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執行環境

環境建置與測試指令請見 [rtos.sh](#)

- CPU 核心數量: 1
- CPU 型號: 12th Gen Intel(R) Core(TM) i5-12400
- RAM: 4GB

測試結果

預設 CFS 完全公平調度 (SCHED_OTHER)

```
# 還原 7z 為預設 CFS
sudo chrt --other -p 0 $(pgrep 7z)

# 還原 mpv 為預設 CFS
sudo chrt --other -p 0 $(pgrep mpv)
```

- 7z

16:	4860	50	8692	4330		24720	53	3734	1961
16:	5666	56	9007	5048		30399	62	3887	2411
16:	5994	58	9139	5340		27880	59	3751	2211
16:	6070	60	9073	5408		26396	54	3843	2094
16:	3801	38	9007	3386		19100	39	3887	1515
16:	3830	38	9073	3412		17961	38	3784	1425
16:	4964	50	8815	4423		28393	59	3817	2252
16:	6108	59	9207	5442		24841	51	3852	1970

- mpv 偶爾掉偵 聲音偶爾撕裂

```
AV: 00:01:00 / 00:03:25 (30%) x2.00 A-V: 13.132 Dropped: 526
```

實時 FIFO 調度 (SCHED_FIFO) GUI 卡到爆

```
# 設定 7z 為 FIFO (優先級 1)
sudo chrt --fifo -p 1 $(pgrep 7z)

# 設定 mpv 為 FIFO (優先級 2)
sudo chrt --fifo -p 2 $(pgrep mpv)
```

- 7z

```
16:      8824      85  9207  7861 |      45896  93  3922  3640
16:     10044      95  9416  8948 |      46272  93  3940  3670
16:     10407      95  9787  9272 |      47550  93  4042  3772
16:     10363      96  9635  9233 |      46260  93  3949  3669
16:      9616      94  9139  8568 |      45857  93  3895  3637
```

- mpv 幾乎卡死動不了

```
AV: 00:00:06 / 00:03:25 (3%) x2.00 A-V: -0.000 Dropped: 111
```

實時 Round-Robin 調度 (SCHED_RR) GUI 卡到爆

```
# 設定 7z 為 RR (優先級 2)
sudo chrt --rr -p 2 $(pgrep 7z)

# 設定 mpv 為 RR (優先級 1)
sudo chrt --rr -p 1 $(pgrep mpv)
```

- 7z

```
16:     10132      96  9416  9027 |      47287  95  3967  3751
16:     10134      96  9416  9029 |      45660  95  3817  3622
16:     10228      97  9416  9112 |      46259  94  3887  3669
16:      9916      97  9139  8835 |      46311  95  3887  3673
16:      9987      97  9207  8898 |      45596  95  3817  3617
16:      9368      94  8878  8346 |      44978  96  3734  3568
```

- mpv 同樣幾乎卡死

```
AV: 00:02:11 / 00:03:25 (64%) x2.00 A-V: 0.264 Dropped: 2221
```

Deadline 調度 (SCHED_DEADLINE, EDF)

Case 4.1: 標準參數 (小心所有EDF的run/period加起來要小於1)

```
# 設定 7z 為 Deadline (runtime=500µs, deadline=10ms, period=10ms)
sudo chrt --deadline --sched-runtime 500000 --sched-deadline 1000000 --sched-period 1500000 -p 0 $(pgrep 7z)

# 設定 mpv 為 Deadline (runtime=500µs, deadline=10ms, period=10ms)
sudo chrt --deadline --sched-runtime 500000 --sched-deadline 800000 --sched-period 1500000 -p 0 $(pgrep mpv)
```

- 7z

```
16:      3515      33  9416  3132 |      16214  33  3913  1286
16:      3434      33  9276  3060 |      15911  33  3826  1262
16:      3251      33  8753  2896 |      16150  33  3887  1281
```

- mpv **AV: 00:00:29 / 00:03:25 (14%) x2.00 A-V: 0.064 Dropped: 101**

Case 4.2: 增加 runtime (允許更多 CPU 時間)

```
sudo chrt --deadline --sched-runtime 800000 --sched-deadline 800000 --sched-period
1500000 -p 0 $(pgrep 7z)
```

- 7z

```
16:      5037      50   9007   4488 |      25147      51   3878   1995
16:      4838      50   8632   4310 |      25221      51   3895   2001
16:      5036      51   8878   4487 |      25278      51   3913   2005
```

- mpv

AV: 00:02:27 / 00:03:25 (72%) x2.00 A-V: 0.020 Dropped: 1440

Case 4.3: 縮短 deadline (更嚴格的截止時間)

```
sudo chrt --deadline --sched-runtime 500000 --sched-deadline 500000 --sched-period
1500000 -p 0 $(pgrep mpv)
```

- 7z

```
16:      5134      52   8878   4574 |      25195      51   3913   1998
16:      5102      52   8815   4546 |      25132      51   3887   1993
16:      5191      51   9007   4625 |      24840      51   3852   1970
```

- mpv

AV: 00:00:25 / 00:03:25 (13%) x2.00 A-V: 2.250 Dropped: 485

Case 4.4: 增加 period (降低調度頻率)

```
sudo chrt --deadline --sched-runtime 500000 --sched-deadline 800000 --sched-period
2000000 -p 0 $(pgrep mpv)
```

- 7z

```
16:      5108      52   8753   4551 |      24453      51   3809   1940
16:      4804      51   8455   4280 |      25294      51   3931   2006
16:      4877      50   8692   4345 |      24512      51   3843   1944
```

- mpv

AV: 00:00:30 / 00:03:25 (15%) x2.00 A-V: 2.019 Dropped: 359

dmesg

```
user@ubuntu-24:~/Desktop$ sudo dmesg | grep DEADLINE
[ 6465.532304] SCHED_DEADLINE parameters set on pid 27311: runtime=500000, deadline=10000000, period=10000000
[ 6562.423796] SCHED_DEADLINE parameters set on pid 27321: runtime=500000, deadline=10000000, period=10000000
[ 6571.220641] SCHED_DEADLINE parameters set on pid 27324: runtime=500000, deadline=10000000, period=10000000
[ 6582.123895] SCHED_DEADLINE parameters set on pid 27265: runtime=500000, deadline=10000000, period=10000000
[ 7031.465562] SCHED_DEADLINE parameters set on pid 27265: runtime=1000000, deadline=10000000, period=10000000
```