

Report

1. System Spec.

host

kernel version : 5.0.0-46-generic

OS : Ubuntu 18.02

CPU core : AMD Ryzen 5 2600X Six-core Processor

Memory : 16GB

VM

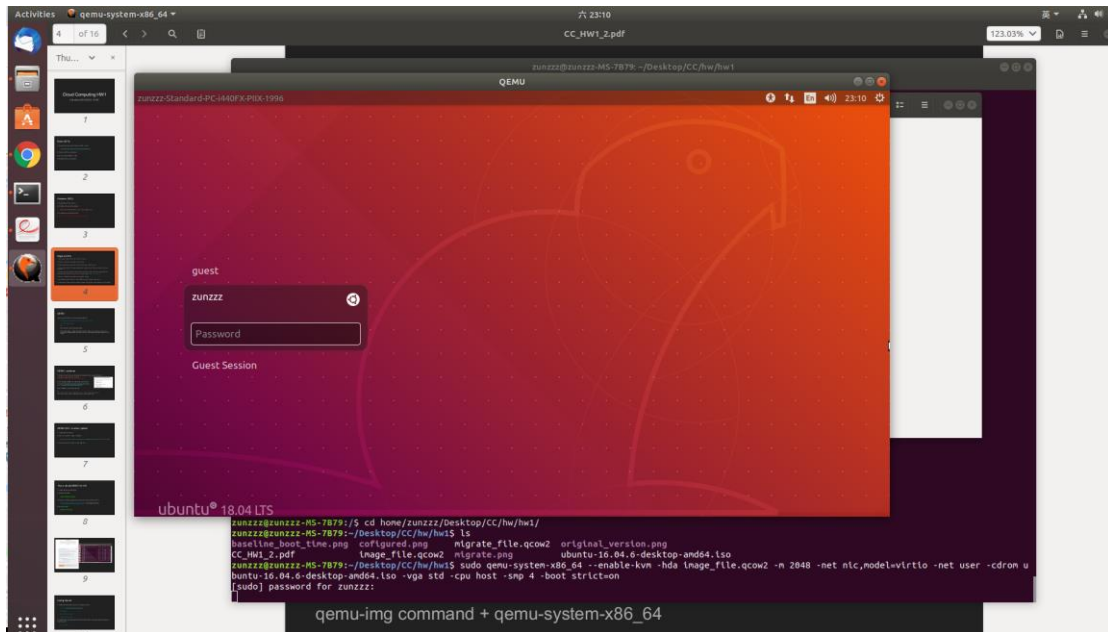
kernel version : 4.19.90

OS : Ubuntu 18.02

CPU core : smp 給 4 個 vCPU

Memory : 2GB

2. Show your screenshot to prove that you use Qemu



3. Which module did you modify in kernel? What do these modules use for?

Power Management

Power Management Debug Support (disable) : 用來 debug

ACPI (disable) : Advanced Configuration and Power Interface

Firmware Drivers

Export DMI identification via sysfs to userspace (disable) : 把 DMI 的認證部分移到 userspace

Add firmware-provided memory map to sysfs (disable)

Bus options

PCI Express ASPM control (disable)

PCI Express Downstream Port Containment support (disable)

PCI Express Precision Time Measurement support (disable)

Wireless

Enable powersave by default (disable) : 使用節省電力的方法

cfg80211 DebugFS entries (disable) : 能夠進入 debug 模式

接著我用 systemd-analyze blame 去看時間花在哪邊最多之後去刪除一些 service

snapd (remove) : 管理軟體的系統

apparmor (remove) : MAC system

NetworkManager (remove) : 處理網路服務

grub-common (remove) : 處理開機失敗的問題

account-daemon (remove) : 藉由 GNOME 管理帳號

modemmanager (remove) : 處理網路的 request

apport (remove) : 顯示錯誤訊息

speech-dispatcher (remove) : 讀取聲音

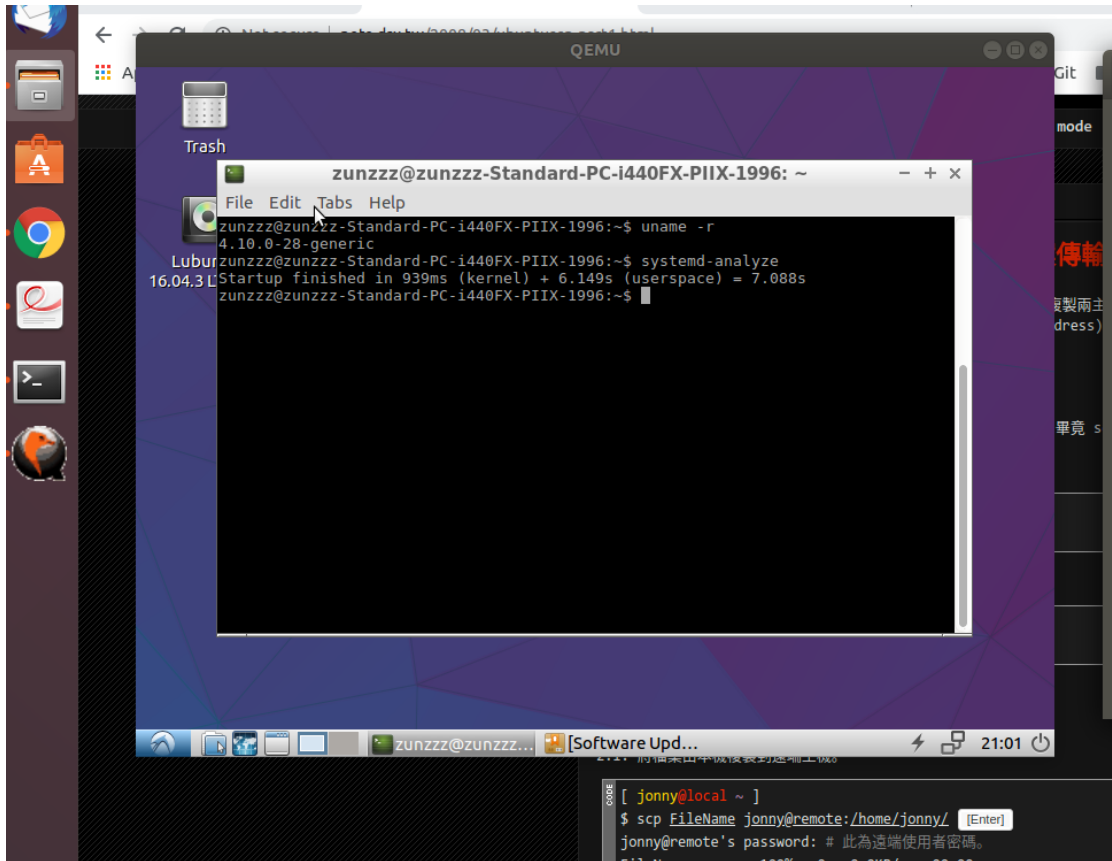
lightdm (remove) : 處理顯示器

4. Did you find any other OS image boot faster than ubuntu and why?

Show your screenshot of your experiment.

這是我找到比 ubuntu 開機還快的 OS，雖然與 ubuntu 是同一個 distribution 但是他支援的功能比較少因此使他的開機速度比較快。

這個的開機時間為 7 秒與 baseline 的 8 秒比快了 1 秒



5. Compare the boot time between general config and modify config & Show your screenshot of your experiment.

以下都是我用-smp 4 去開啟 Qemu 所跑出的結果
baseline

五 20:26
CC_HW1_2.pdf

6. Run kernel header

QEMU

```
zunzzz@zunzzz-Standard-PC-i440FX-PIIX-1996: /usr/src/linux-4.19.109
.config:1382:warning: symbol value 'm' invalid for NF_TABLES_IPV6
.config:1394:warning: symbol value 'm' invalid for NF_NAT_MASQUERADE_IPV6
.config:1420:warning: symbol value 'm' invalid for NF_TABLES_BRIDGE
.config:3998:warning: symbol value 'm' invalid for HW_RANDOM_TPM
.config:4948:warning: symbol value 'm' invalid for LIRC
.config:6174:warning: symbol value 'm' invalid for SND_SOC_INTEL_SST_TOPLEVEL
.config:6179:warning: symbol value 'm' invalid for SND_SOC_INTEL_MACH
configuration written to .config

*** End of the configuration.
*** Execute 'make' to start the build or try 'make help'.

(tf) zunzzz@zunzzz-Standard-PC-i440FX-PIIX-1996:/usr/src/linux-4.19.109$ system-
analyze result
No command 'system-analyze' found, did you mean:
  Command 'systemd-analyze' from package 'systemd' (main)
system-analyze: command not found
(tf) zunzzz@zunzzz-Standard-PC-i440FX-PIIX-1996:/usr/src/linux-4.19.109$ systemd
-analyze result
Unknown operation 'result'.
(tf) zunzzz@zunzzz-Standard-PC-i440FX-PIIX-1996:/usr/src/linux-4.19.109$ systemd
-analyze
Startup finished in 1.094s (kernel) + 6.922s (userspace) = 8.017s
(tf) zunzzz@zunzzz-Standard-PC-i440FX-PIIX-1996:/usr/src/linux-4.19.109$
```

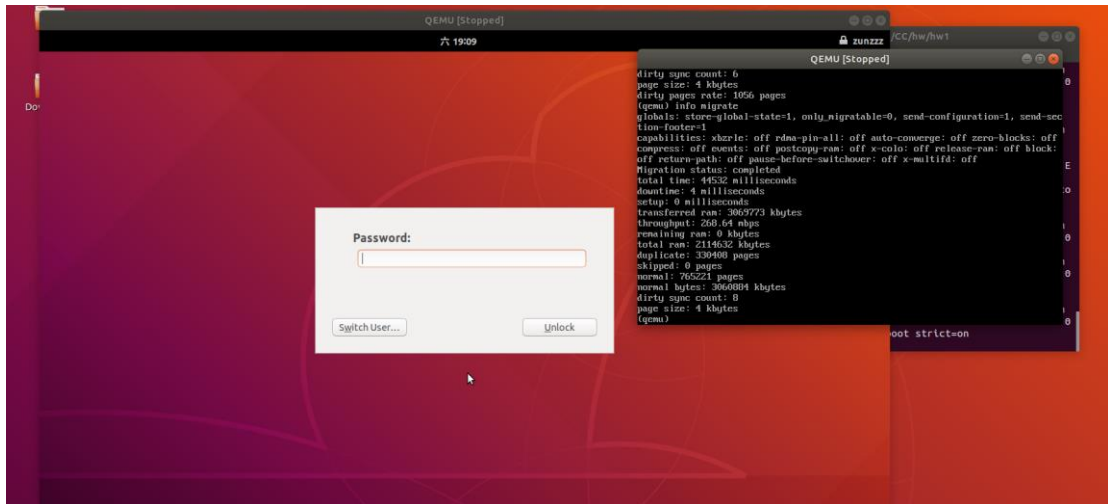
advance

```
104ms packagekit.service
103ms dns-clean.service
77ms systemd-udev-trigger.service
67ms avahi-daemon.service
64ms plymouth-start.service

(tf) zunzzz@zunzzz-Standard-PC-i440FX-PIIX-1996:~$ systemd-analyze
Startup finished in 855ms (kernel) + 1.564s (userspace) = 2.420s
graphical.target reached after 1.559s in userspace
(tf) zunzzz@zunzzz-Standard-PC-i440FX-PIIX-1996:~$
```

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Re: Wh
by Garry
I did a se
CODE: SE

6. Show your screenshot to prove that your migrate is success.



7. Use different number of CPU core to test MNIST execution time and make a table.

我藉由更改 smp tag 的參數去給 VM 不同數量的 vCPU，以下是我 CPU 數量和執行時間的表格，之後實驗結果是不管給幾個 vCPU 數量給 VM 跑的時間都差不多。

Number of CPUs	Execution time
1	28.845s
2	28.532s
3	29.311s
4	28.839s
5	30.403s
6	29.412s
7	34.421s
8	31.111s

8. Please simply explain what is the difference between cold migration, warm migration and live migration.

Cold migration：在做 migration 的時候，VM 需要處於 power off 的狀態。

Live migration：與 cold migration 相對應又稱 hot migration，在做 migration 的時候，VM 是處於 power on 的狀態。

Warm migration：這是備用方案，target VM 與 source VM 保持同步並且 target VM 保存 source VM 的 snapshot 在 source VM 故障時能夠藉由 snapshot 進行 VM 的 migration。