

312512050_LAB2

1. 輸入指令 `make ARCH=arm64 CROSS_COMPILE=aarch64-linux-gnu- menuconfig`

可以用介面的方式修改.config 檔，刪除不必要的功能、驅動程式或模塊來縮小 image 大小。

a) 我所刪除的選項為

- System V IPC

提供程序間通訊的機制，包括訊息儲列、共享內存區等

- POSIX Message Queues

POSIX 訊息儲列允許程序通過消息通信

- Configure standard kernel features (expert users)

提供了更多 kernel 的配置選項

- Virtualization

虛擬化，若系統需在虛擬環境中執行，才需啟用此選項

- Serial ATA and Parallel ATA drivers (libata)

串聯 ATA (SATA) 和並聯 ATA (PATA) 硬碟驅動程式

- Sound card support

讓系統使用音效卡進行音訊輸入和輸出

- Remote controller support

讓系統可以連接遙控器作為輸入裝置

- Multimedia support

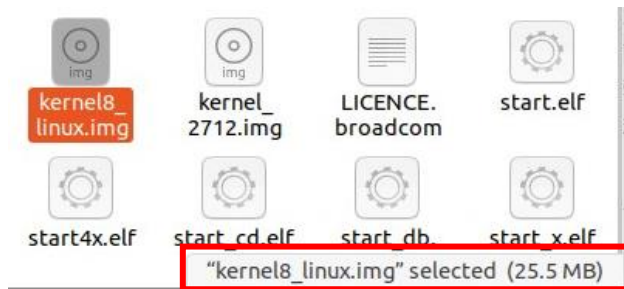
讓系統支持多媒體功能（例如攝影機等）

- Microsoft surface platform-specific

針對微軟平台設備的驅動程式

b) Image size 比較

原 image : 25.5MB



修改後的 image : 24.7MB



2. 評測 kernel 的套件 : <https://github.com/aiconcwo/rpi-benchmark/tree/master>

a) 套件說明

該腳本分別使用了 sysbench, hdparm 這兩個套件

sysbench 用於測試 CPU、多線程以及記憶體性能

hdparm 用於測試硬碟性能，測試了硬碟的讀取數度以及溫度

還有最後測試寫入和讀取的性能

b) 結果

原 kernel

```
Raspberry Pi Benchmark Test
Author: AikonCWD
Version: 3.0

temp=42.9'C
arm_freq=1400
arm_freq_min=600
core_freq=400
sdram_freq=450
gpu_freq=300
sd_clock=50.000 MHz

Running CPU test...
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
total time: 10.0035s
min: 0.58
avg: 1.79
max: 18.85
temp=44.5'C

Running THREADS test...
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
total time: 10.0292s
min: 6.61
avg: 33.27
max: 161.34
temp=46.2'C

Running MEMORY test...
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
3072.00 MiB transferred (1600.26 MiB/sec)
total time: 1.9078s
min: 0.00
avg: 0.00
max: 16.12
temp=46.2'C

Running HDPARM test...
Timing buffered disk reads: 66 MB in 3.02 seconds = 21.82 MB/sec
temp=44.0'C

Running DD WRITE test...
536870912 bytes (537 MB, 512 MiB) copied, 27.9884 s, 19.2 MB/s
temp=43.5'C

Running DD READ test...
536870912 bytes (537 MB, 512 MiB) copied, 23.9976 s, 22.4 MB/s
temp=45.1'C

AikonCWD's rpi-benchmark completed!
```

修改後的 kernel

```
Raspberry Pi Benchmark Test
Author: AikonCWD
Version: 3.0

temp=39.2'C
arm_freq=1400
arm_freq_min=600
core_freq=400
sdram_freq=450
gpu_freq=300
sd_clock=50.000 MHz

Running CPU test...
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
total time: 10.0041s
min: 0.58
avg: 1.79
max: 24.12
temp=41.9'C

Running THREADS test...
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
total time: 10.0318s
min: 6.49
avg: 31.94
max: 158.61
temp=44.0'C

Running MEMORY test...
WARNING: the --test option is deprecated. You can pass a script name or path on the command line without any options.
3072.00 MiB transferred (1572.05 MiB/sec)
total time: 1.9440s
min: 0.00
avg: 0.00
max: 9.06
temp=44.0'C

Running HDPARM test...
Timing buffered disk reads: 66 MB in 3.01 seconds = 21.89 MB/sec
temp=41.9'C

Running DD WRITE test...
536870912 bytes (537 MB, 512 MiB) copied, 25.402 s, 21.1 MB/s
temp=40.8'C

Running DD READ test...
536870912 bytes (537 MB, 512 MiB) copied, 23.5955 s, 22.8 MB/s
temp=42.9'C

AikonCWD's rpi-benchmark completed!
```

3. Patch 版本：patches-6.6.21-rt26.tar.gz

a) 使用 `head Makefile -n 4` 指令查看 kernel 版本，我的版本顯示為

`VERSION = 6`

`PATCHLEVEL = 6`

`SUBLEVEL = 21`

b) 下載對應的 patch

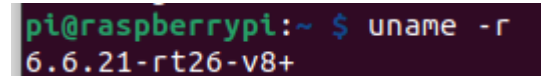
下載網址：<https://cdn.kernel.org/pub/linux/kernel/projects/rt/6.6/older/> 中

選擇 patches-6.6.21-rt26.tar.gz 進行下載

使用 `cat patch-3.10.25-rt23.patch | patch -p1` 指令，將 patch 應用到當前目

錄的源代碼中

c) 下載結果：



```
pi@raspberrypi:~ $ uname -r
6.6.21-rt26-v8+
```