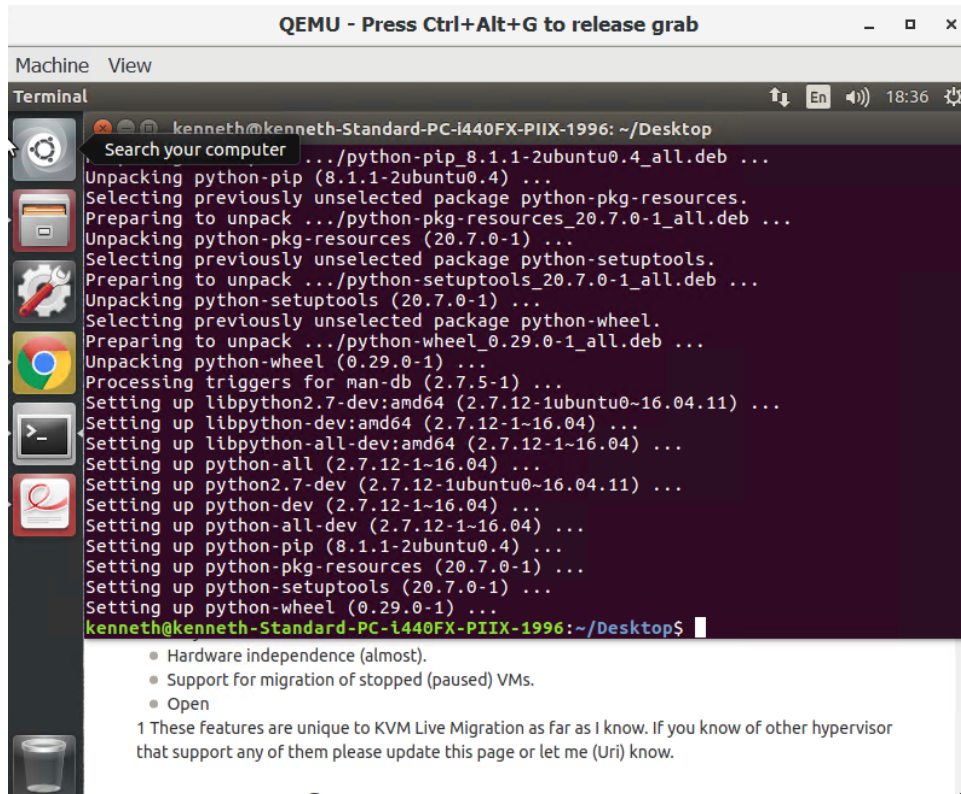Cloud Computing Homework 1 Report

Part 1. System Spec

qemu-system-x86_64.exe --enable-kvm -hda
C:\Users\Kenneth\Desktop\debian_wheezy_amd64_standard.qcow2 -m 2048 -net nic,model=virtio -net user -vga std -smp 1,cores=4,threads=2,sockets=2,maxcpus=16 -boot strict=on -accel hax

Part 2. Proof of using Qemu

Part 3. Modules modified

First, I listed all the services by command system-analyze blame.

```
kenneth@kenneth-Standard-PC-i440FX-PIIX-1996:/usr/src$ systemd-analyze blame
     5min 17.263s apt-daily-upgrade.service
          26.805s apt-daily.service
           5.855s NetworkManager-wait-online.service
           4.493s fwupd.service
           2.971s dev-sda1.device
           1.343s snapd.seeded.service
           1.302s apparmor.service
           1.282s console-setup.service
           1.007s accounts-daemon.service
           1.000s plymouth-read-write.service
            776ms systemd-logind.service
            709ms lightdm.service
            679ms keyboard-setup.service
            610ms NetworkManager.service
            538ms gpu-manager.service
            504ms irqbalance.service
            478ms ondemand.service
            443ms networking.service
            408ms systemd-user-sessions.service
            394ms systemd-udev-trigger.service
            386ms systemd-modules-load.service
            344ms colord.service
            339ms systemd-journald.service
            324ms speech-dispatcher.service
            318ms snapd.service
            307ms thermald.service
            289ms plymouth-start.service
            270ms systemd-update-utmp.service
            249ms systemd-tmpfiles-clean.service
```

And I decided to cut some of the services, which are apport.service, apparmor.service, snapd, NetworkManager-wait-online.service

```
kenneth@kenneth-Standard-PC-i440FX-PIIX-1996:/usr/src$ sudo systemctl disable ap
port.service
[sudo] password for kenneth:
apport.service is not a native service, redirecting to systemd-sysv-install
Executing /lib/systemd/systemd-sysv-install disable apport
insserv: warning: current start runlevel(s) (empty) of script `apport' overrides
 LSB defaults (2 3 4 5).
insserv: warning: current stop runlevel(s) (2 3 4 5) of script `apport' override
s LSB defaults (empty).
kenneth@kenneth-Standard-PC-i440FX-PIIX-1996:/usr/src$ sudo systemctl disable ap
parmor.service
apparmor.service is not a native service, redirecting to systemd-sysv-install
Executing /lib/systemd/systemd-sysv-install disable apparmor
insserv: warning: current start runlevel(s) (empty) of script `apparmor' overrid
es LSB defaults (S).
insserv: warning: current stop runlevel(s) (S) of script `apparmor' overrides LS
B defaults (empty).
kenneth@kenneth-Standard-PC-i440FX-PIIX-1996:/usr/src$ sudo systemctl disable sn
apd
Removed symlink /etc/systemd/system/multi-user.target.wants/snapd.service.
kenneth@kenneth-Standard-PC-i440FX-PIIX-1996:/usr/src$ sudo systemctl disable Ne
tworkManager-wait-online.service
Removed symlink /etc/systemd/system/network-online.target.wants/NetworkManager-w
ait-online.service.
```

For the make menuconfig, I remains the same setting as what menuconfig had ticked.
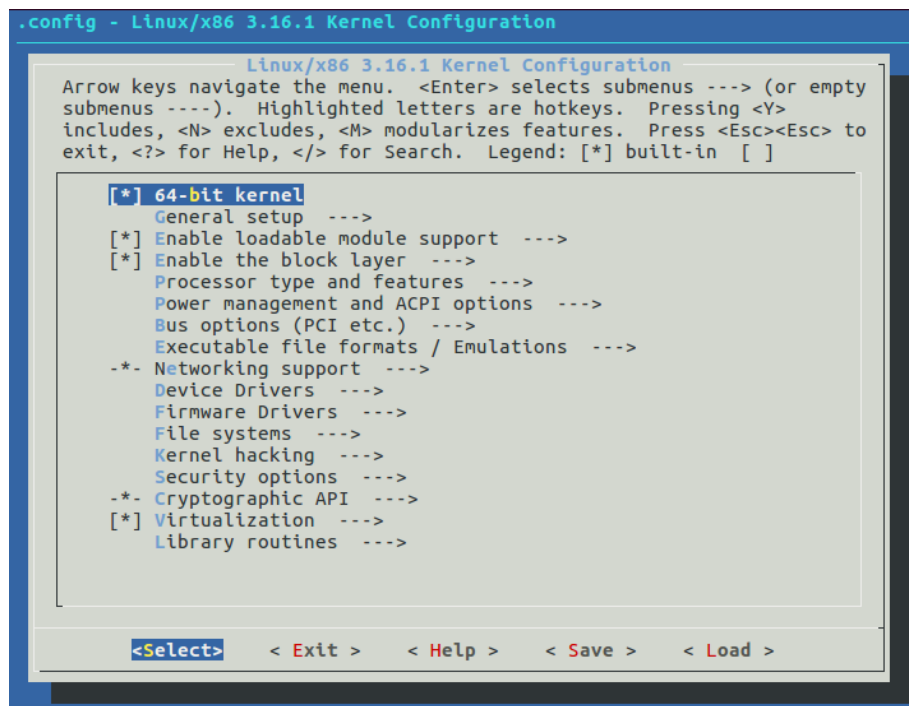
Part 4. OS image that boot faster than Ubuntu

Unfortunatly, I did not find any OS image than faster than Ubuntu.

Part 5. Comparison in boot time between general config and modify config:

5.a General config

```
kenneth@kenneth-Standard-PC-i440FX-PIIX-1996:~/Desktop$ systemd-analyze
Startup finished in 3.842s (kernel) + 10.302s (userspace) = 14.145s
```

5.b Modified config

```
kenneth@kenneth-Standard-PC-i440FX-PIIX-1996:~/Desktop$ systemd-analyze
Startup finished in 3.224s (kernel) + 13.331s (userspace) = 16.556s
```

Part 6. Migrate

Part 7. MNIST execumie time with different number of CPU core

EXECUTION TIME

Core	Real	User	Sys
1	1m51.381s	0m45.852s	0m1.268s
2	1m51.554s	0m45.872s	0m1.368s
3	1m58.043s	0m46.944s	0m1.252s
4	1m46.634s	0m41.252s	0m1.220s

Part 8. Difference between cold migration, warm migration, live migration

1. Cold migration

- When the domain is not currently running on the source system.
- Almost instantaneous
- Since only metadata is moved. After migration the domain is defined on the target, but remains inactive.

2. Warm migration
   - When the domain is running on the source system
   - The LDoms manager on the source system contacts the target system to start the migration and ensure the target system matches chip type and has resources to host the domain.
   - It then suspends the guest's operation, compresses and encrypts its state information (mostly RAM) using the T-series crypto acceleration, and transmits it to the target.
   - The LDoms manager on the target decompresses and decrypts the contents and resumes domain operation.
   - The domain can be unresponsive for minutes (depending on memory size and network speed). but picks up from where it was.

3. Live migration
   - Also known as hot migration
   - Similar to warm migration, except that the guest is not suspended during transmission.
   - The LDoms manager keeps track of memory changed while state is being transmitted, and then makes followup passes to retransmit data changed state information.
   - A brief pause is used at the end to transmit residual changed state.