : 2019-04-08-raspbian-stretch-full
- 為了可以使用USB轉TTL傳輸線
 - 修改 /boot/config.txt , 新增三行
 - dtoverlay=pi3-miniuart-bt
 - core_freq=250
 - enable_uart=1
 - 修改 /boot/cmdline.txt , 將 quiet splash 的 quiet 移除

```
55 # Enable audio (loads snd_bcm2835)
56 dtparam=audio=on
57 dtoverlay=pi3-miniuart-bt
58 core_freq=250
59 enable_uart=1
```

新增三行

```
1 dwc_otg.lpm_enable=0 console=serial0,115200
    console=tty1 root=/dev/mmcblk0p2 rootfstype=
    ext4 elevator=deadline fsck.repair=yes rootw
    ait quiet splash plymouth.ignore-serial-con
    sole quiet init=/usr/lib/raspi-config/init_r
    esize.sh
```

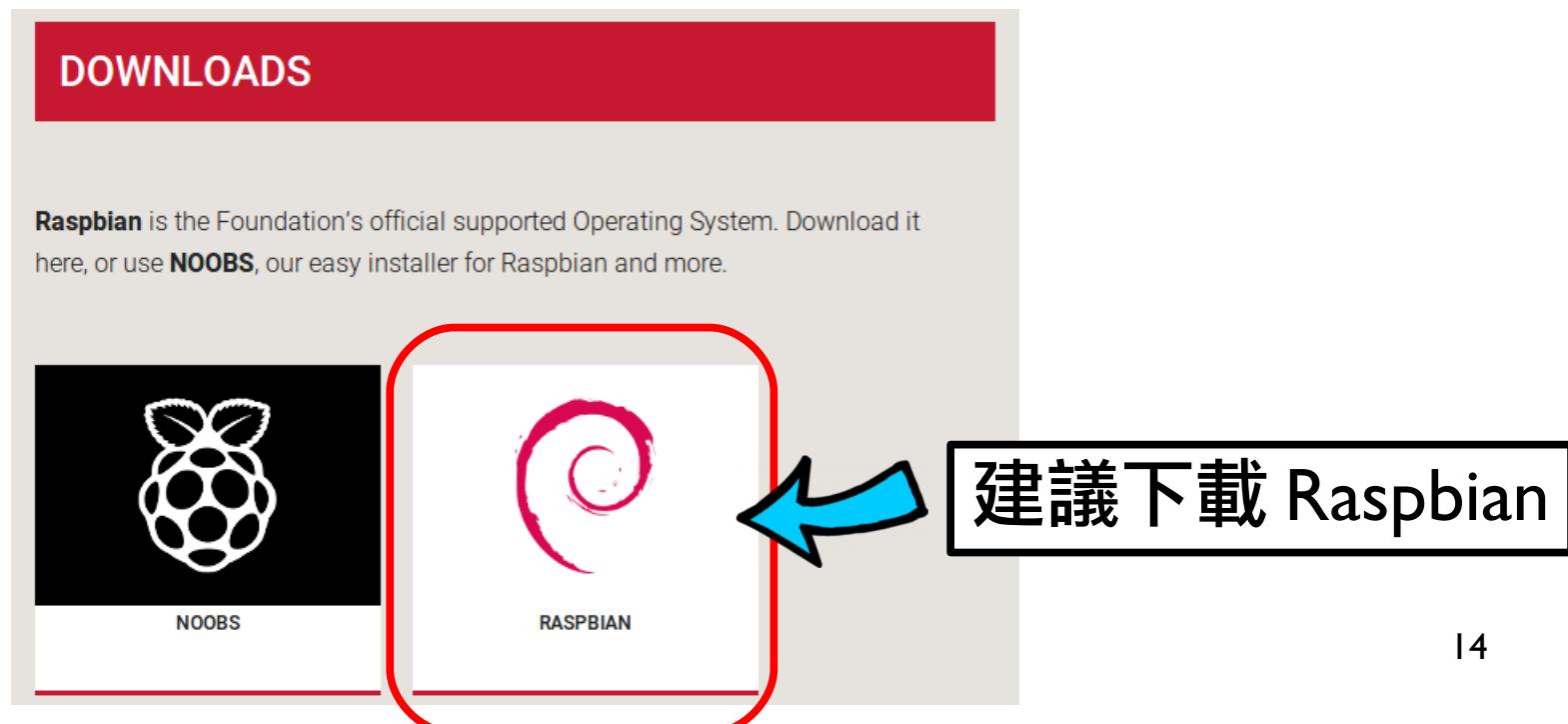
刪除 quiet

安裝 Raspberry Pi

- 步驟 1：下載映像檔 (image)
- 步驟 2：透過燒錄軟體將映像檔燒到 SD 卡
- 步驟 3：將 SD 卡插到 Raspberry Pi & 上電

步驟 I: 下載映像檔

- 官方下載網頁
 - <http://www.raspberrypi.org/downloads>
- 選擇映像檔 (image), 建議使用 Raspbian



Raspbian Stretch with Pixel

Raspbian Stretch with desktop and recommended software

Image with desktop and recommended software based on Debian Stretch

Version: April 2019

Release date: 2019-04-08

Kernel version: 4.14

[Release notes](#)

[Download Torrent](#)

[Download ZIP](#)

SHA-256: a3ced697ca0481bb0ab3b1bd42c93eb24de6264f4b70e
b33d83eb

Raspbian Stretch Lite

Minimal image based on Debian Stretch

Version: April 2019

Release date: 2019-04-08

Kernel version: 4.14

[Release notes](#)

[Download Torrent](#)

[Download ZIP](#)

SHA-256: 03ec326d45c6eb6cef848cf9ald6c7315a9410b49a276a6b28e67a40
b11fdfcf

Raspbian Stretch with desktop

Image with desktop based on Debian Stretch

Version: April 2019

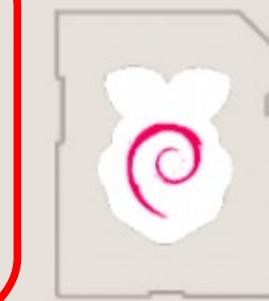
Release date: 2019-04-08

Kernel version: 4.14

[Release notes](#)

[Download Torrent](#)

[Download ZIP](#)



SHA-256: 7e10a446f8e57210d0e9ad02f0c833aabb86e58187b4dc02431aff5a
3f1ccb83

下載 Desktop+Software 版本



步驟 2: 下載燒錄軟體

- Windows 下載 Win32 Disk Imager
 - <http://sourceforge.net/projects/win32diskimager>

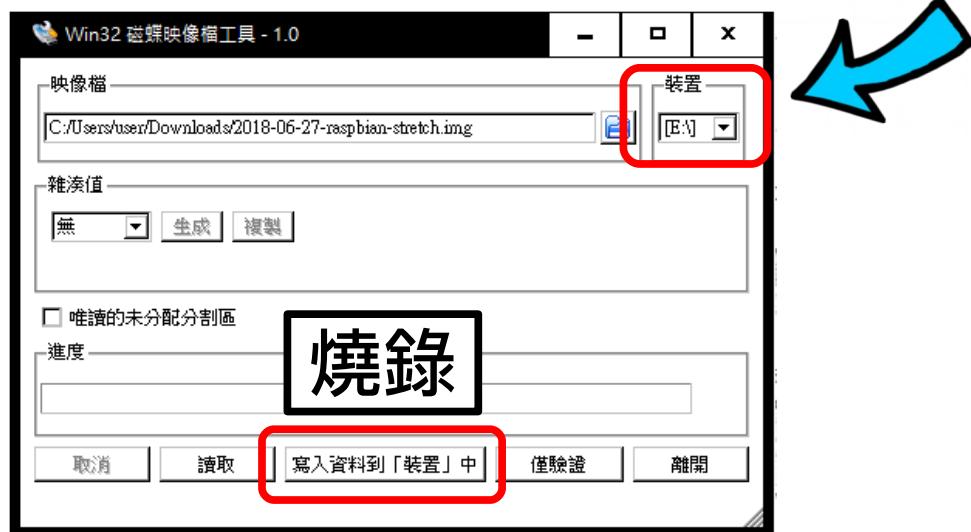
The screenshot shows a web browser displaying the SourceForge project page for 'Win32 Disk Imager'. The page has a dark header with the SourceForge logo and navigation links for Browse, Blog, Deals, Help, Create, Join, and Login. A search bar is at the top right. An advertisement for 'Excel Read/Write in .NET' is visible above the main content. Below the ad, a message encourages migrating from GitHub to SourceForge. The main content area features the project's logo, a brief description, and social sharing buttons. It also displays a 'PROJECT OF THE MONTH MAR 2014' badge. Key statistics shown are 94 reviews, 61,164 downloads this week, and the last update on 2018-06-07. A large green 'Download' button is prominent. The page footer includes links for Windows, Summary, Files, Reviews, Support, Wiki, Feature Requests, Bugs, Code, Mailing Lists, and Blog.

Win32 Disk Imager 燒錄映像檔

I. 還沒將 SD 卡插到電腦以前



3. 選擇 SD 卡位置後寫入映像檔

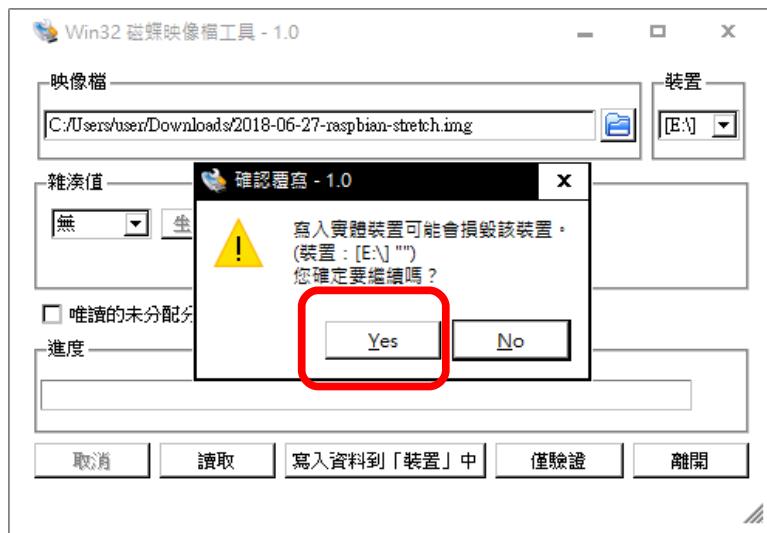


2. 將 SD 卡插到電腦以後

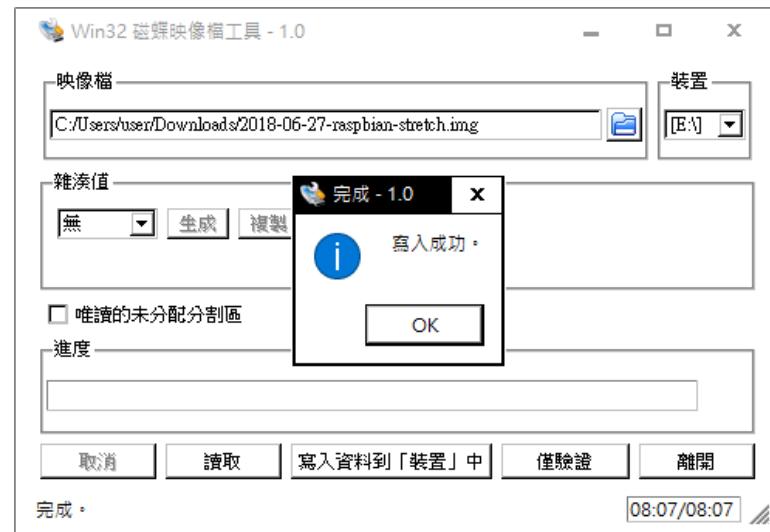


Win32 Disk Imager 燒錄映像檔

I. 確定燒錄



2. 完成燒錄



3. 出現兩個分割區 (partition)

名稱	類型	大小總計	可用空間
資料夾 (7)			
3D 物件	系統資料夾		
下載	系統資料夾		
文件	系統資料夾		
音樂	系統資料夾		
桌面	系統資料夾		
圖片	系統資料夾		
影片	系統資料夾		
裝置和磁碟機 (4)			
本機磁碟 (C:)	本機磁碟	58.8 GB	3.14 GB
本機磁碟 (D:)	本機磁碟	59.6 GB	8.97 GB
boot (E:)	USB 磁碟機	42.5 MB	20.8 MB
USB 磁碟機 (F:)	USB 磁碟機		

多長出一個分割區

將 microSD 卡退出後再插入

- Q: 怎麼只剩下 6xMB 了 ?
- A: 因為切成兩個分割區 , 一個是 FAT 一個是 EXT4

- Q: 為什麼不直接使用 ?
- 為了可以使用 USB 轉 TTL 傳輸線
 - 修改 /boot/config.txt , 新增三行
 - dtoverlay=pi3-miniuart-bt
 - core_freq=250
 - enable_uart=1

```
55 # Enable audio (loads snd_bcm2835)
56 dtparam=audio=on
57 dtoverlay=pi3-miniuart-bt
58 core_freq=250
59 enable_uart=1
```

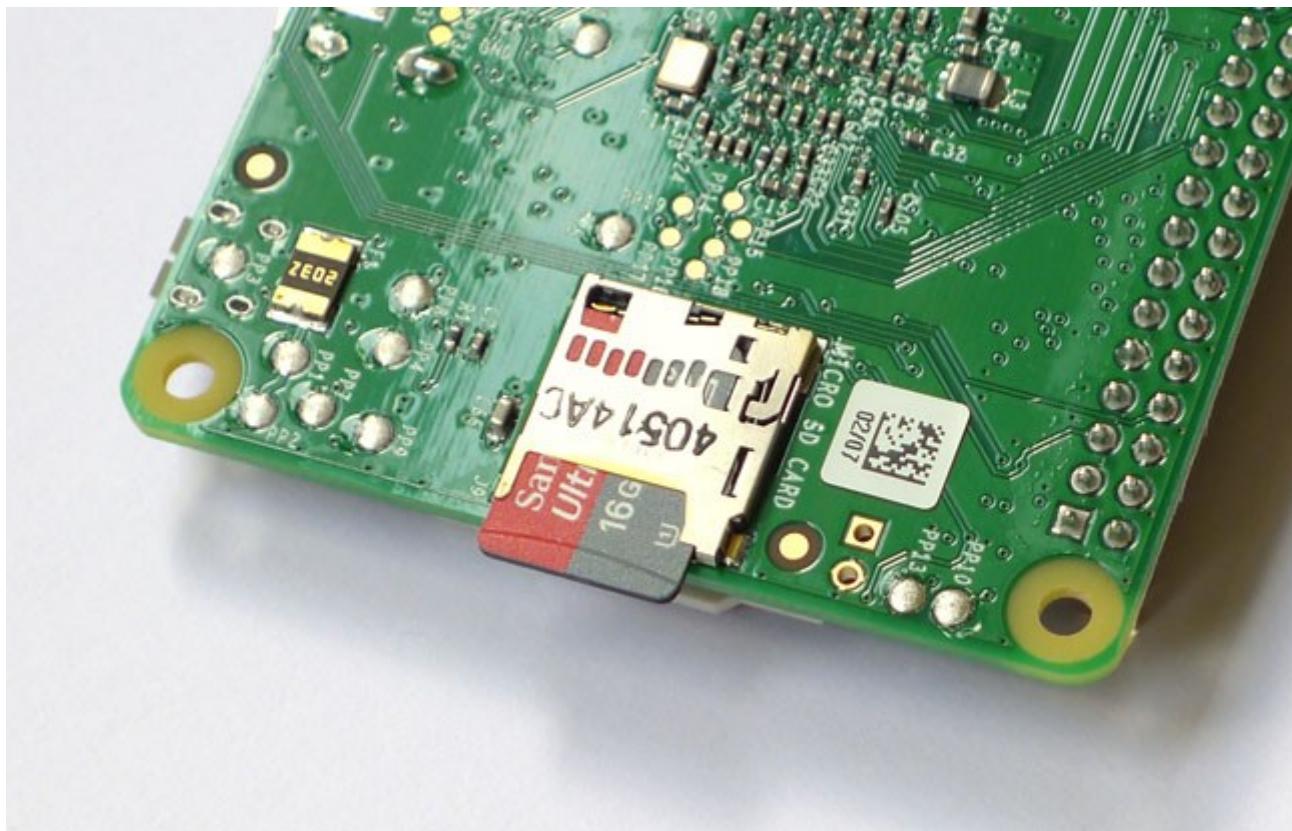
新增三行

- 修改 /boot/cmdline.txt , 將 quiet splash 的 quiet 移除

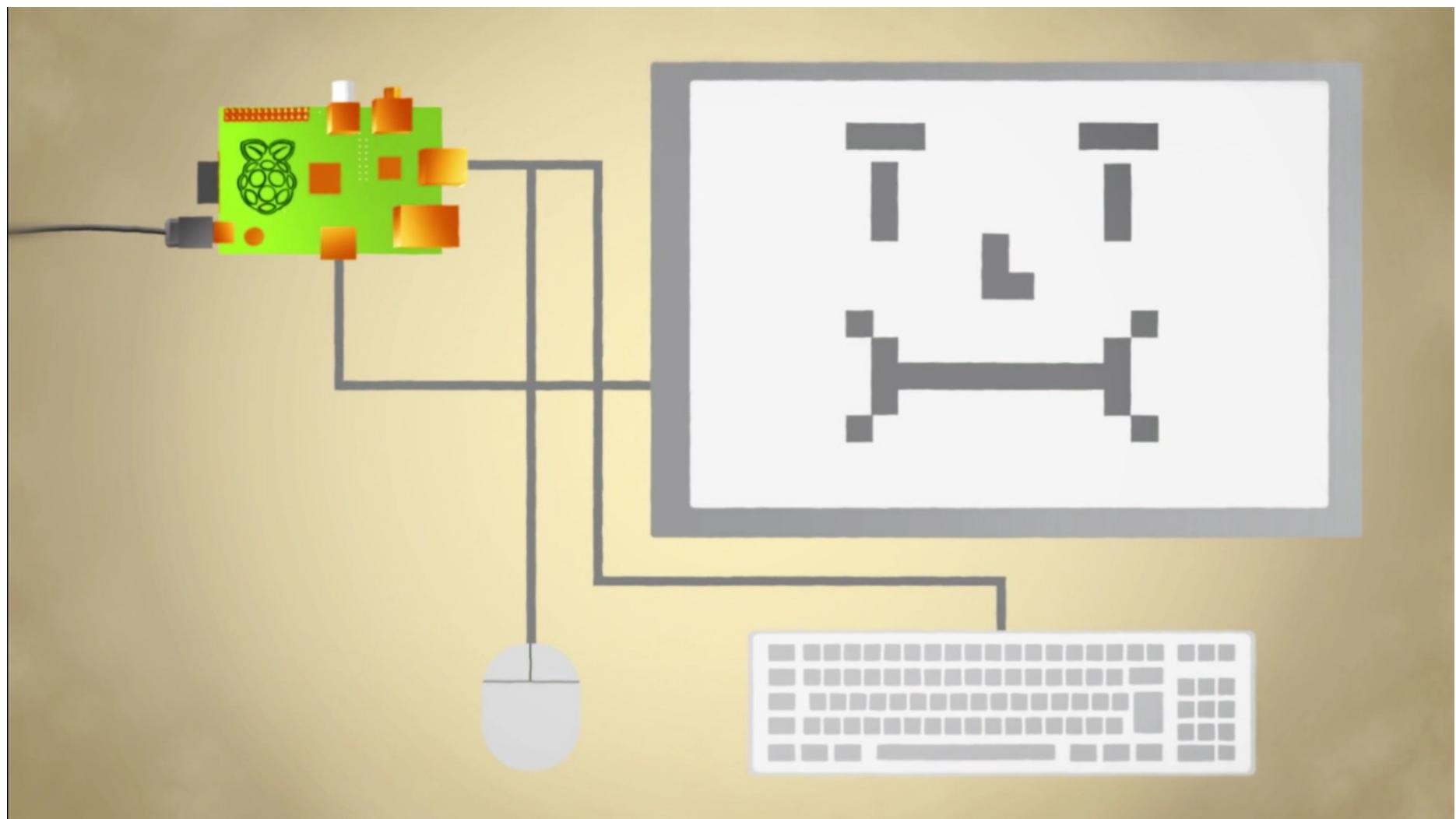
```
1 dwc_otg.lpm_enable=0 console=serial0,115200
    console=tty1 root=/dev/mmcblk0p2 rootfstype=
    ext4 elevator=deadline fsck.repair=yes rootw
    ait quiet splash plymouth.ignore-serial-con
    sole quiet init=/usr/lib/raspi-config/init_r
    esize.sh
```

刪除 quiet

再將 microSD 卡插到 Pi 上



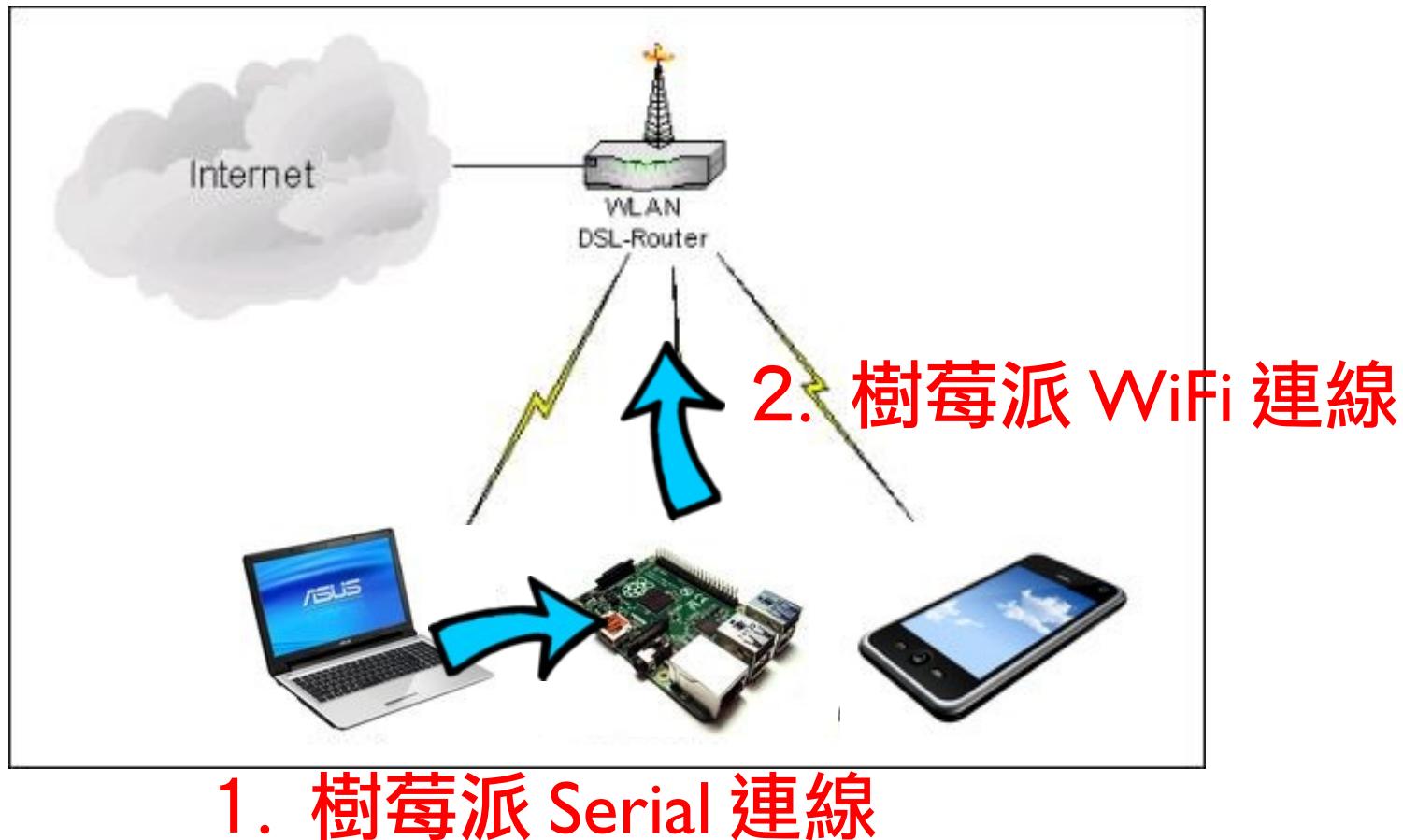
接上螢幕、滑鼠和鍵盤



沒有螢幕與鍵盤如何使用樹莓派？

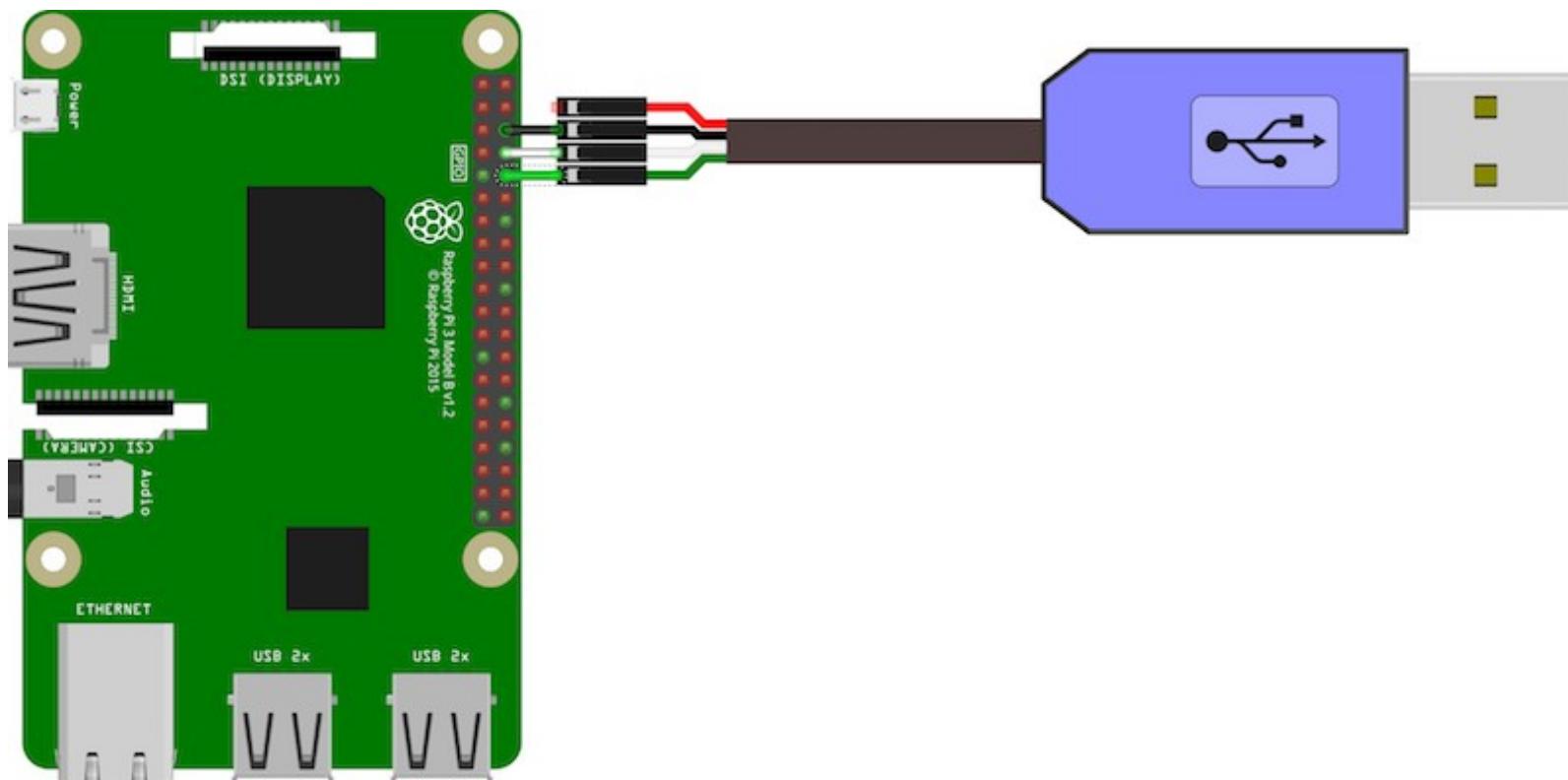
環境設定 : Serial + WiFi

用 Serial 來設定 WiFi

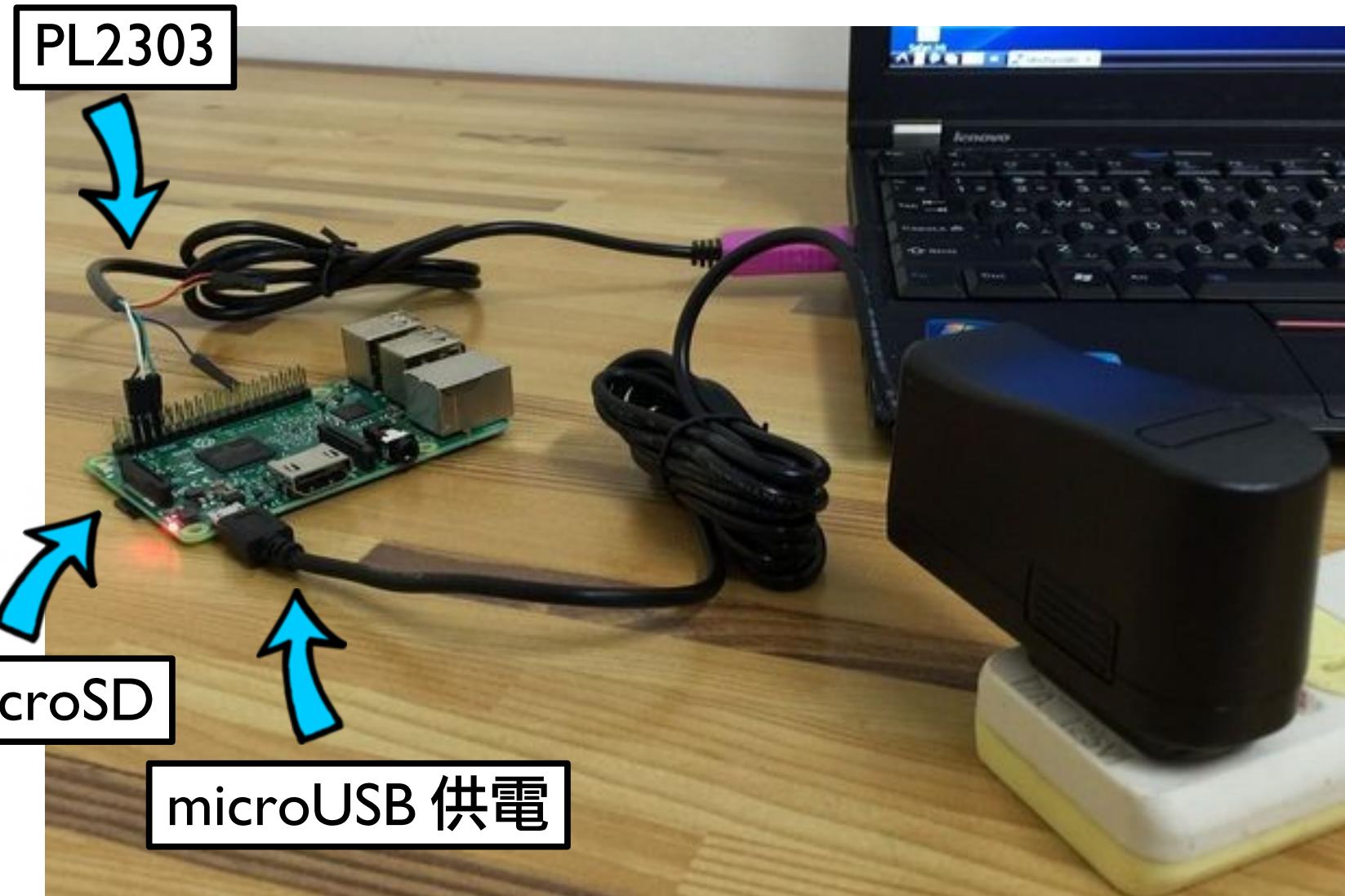


Serial 連線方式

- 以 USB 轉 TTL 傳輸線和 Pi 相連
- 接線：黑色 / 白色 / 綠色照圖接，紅色不接

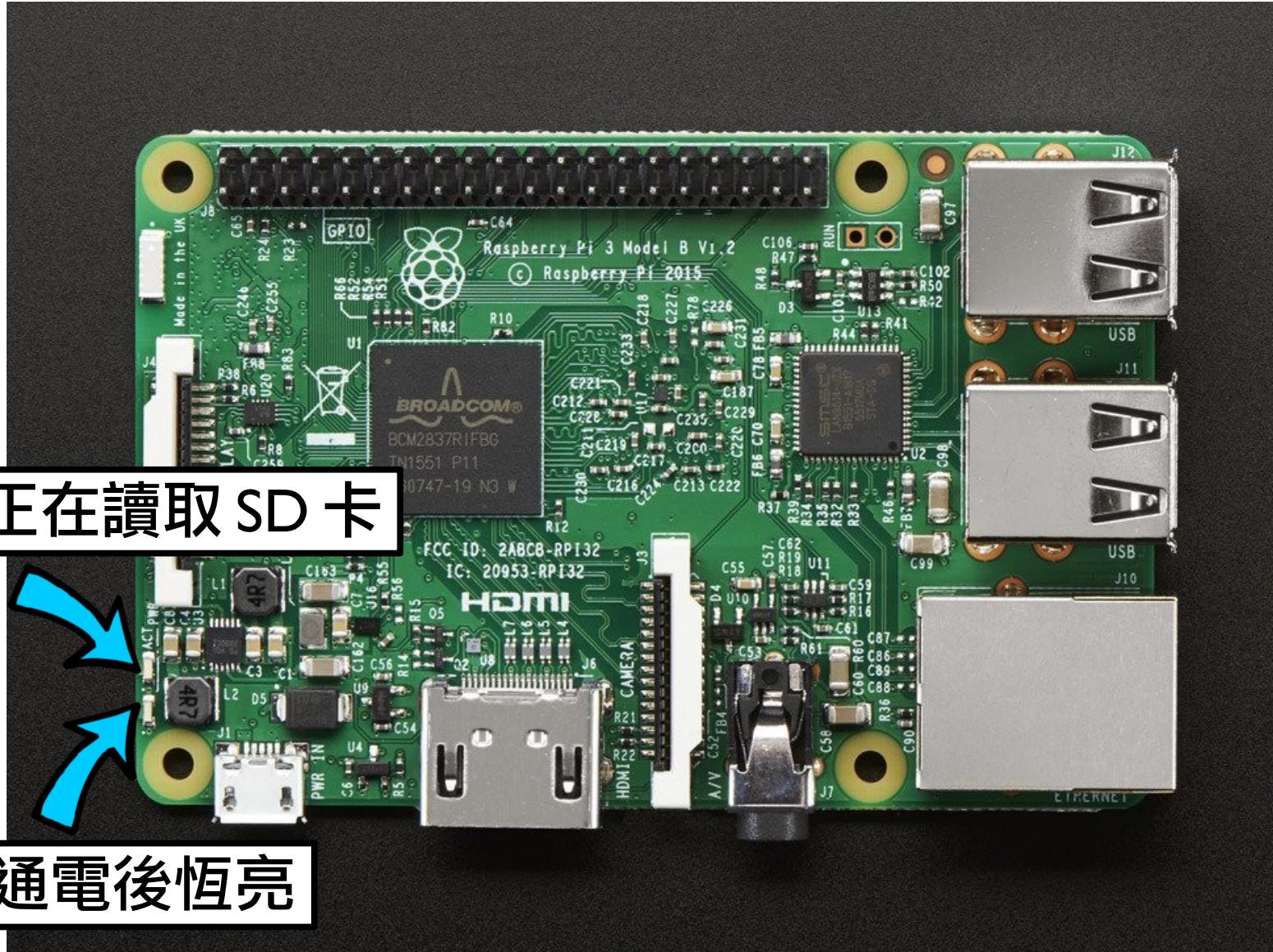


PL2303 接好後上電



常用

燈號



PWR: 通電後恆亮

Serial Port in Windows

這是大歐

- 安裝驅動程式 , <http://goo.gl/QC5Q30>

I SIO (Smart-IO) > USB to UART/Serial/Printer > PL2303 Windows Driver Download

PL2303 Windows Driver Download USB to UART RS232 Serial

Standard
Driver

Driver Installer	File	Installer Version	OS Support
Standard Driver	Download file	1.20.0 (2018-7-30)	Windows XP/7/8/10 - WDF Driver: v3.8.25.0 (7/12/2018) - Windows - WDM Driver: v3.8.24.0 (7/05/2018) - Windows

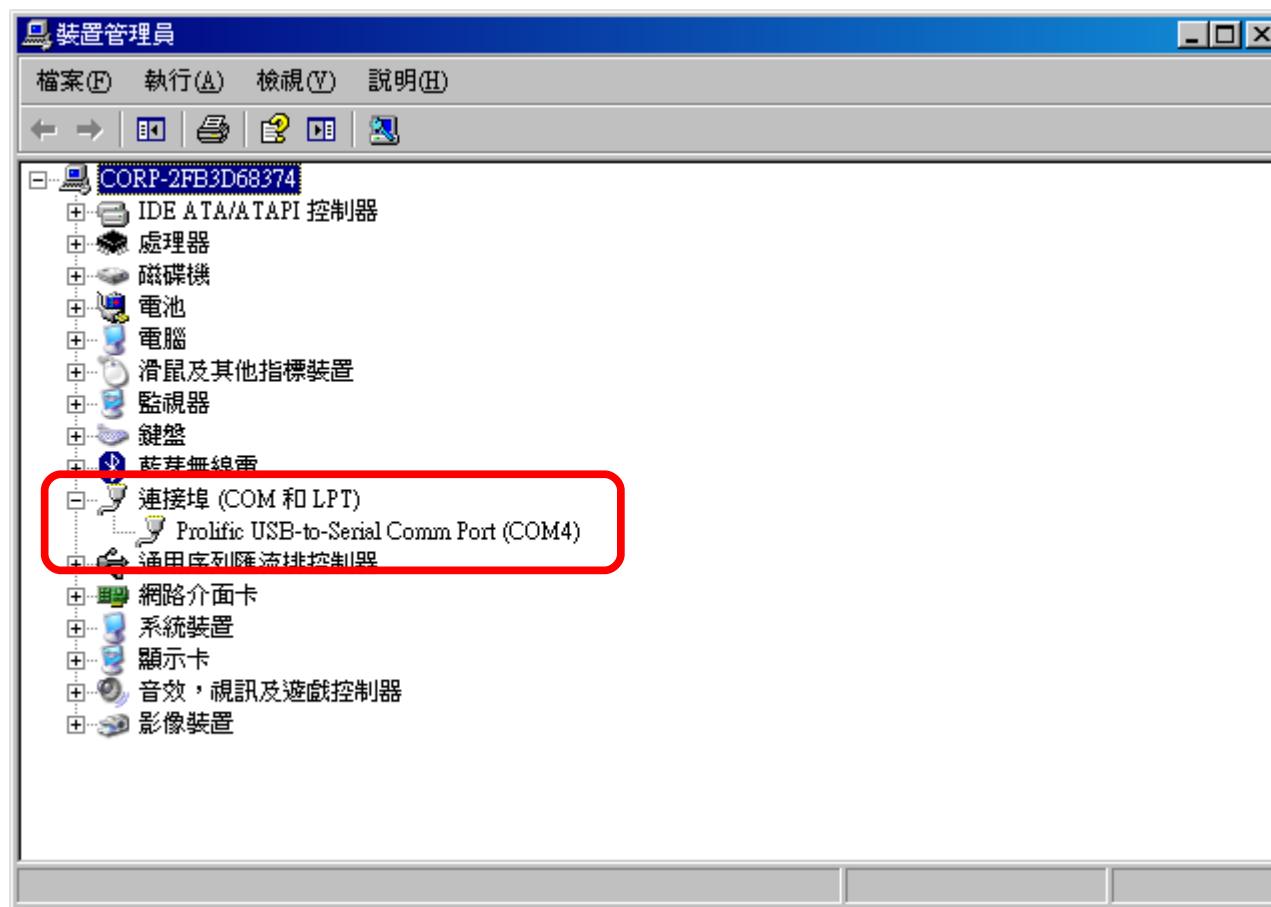
版本號可能不同

- 解壓縮後 , 執行 DriverInstaller_vXXXX.exe

..		
PL2303 Windows Driver User Manual v1.16.0.pdf		1 529 066
PL2303_DriverInstallerv1.16.0_ReleaseNote.txt		11 503
Windows Hardware Certification.pdf		43 980
PL2303_Prolific_DriverInstaller_v1160.exe		3 701 580
PL2303CheckChipVersion_ReadMe.txt		1 763
checkChipVersion_v1006.exe		212 992

Serial Port in Windows

- 從裝置管理員找到 COM 的埠號 (本例為 COM4)



Serial Port in Windows - 2

- 下載 putty , <http://goo.gl/zdD9G9>

Alternative binary files

The installer packages above will provide all of these (except PuTTYtel), but you can download them one by one if you prefer.

(Not sure whether you want the 32-bit or the 64-bit version? Read the [FAQ entry](#).)

putty.exe (the SSH and Telnet client itself)

32-bit: [putty.exe](#)

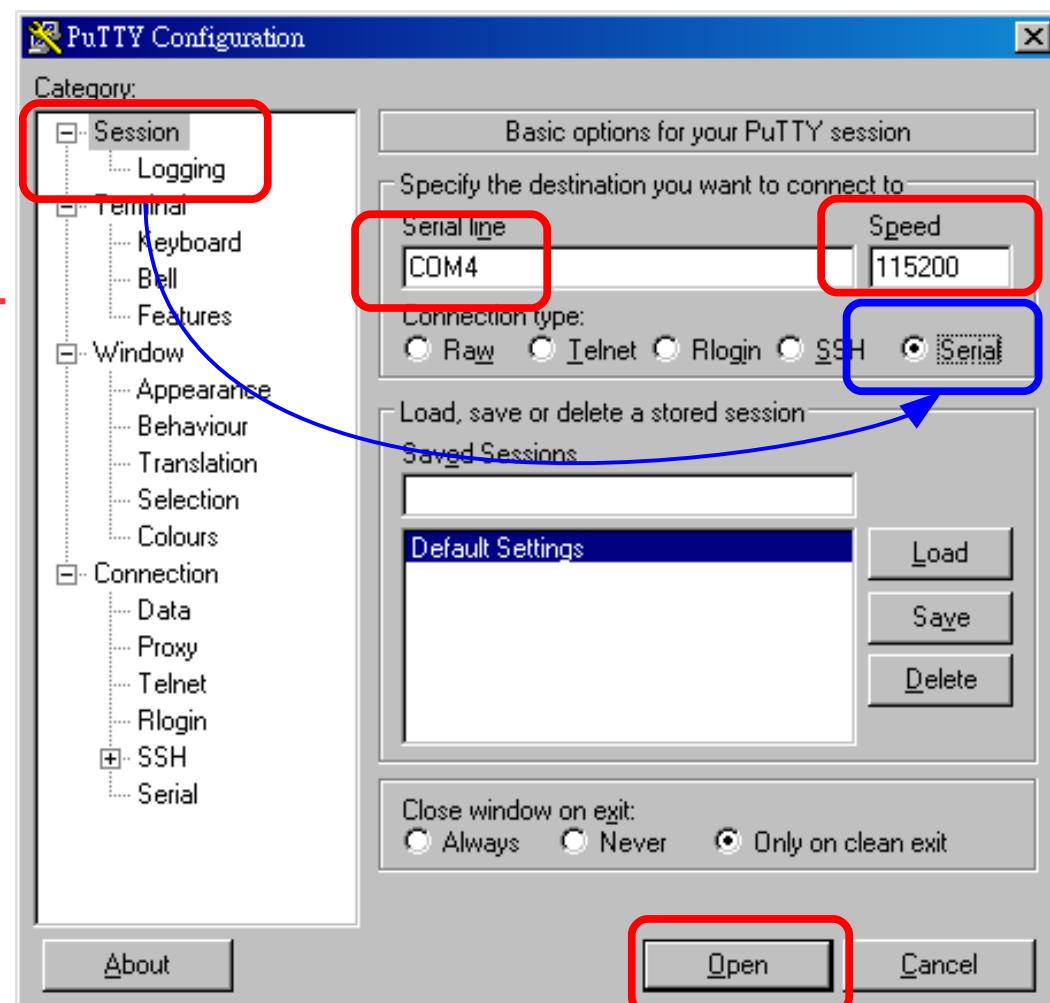
[\(or by FTP\)](#) [\(signature\)](#)

64-bit: [putty.exe](#)

[\(or by FTP\)](#) [\(signature\)](#)

Serial Port in Windows - 3

- 執行 putty
 - 1. 選擇 Session
 - 2. 選擇 Serial
 - 3. Serial line 填 COM4
 - 4. Speed 填入 115200
 - 5. Open!
- 沒畫面，先按 ENTER
- 再不行，重插拔電源



連線成功



```
[ 4.041899] usb 1-1.3.2: New USB device found, idVendor=04b3, idProduct=3025
[ 4.041909] usb 1-1.3.2: New USB device strings: Mfr=1, Product=2, SerialNumber=0
[ 4.041916] usb 1-1.3.2: Product: USB NetVista Full Width Keyboard
[ 4.041922] usb 1-1.3.2: Manufacturer: CHICONY
[ 4.097118] i2c /dev entries driver
[ 4.099913] input: CHICONY USB NetVista Full Width Keyboard as /devices/platform/soc/3f980000.usb/usb1/1/1-1.3/1-1.3.2:1.0/0003:04B3:3025.0001/input/input0
[ 4.161827] hid-generic 0003:04B3:3025.0001: input,hidraw0: USB HID v1.10 Keyboard [CHICONY USB NetVista Full Width Keyboard] on usb-3f980000.usb-1.3.2/input0
[ 4.270713] usb 1-1.3.3: new low-speed USB device number 6 using dwc_otg
[ 4.416582] usb 1-1.3.3: New USB device found, idVendor=17ef, idProduct=6019
[ 4.416592] usb 1-1.3.3: New USB device strings: Mfr=0, Product=2, SerialNumber=0
[ 4.416599] usb 1-1.3.3: Product: Lenovo Optical USB Mouse
[ 4.464274] input: Lenovo Optical USB Mouse as /devices/platform/soc/3f980000.usb/usb1/1/1-1.3/1-1.3.3:1.0/0003:17EF:6019.0002/input/input1
[ 4.492758] hid-generic 0003:17EF:6019.0002: input,hidraw1: USB HID v1.11 Mouse [Lenovo Optical USB Mouse] on usb-3f980000.usb-1.3.3/input0

Raspbian GNU/Linux 9 raspberrypi ttyAMA0
raspberrypi login:
```

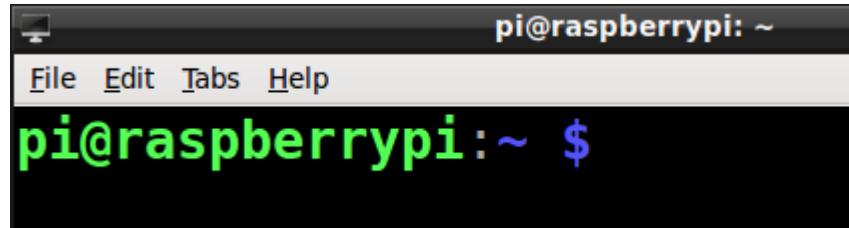
- 預設帳號 pi，密碼 raspberry
- 沒畫面，先按 ENTER，再不行，將電源重新插拔
- 如果出現亂碼，確定 speed 為 115200

Serial Port in Mac

- 安裝驅動程式 , <http://goo.gl/htlt3F>
- 重開機生效
- \$ ls /dev/cu*
 - 如果有 /dev/cu.usbserial
- \$ screen /dev/cu.usbserial 115200
 - 如果沒畫面，重新插拔電源 (PL2303 不要拔)

符號說明

- 登入畫面



- **pi** 是登入的使用者
- **@** 表示”在”
- **raspberrypi** 是主機名稱
- **~** 表示在 '家目錄' (home directory)
- **\$** 表示使用者所使用的 shell (一種文字工具介面)

投影片符號說明

- \$ 開頭表示這一行是指令
- 範例 : \$ ls

```
pi@raspberrypi:~ $ ls  
Desktop    Downloads  Pictures  python_games  Videos  
Documents  Music      Public     Templates
```

- 範例 : \$ ls Documents

```
pi@raspberrypi:~ $ ls Documents/  
BlueJ Projects  Greenfoot Projects  Scratch Projects
```

你必須知道的 Linux 指令

- \$ cd <目錄> # 跳到 <目錄>
 - \$ cd .. # 回上一層
 - \$ cd ~ # 回 <家目錄>
- \$ pwd # 查看目前工作目錄
- \$ ls # 列出檔案與目錄
- \$ sudo reboot # 重開機
- \$ sudo poweroff # 關機

常用

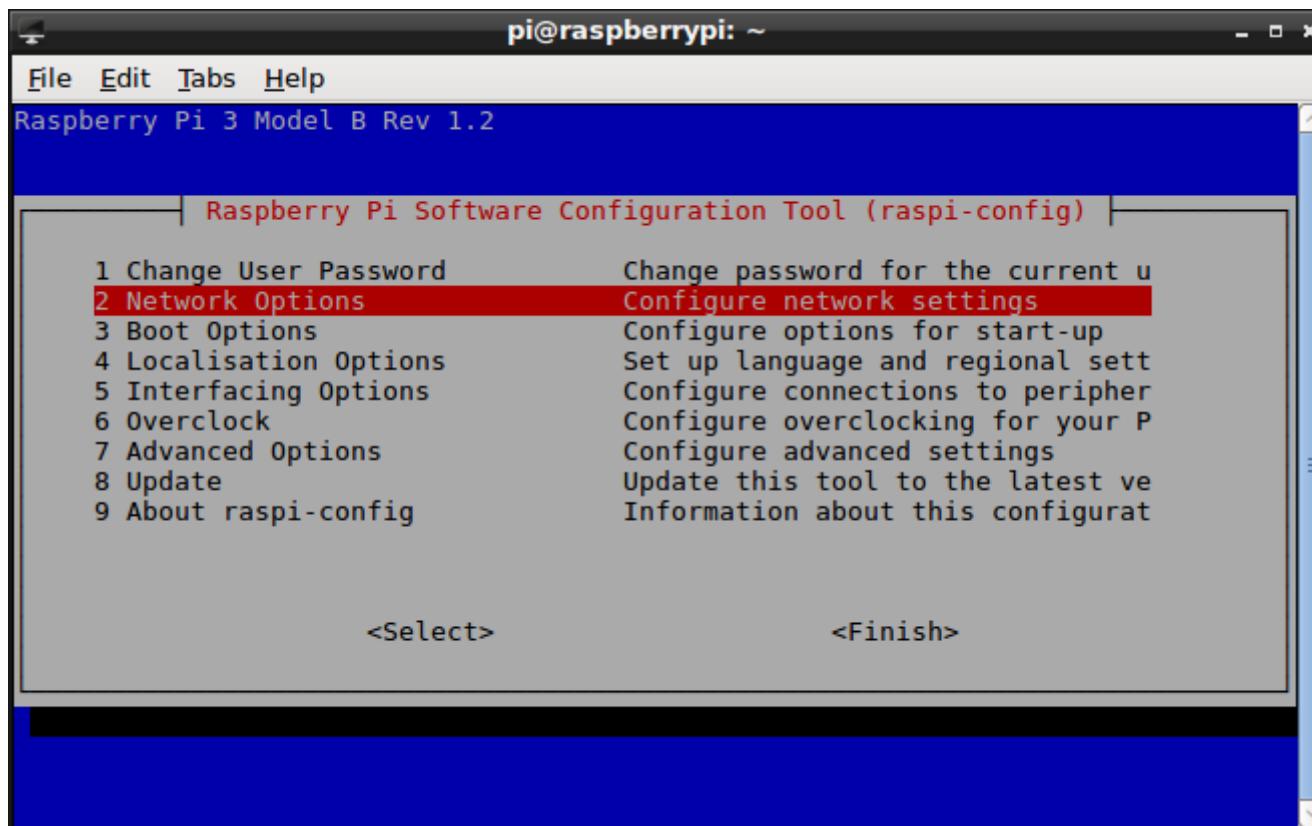
shell 好幫手

- 按 '上' 鍵重複執行命令
 - \$ [↑]
- 打過什麼指令？
 - \$ history
- 按 'tab' 自動補完
 - \$ [tab]

常用

設定 WiFi

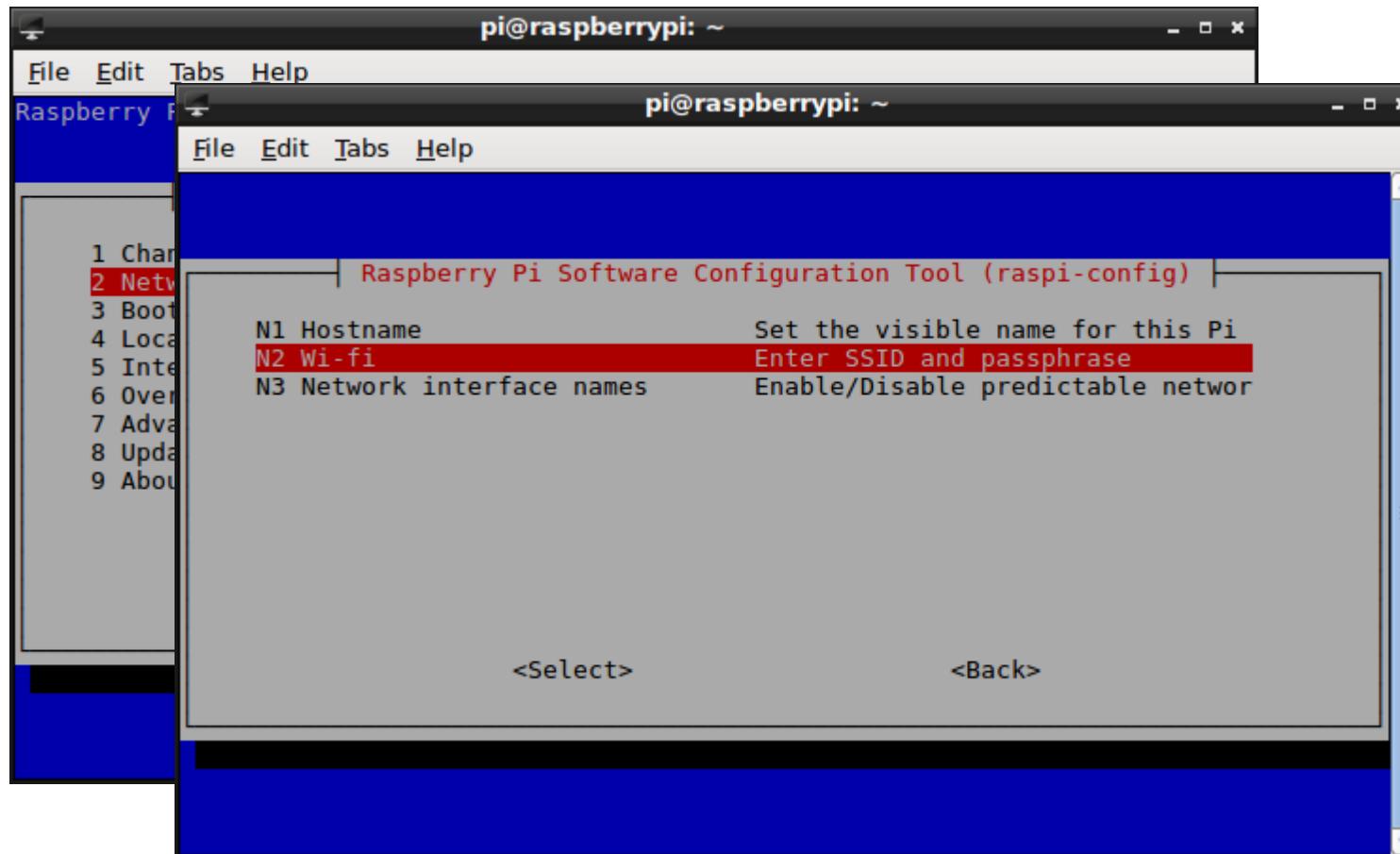
- \$ sudo raspi-config



常用

設定 WiFi

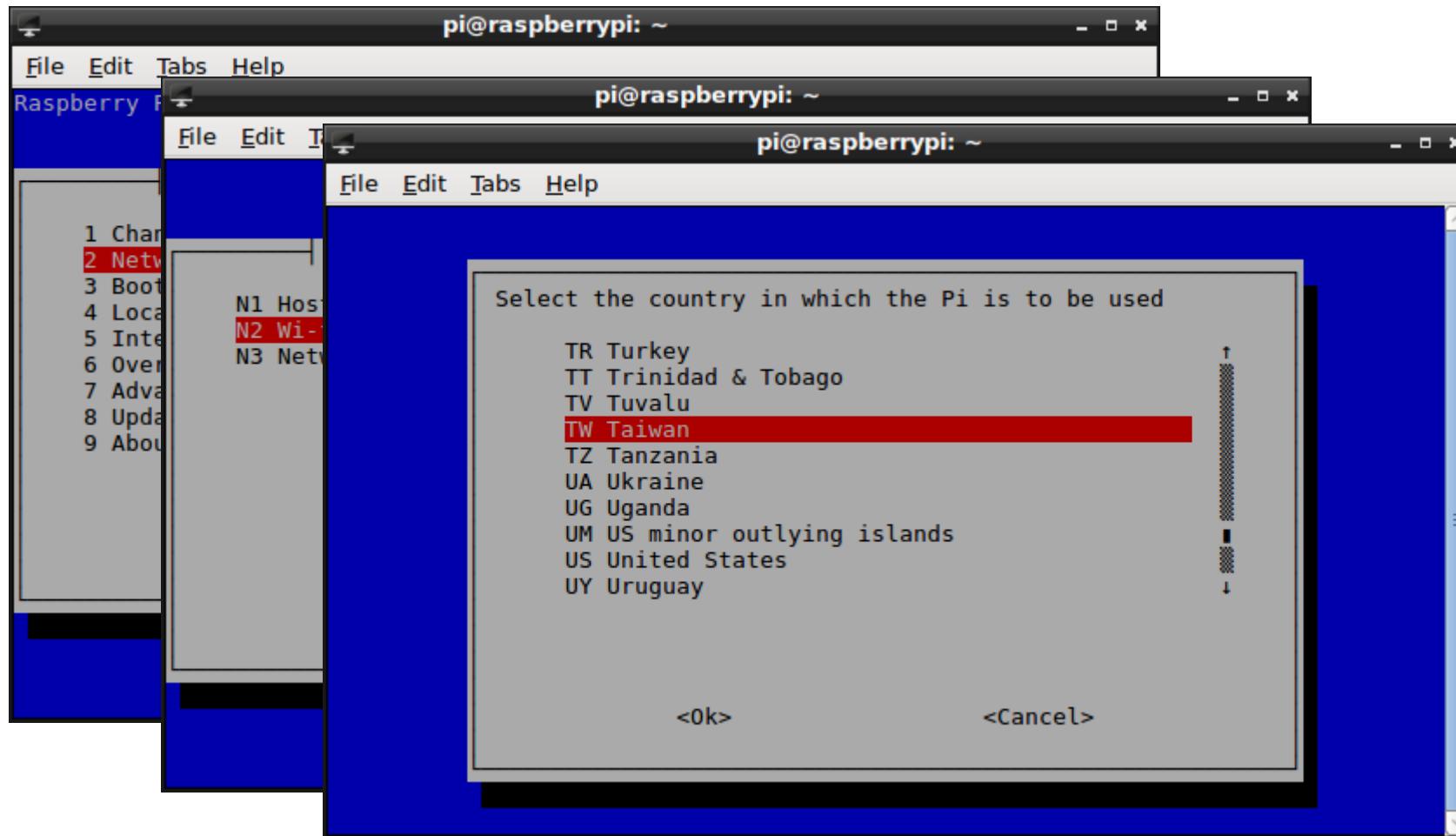
- \$ sudo raspi-config



常用

設定 WiFi

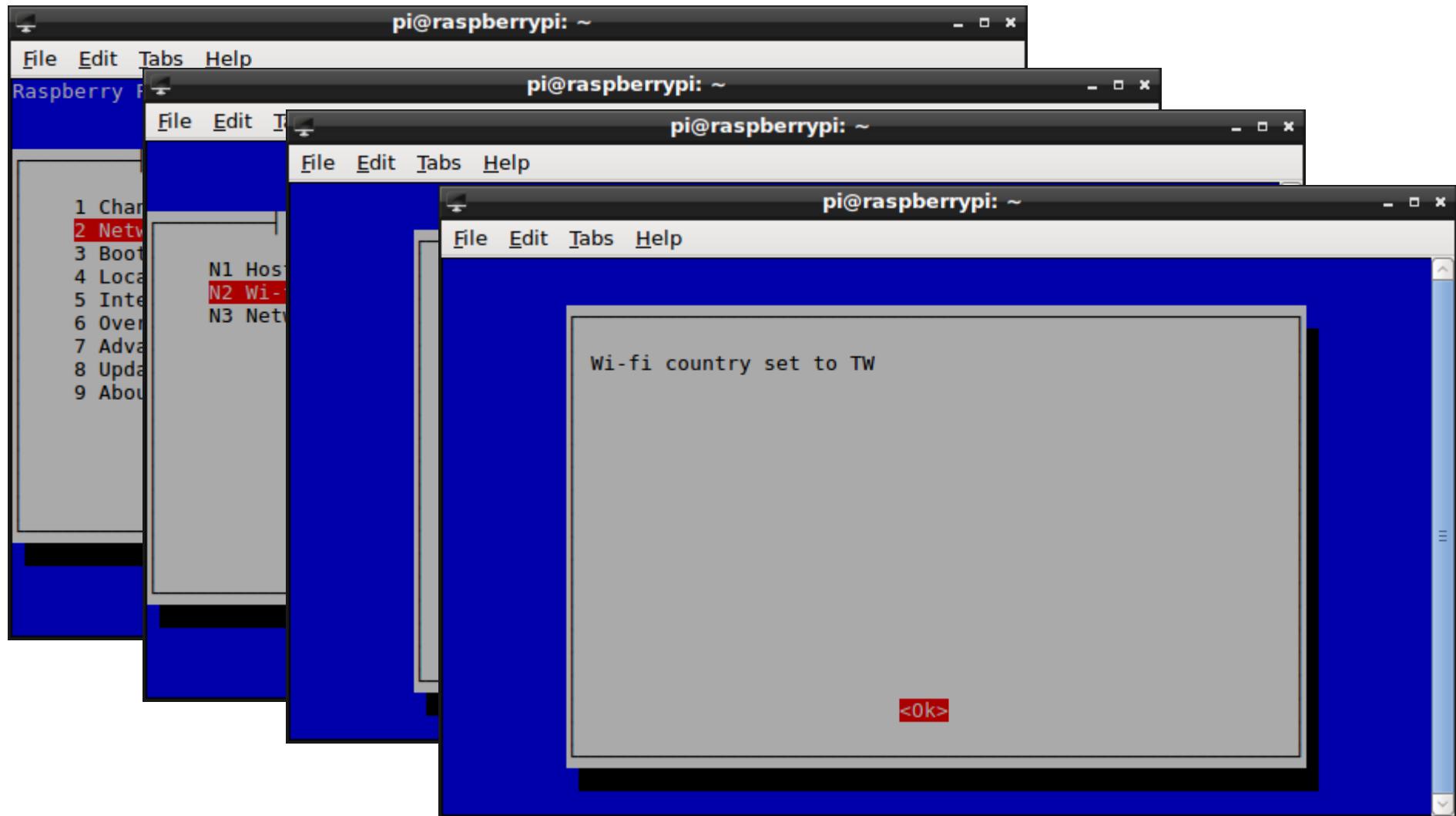
- \$ sudo raspi-config



常用

設定 WiFi

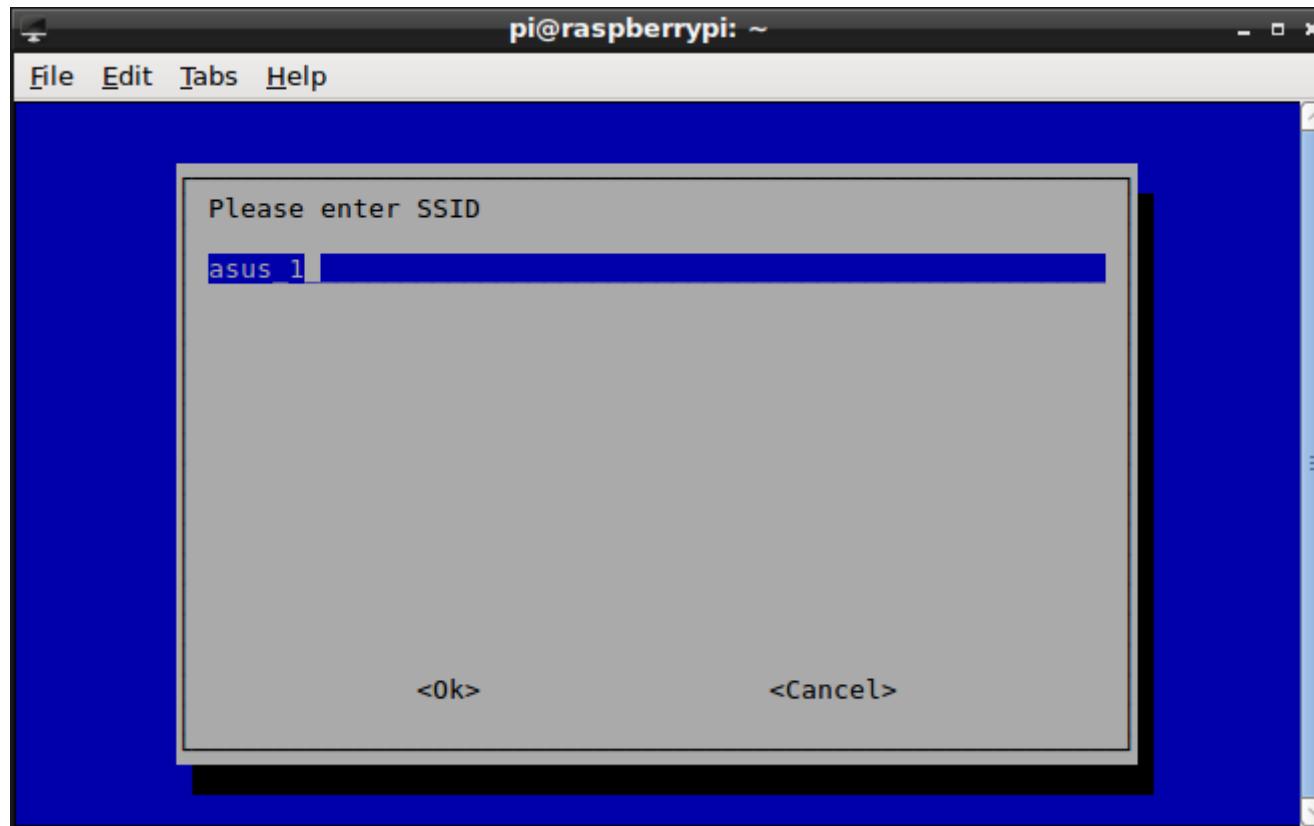
- \$ sudo raspi-config



常用

設定 WiFi

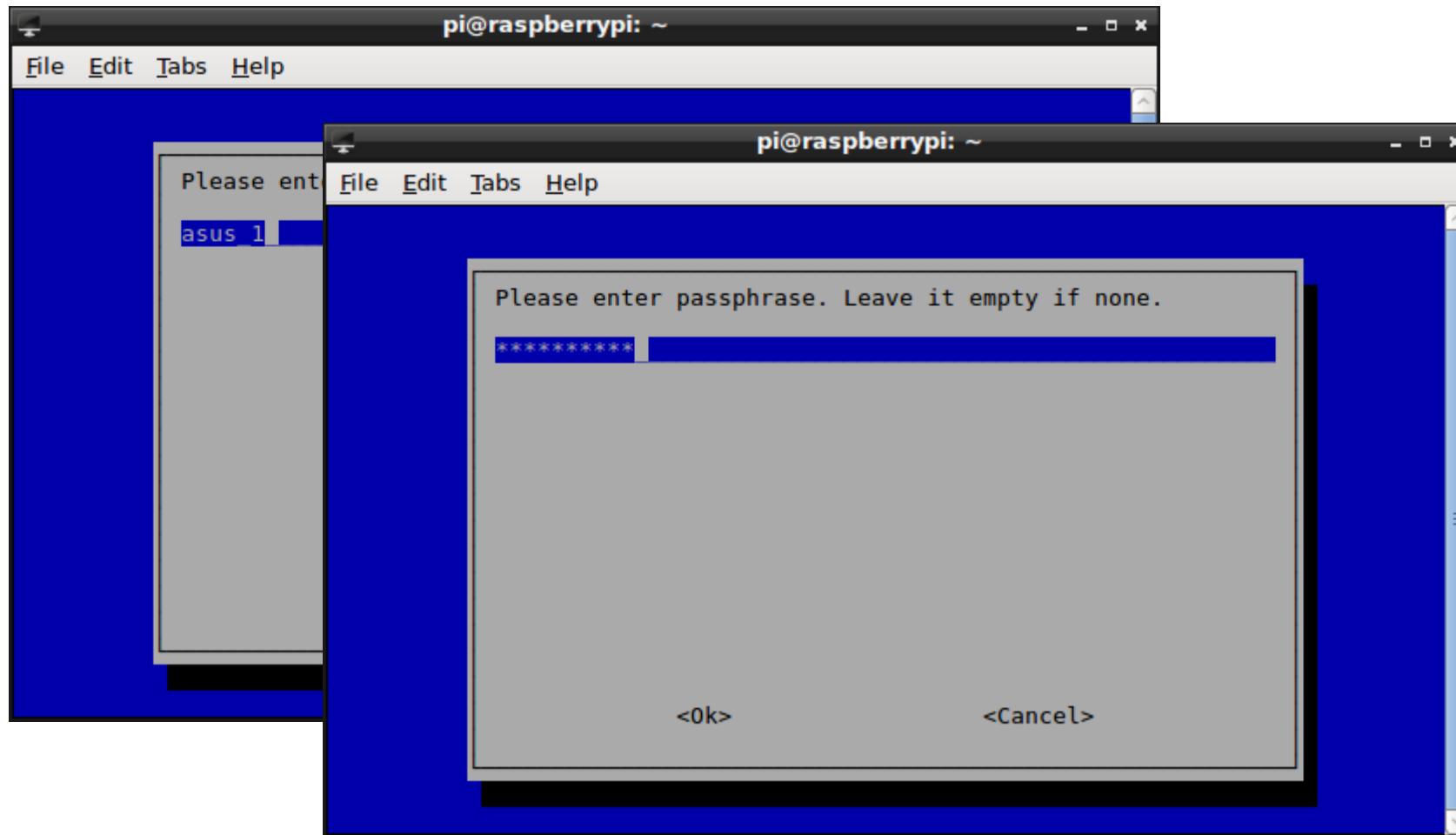
- \$ sudo raspi-config



常用

設定 WiFi

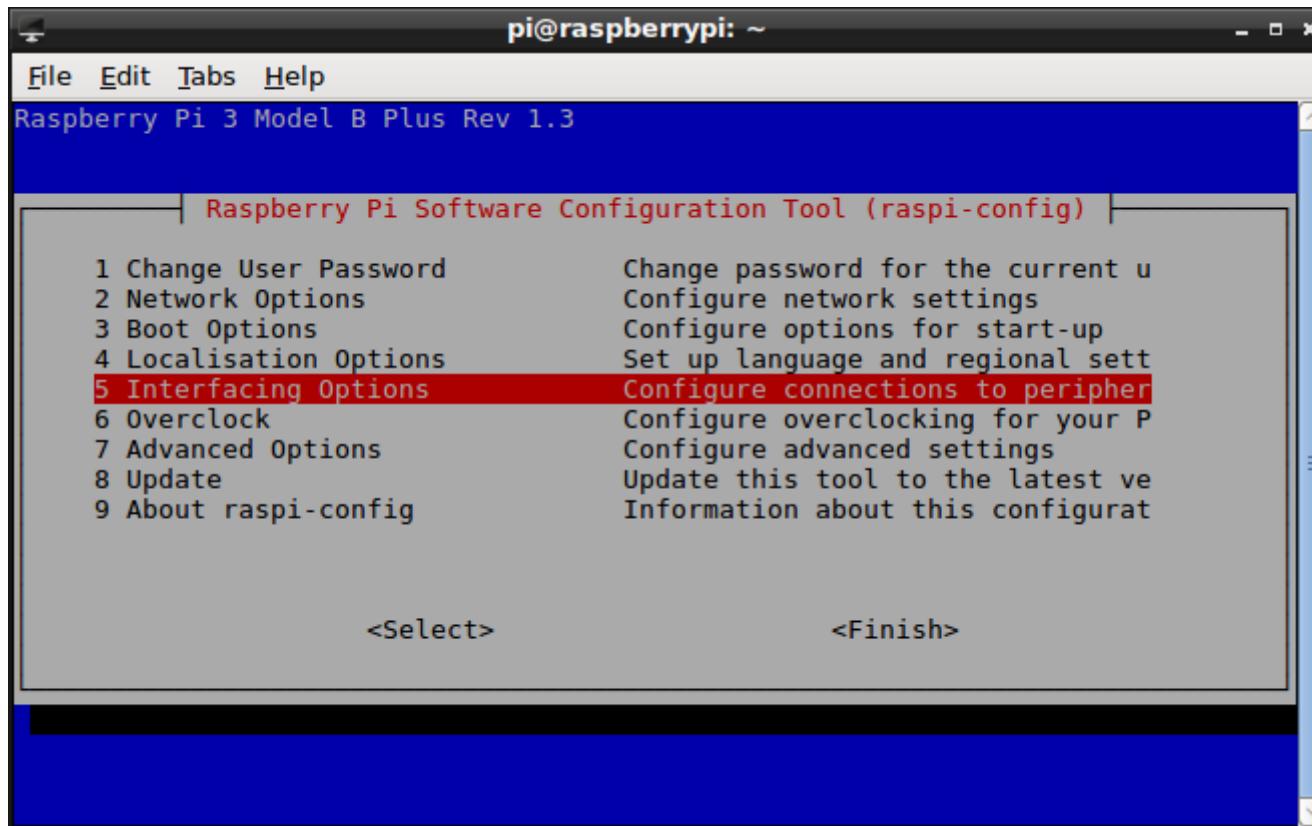
- \$ sudo raspi-config



常用

開啟 SSH 服務

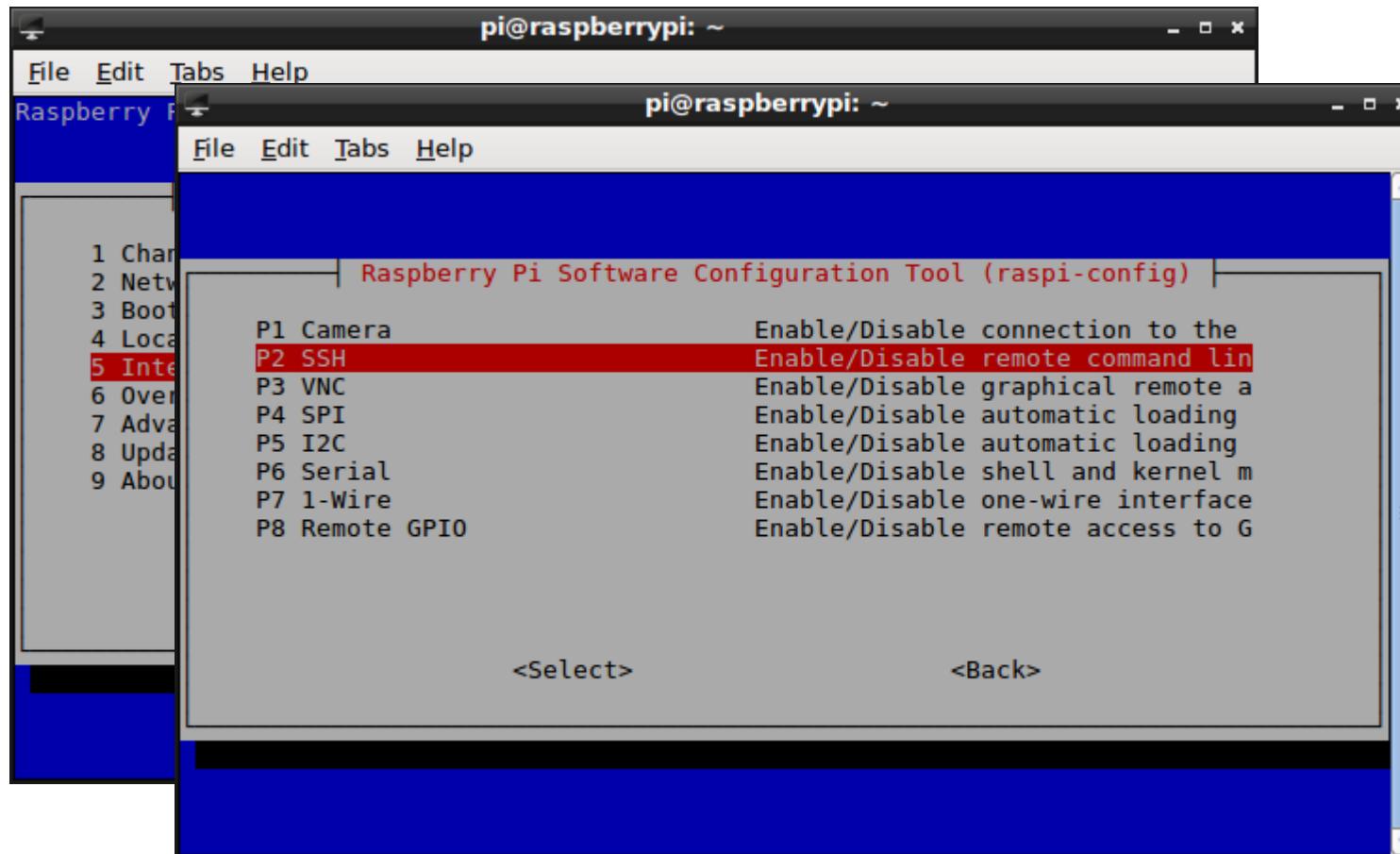
- \$ sudo raspi-config



常用

開啟 SSH 服務

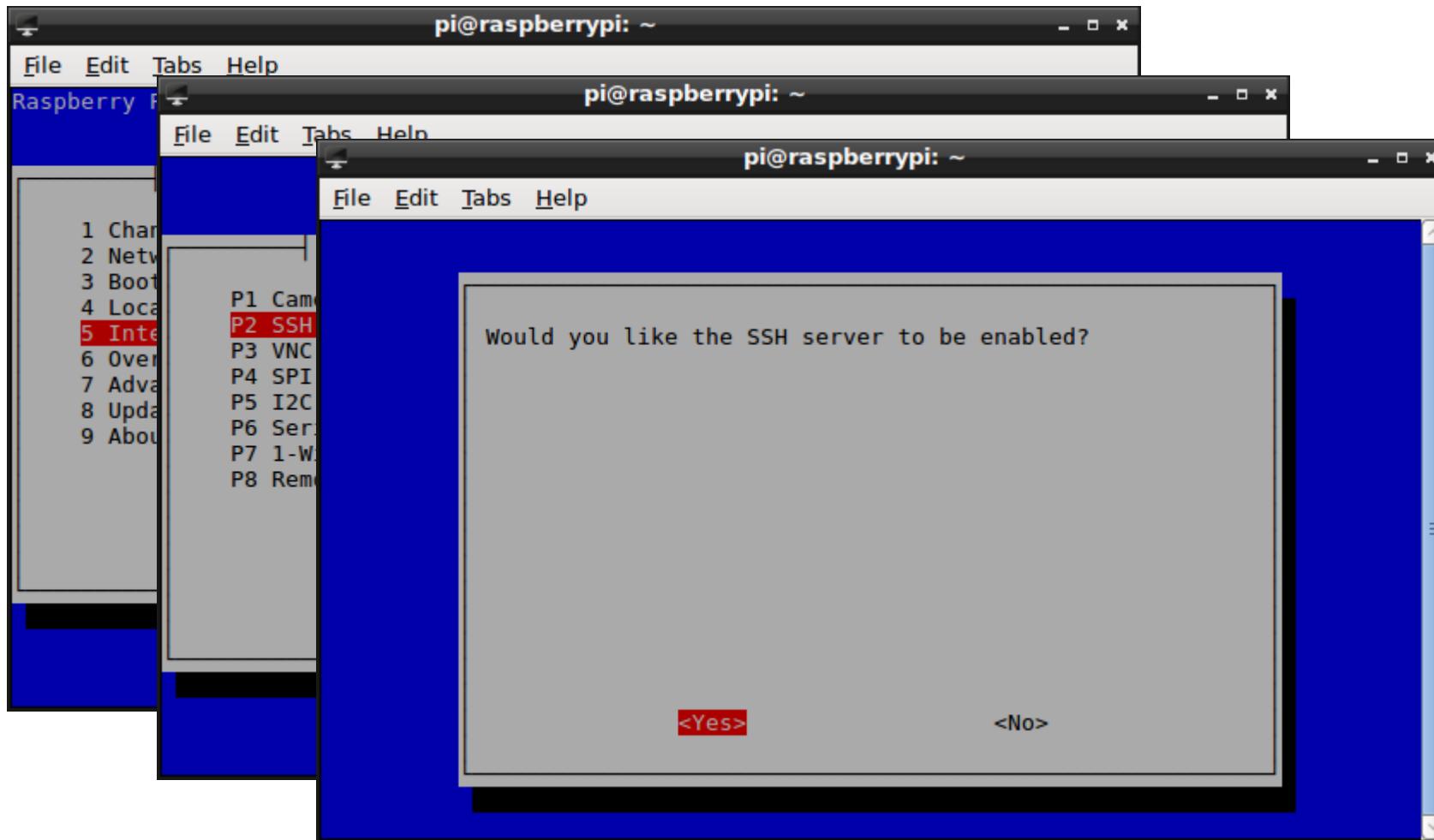
- \$ sudo raspi-config



常用

開啟 SSH 服務

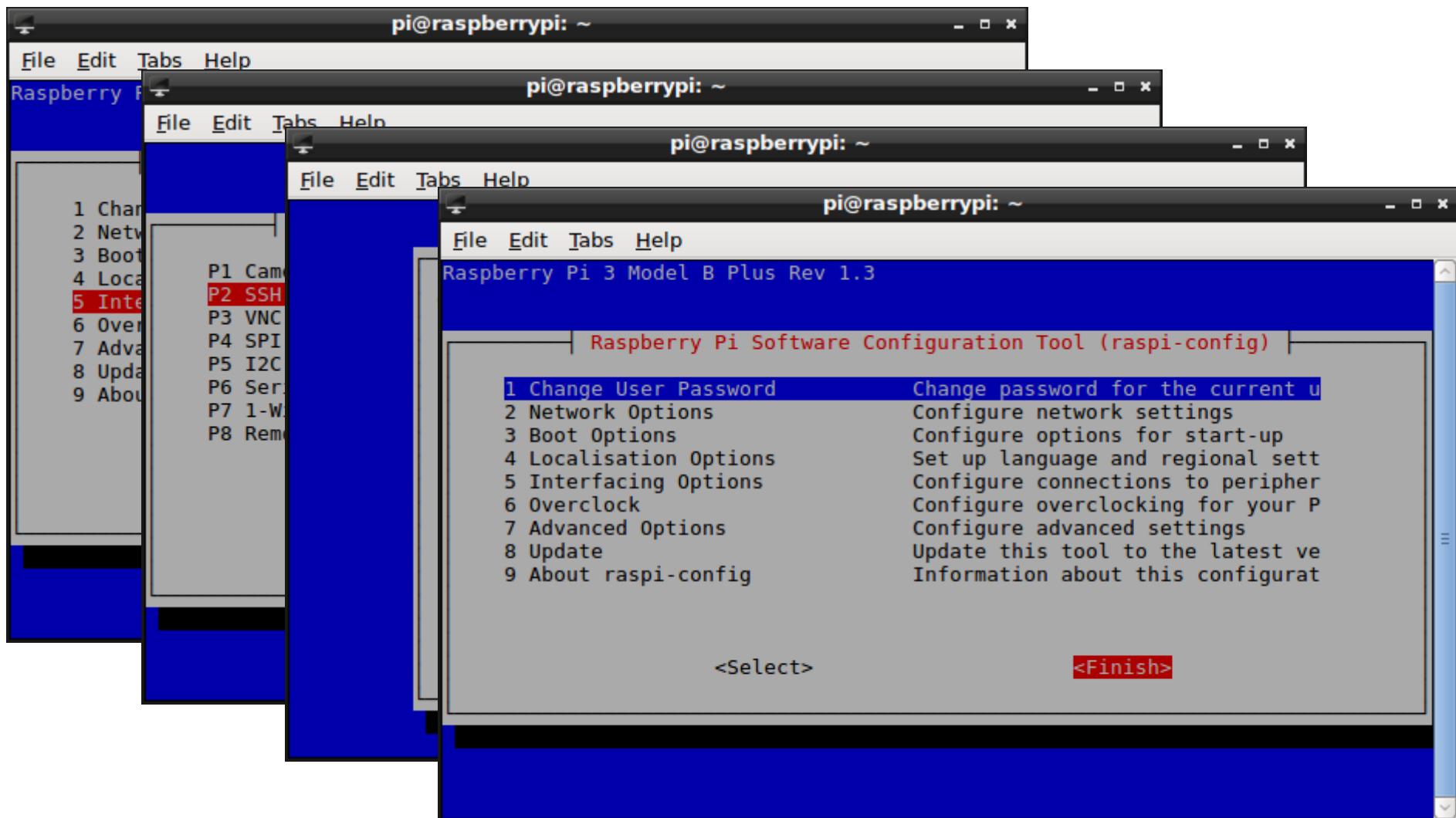
- \$ sudo raspi-config



常用

開啟 SSH 服務

- \$ sudo raspi-config



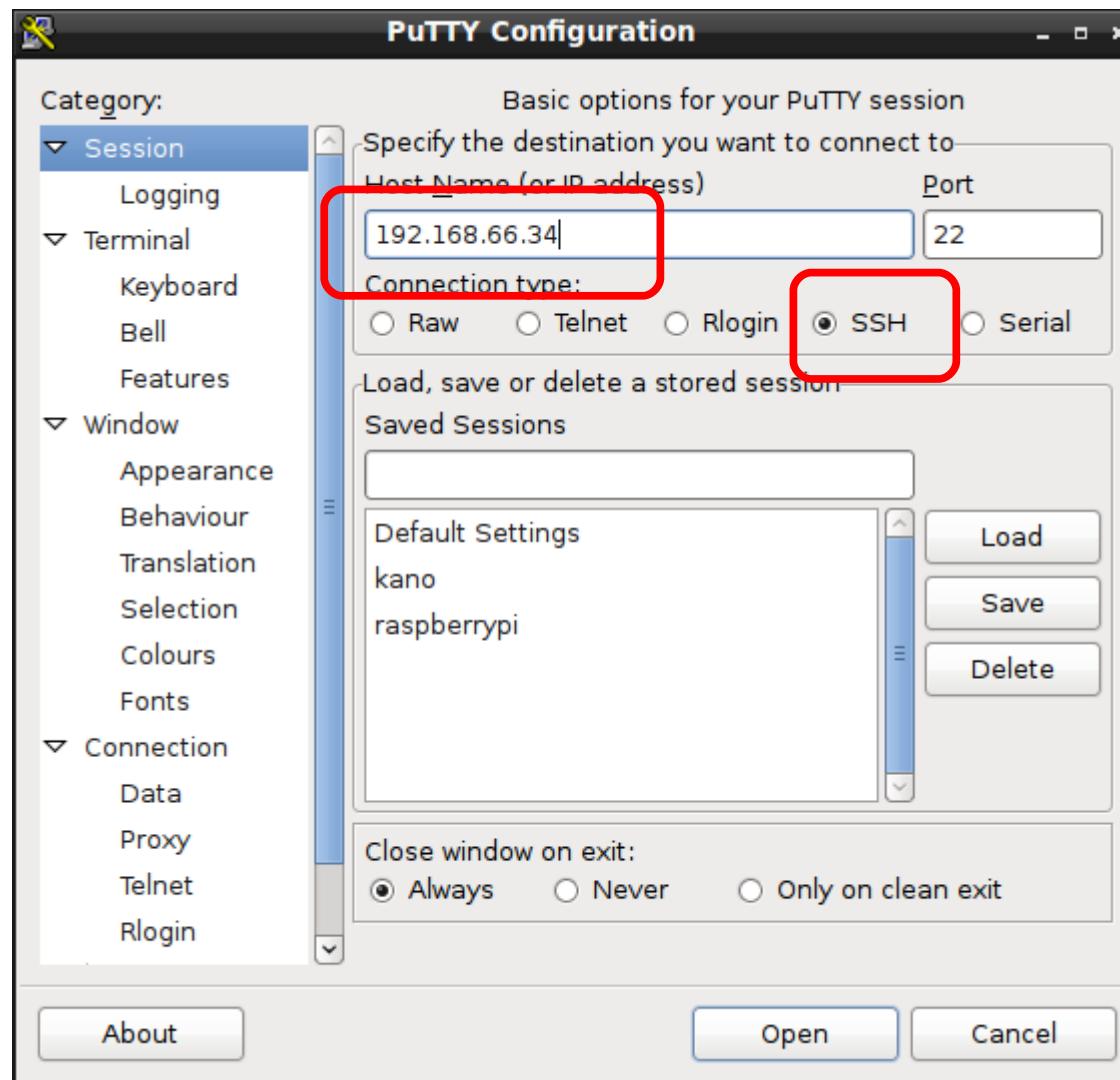
如果連線 WiFi 成功，查詢 IP

```
$ ifconfig wlan0
```

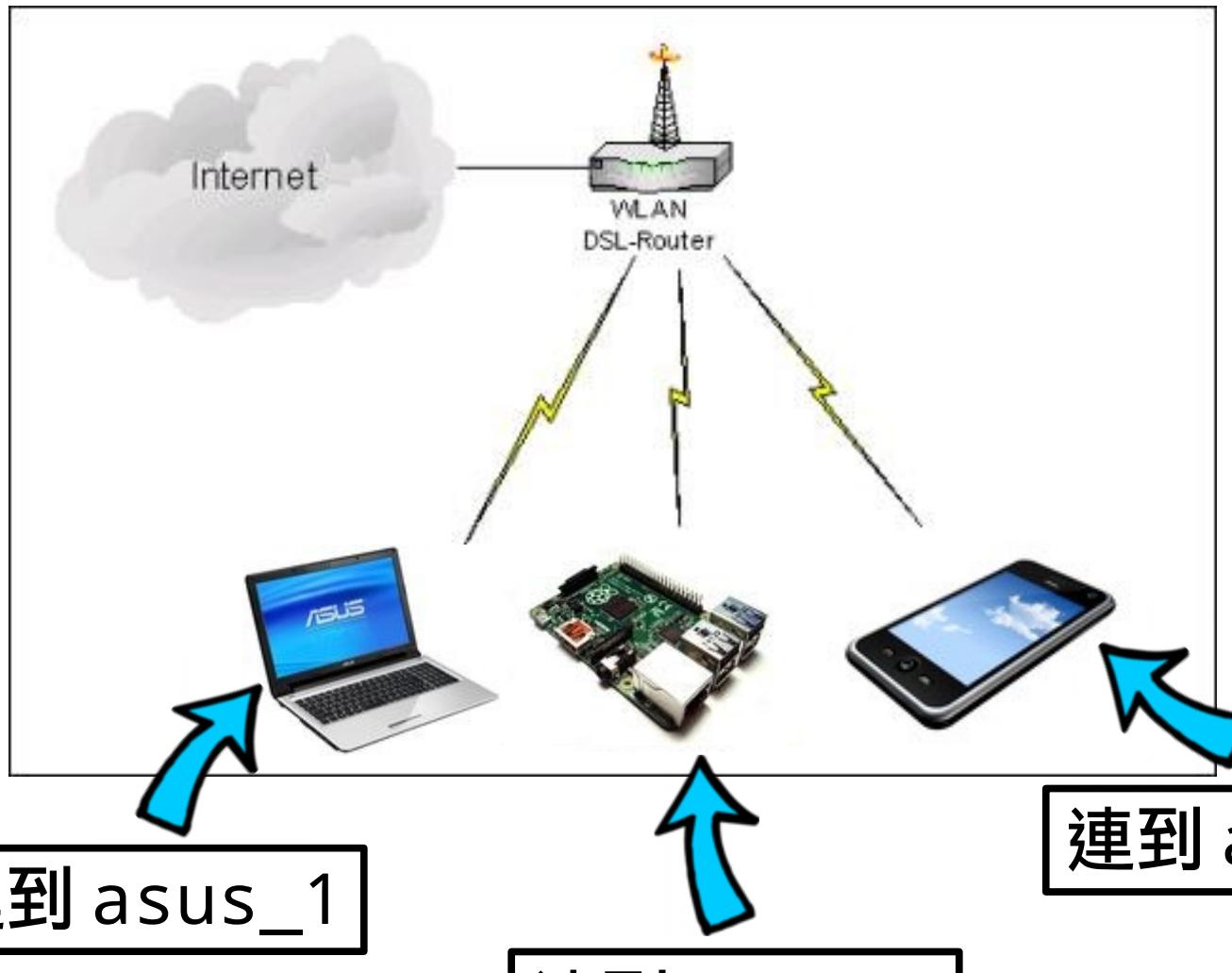
```
pi@raspberrypi:~ $ ifconfig wlan0
wlan0      Link encap:Ethernet  Hwaddr b8:27:eb:a1:f3:09
           inet addr:192.168.66.34  Bcast:192.168.66.255  Mask:255.255.255.0
                     inet6 addr: fe80::46f6:51cb:483b:1b54/64 Scope:Link
                           UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
                           RX packets:898 errors:0 dropped:256 overruns:0 frame:0
                           TX packets:273 errors:0 dropped:0 overruns:0 carrier:0
                           collisions:0 txqueuelen:1000
                           RX bytes:169407 (165.4 KiB)  TX bytes:36968 (36.1 KiB)
```

- IP = 192.168.66.34 (每個人不同)

就可以使用 SSH 連線 (要同網段)



同網段的意思



我的 Pi 連到那台 AP ?

```
$ iwconfig wlan0
```

```
pi@raspberrypi:~ $ iwconfig wlan0
wlan0    IEEE 802.11bgn ESSID:"asus_1"
          Mode:Managed  Frequency:2.462 GHz  Access Point: 10:DA:43:8F:A7:CD
          Bit Rate=72.2 Mb/s   Tx-Power=31 dBm
          Retry short limit:7   RTS thr:off   Fragment thr:off
          Power Management:on
          Link Quality=70/70  Signal level=-36 dBm
          Rx invalid nwid:0  Rx invalid crypt:0  Rx invalid frag:0
          Tx excessive retries:0  Invalid misc:0   Missed beacon:0
```

- SSID = asus_1 (每個人不同)

Serial 連線和 SSH 連線有什麼不同？

- Serial 以實體線路相連，純文字，是獨占式的連線

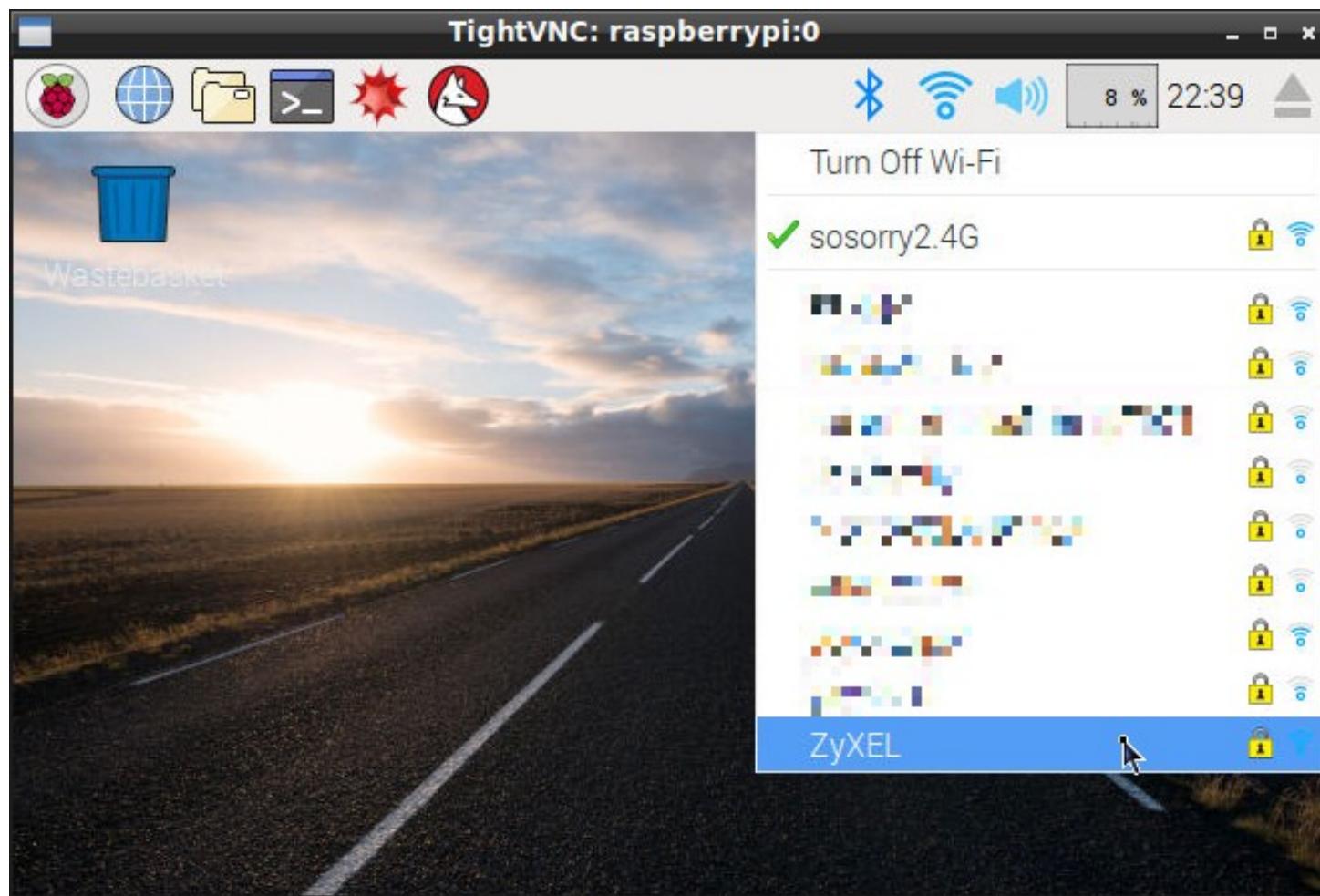


- SSH 是 TCP/IP 通訊協定，透過 Ethernet 或 WiFi 連線

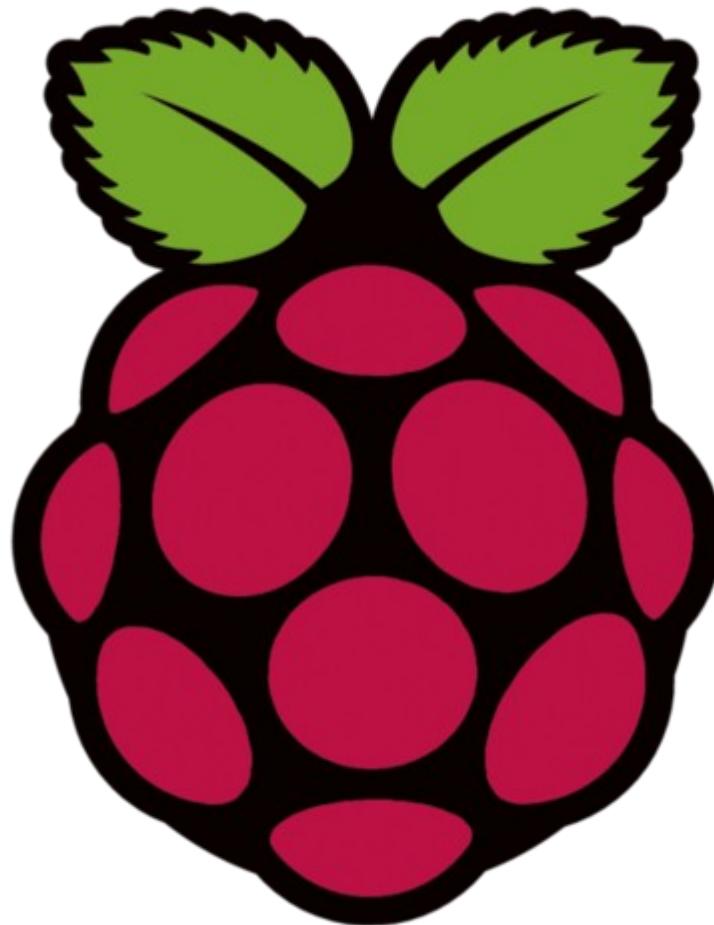


回家後該如何連上 WiFi ？

- 將 Pi 接螢幕，就可以用 X-Window 輕鬆連線 WiFi



Raspberry Pi Rocks the World



Thanks