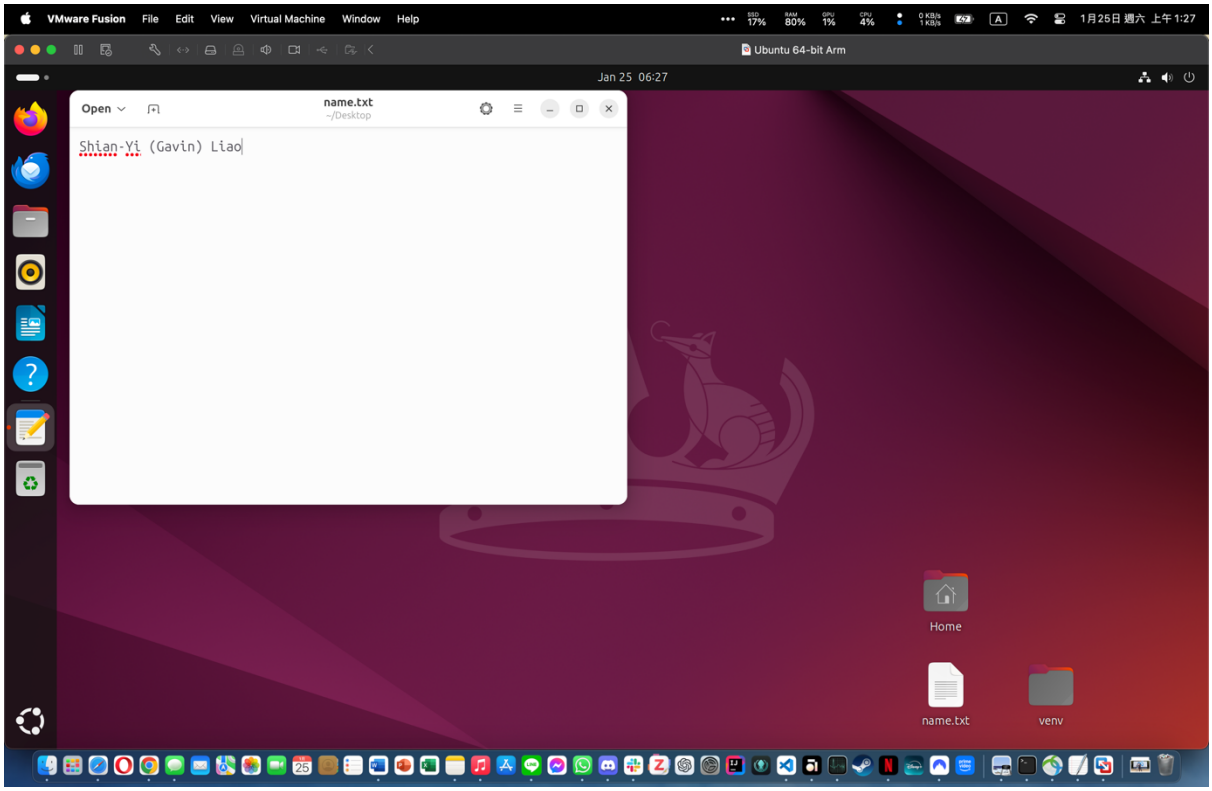
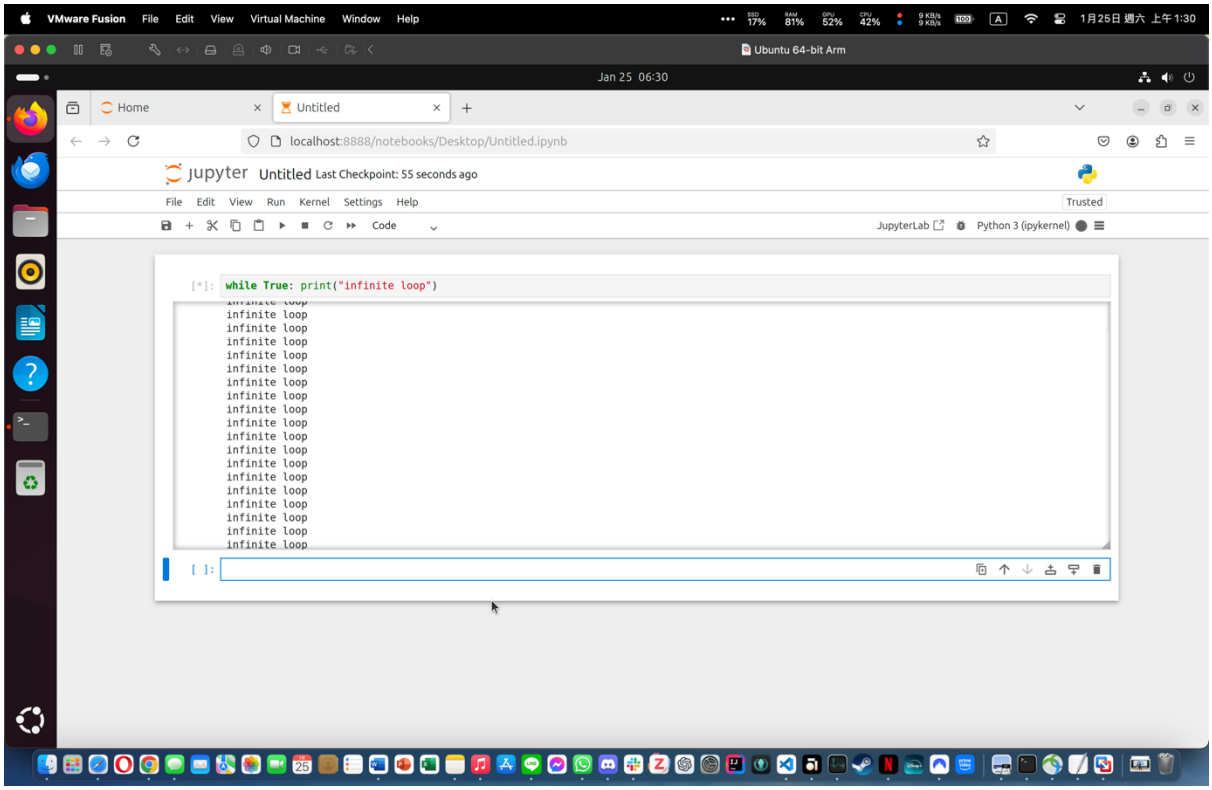
HW2

Shian-Yi (Gavin) Liao

1. A. VM installation

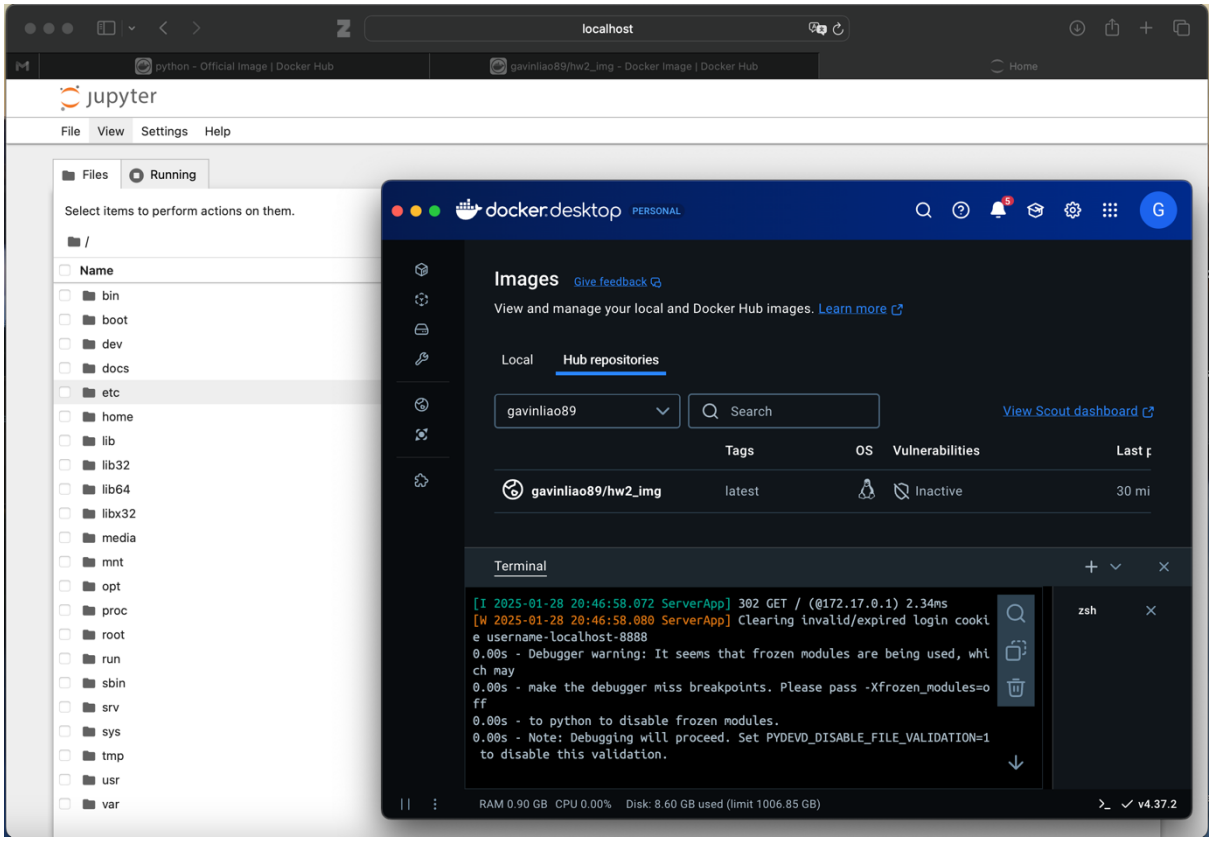


B. Jupyter Notebook installation



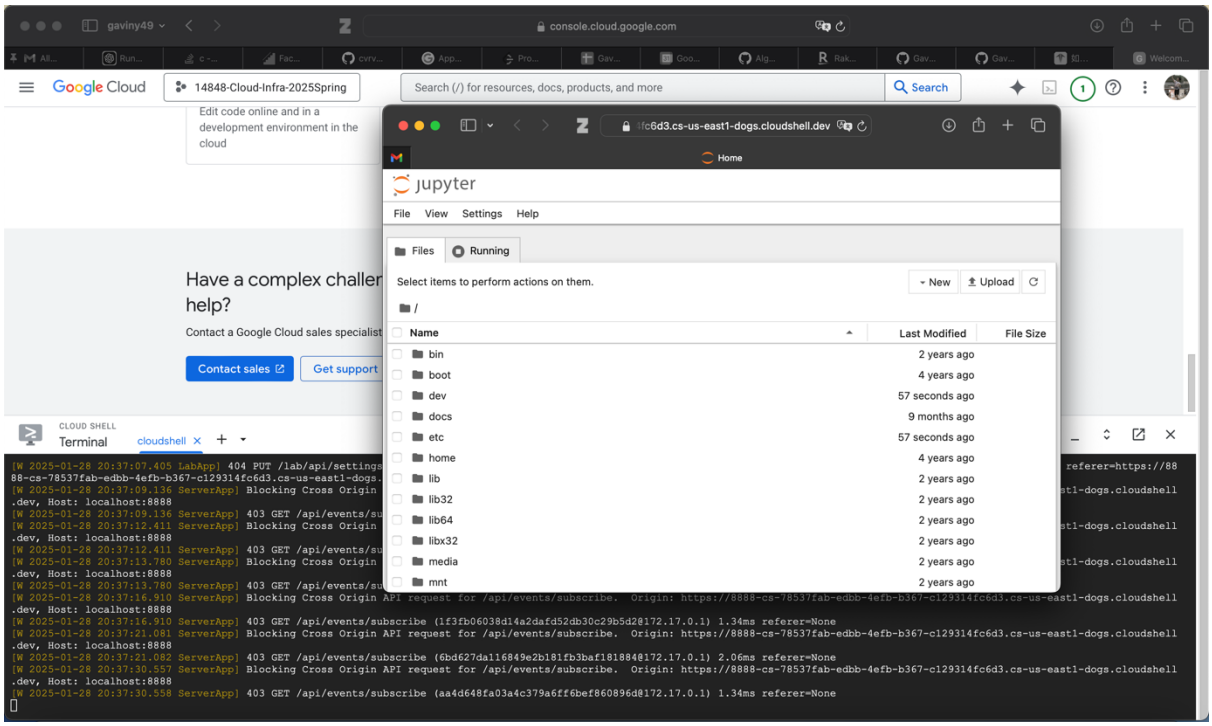
2. A. Dockerfile on GitHub repo: https://github.com/GavinLiao89/Test-Cloud-Infrastructure.git

   B. Run Jupyter Notebook using docker locally



   C. Image Repo: https://hub.docker.com/repository/docker/gavinliao89/hw2_img/general

   D. Run Jupyter Notebook using Google GCP



3. As we can see from the following screenshots, the performance for VM and Docker is as below:

VM:

• Memory: 229 MB

• CPU%: 1.4%

Docker (localhost):

• Memory (localhost): 2.33 GB

• CPU% (localhost): 99.8%

• Memory (docker): 110 MB

• CPU% (docker): 107.2%

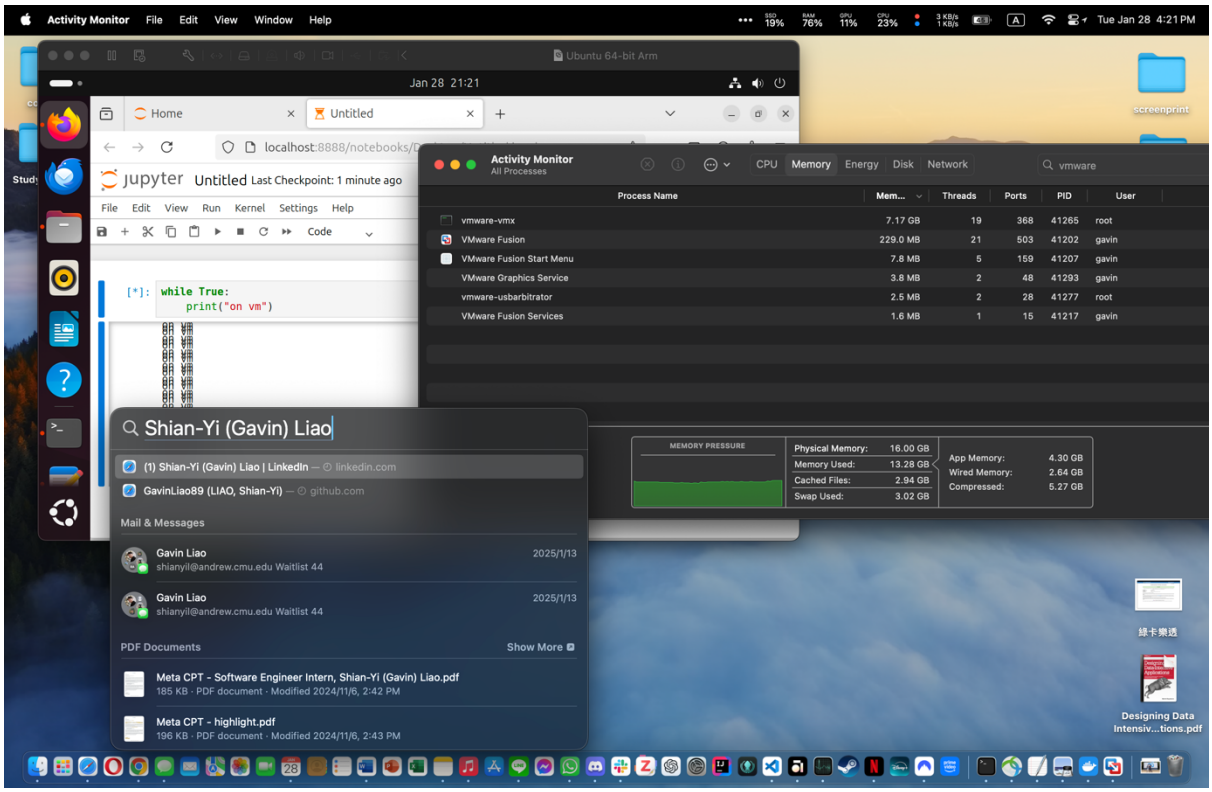
In this case, we can see that the VM performs better. I believe there are a few reasons for this outcome:

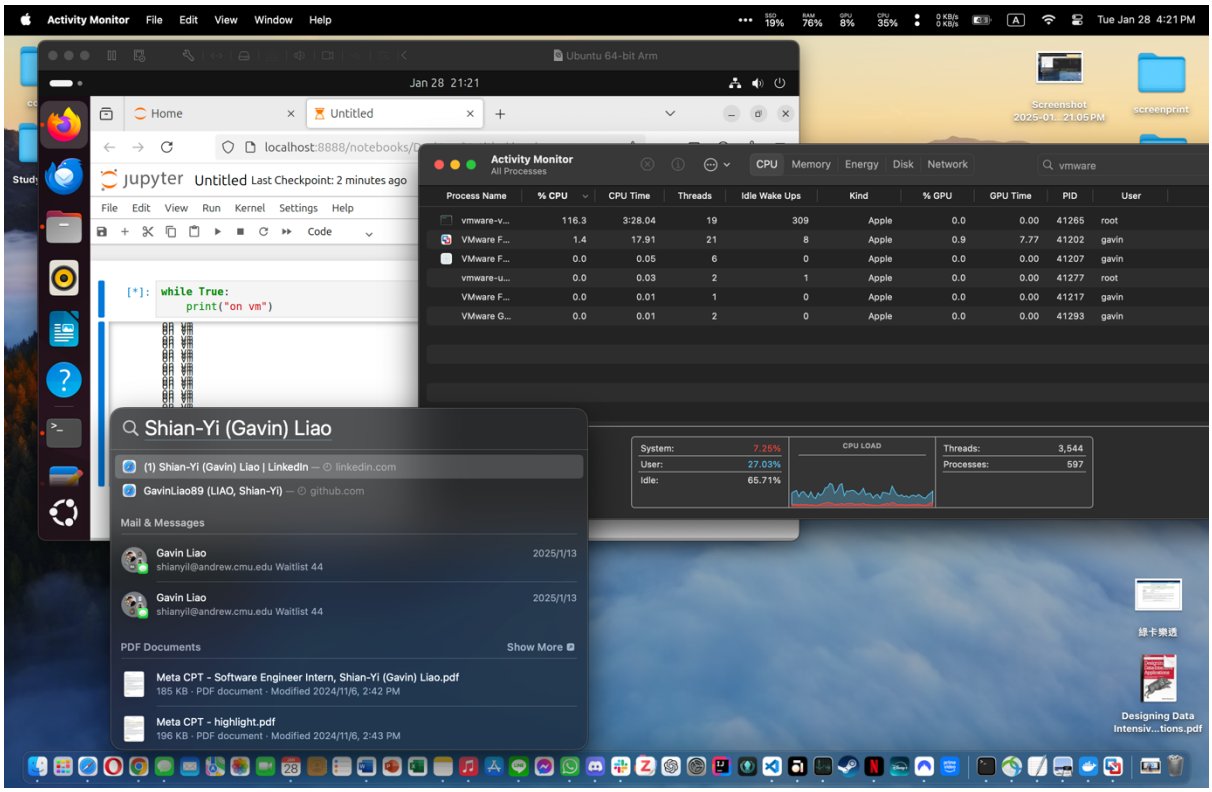
• **CPU resource allocation**: While VM is allocated with a fixed number of CPUs and memory, which means the performance will be consistent. On the other hand, the Docker will have to share resources with other processes since we are running locally.

• **Overhead**: Jupyter Notebook running on VM is considered running locally. However, we will have to go through Docker's NS management while running Jupyter notebook on Docker.

In conclusion, I believe that the resource allocation is the main reason why VM performs better.

• VM run




Activity Monitor File Edit View Window Help
Tue Jan 28 4:21 PM
Ubuntu 64-bit Arm
Jan 28 21:21
Home
Untitled
localhost:8888/notebooks/
jupyter Untitled Last Checkpoint: 2 minutes ago
File Edit View Run Kernel Settings Help
Code
[*]: while True:
print("on vm")
Activity Monitor
All Processes
CPU Memory Energy Disk Network
vmware
Process Name % CPU CPU Time Threads Idle Wake Ups Kind % GPU GPU Time PID User
vmware-v... 116.3 3:28.04 19 309 Apple 0.0 0.00 41265 root
VMware F... 1.4 17.91 21 8 Apple 0.9 7.77 41202 gavin
VMware F... 0.0 0.05 6 0 Apple 0.0 0.00 41207 gavin
vmware-u... 0.0 0.03 2 1 Apple 0.0 0.00 41277 root
VMware F... 0.0 0.01 1 0 Apple 0.0 0.00 41217 gavin
VMware G... 0.0 0.01 2 0 Apple 0.0 0.00 41293 gavin
System: 7.25%
User: 27.03%
Idle: 65.71%
CPU LOAD
Threads: 3,544
Processes: 597
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screenprint
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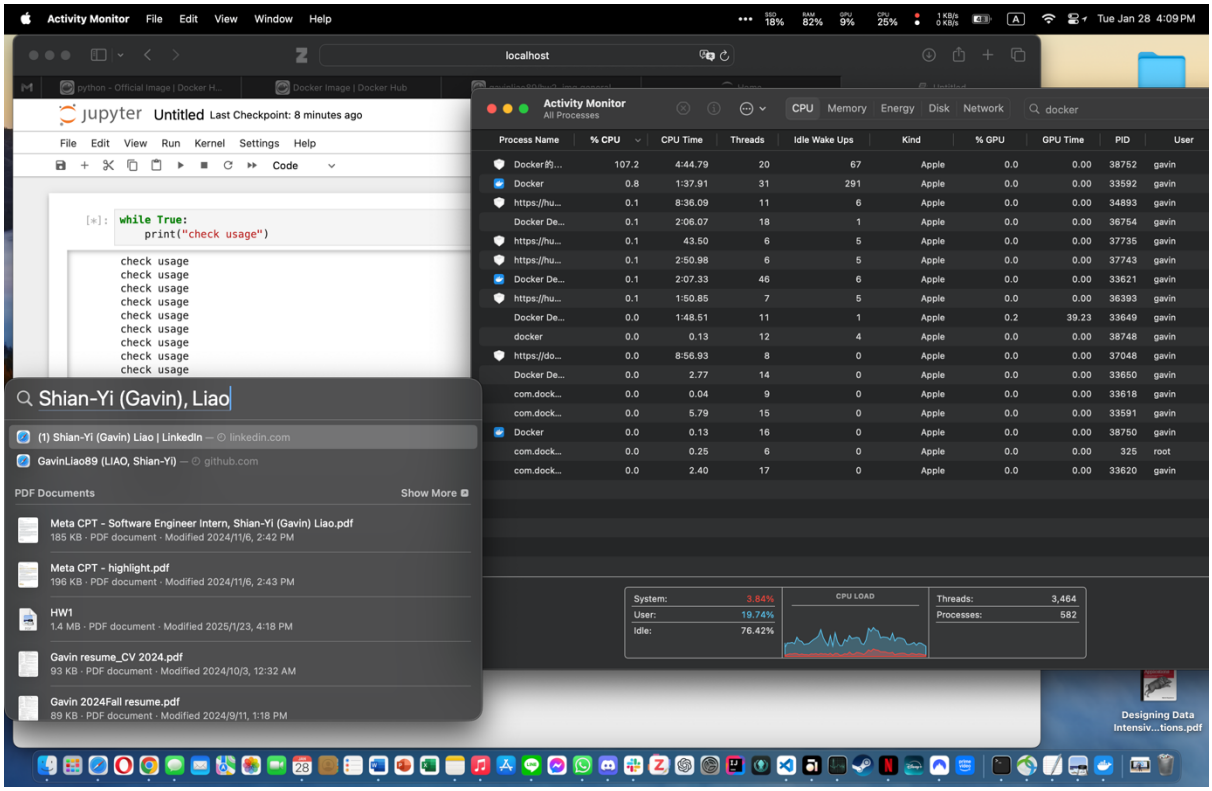
- Docker run


Activity Monitor File Edit View Window Help
Tue Jan 28 4:09 PM
localhost
jupyter Untitled Last Checkpoint: 8 minutes ago
File Edit View Run Kernel Settings Help
Code
[*]: while True:
print("check usage")
check usage
Activity Monitor
All Processes
CPU Memory Energy Disk Network
docker
Process Name % CPU CPU Time Threads Idle Wake Ups Kind % GPU GPU Time PID User
Docker的... 107.2 4:44.79 20 67 Apple 0.0 0.00 38752 gavin
Docker 0.8 1:37.91 31 291 Apple 0.0 0.00 33592 gavin
https://hu... 0.1 8:36.09 11 6 Apple 0.0 0.00 34893 gavin
Docker De... 0.1 2:06.07 18 1 Apple 0.0 0.00 36754 gavin
https://hu... 0.1 43.50 6 5 Apple 0.0 0.00 37735 gavin
https://hu... 0.1 2:50.98 6 5 Apple 0.0 0.00 37743 gavin
Docker De... 0.1 2:07.33 46 6 Apple 0.0 0.00 33621 gavin
https://hu... 0.1 1:50.85 7 5 Apple 0.0 0.00 36393 gavin
Docker De... 0.0 1:48.51 11 1 Apple 0.2 39.23 33649 gavin
docker 0.0 0.13 12 4 Apple 0.0 0.00 38748 gavin
https://do... 0.0 8:56.93 8 0 Apple 0.0 0.00 37048 gavin
Docker De... 0.0 2.77 14 0 Apple 0.0 0.00 33650 gavin
com.dock... 0.0 0.04 9 0 Apple 0.0 0.00 33618 gavin
com.dock... 0.0 5.79 15 0 Apple 0.0 0.00 33591 gavin
Docker 0.0 0.13 16 0 Apple 0.0 0.00 38750 gavin
com.dock... 0.0 0.25 6 0 Apple 0.0 0.00 325 root
com.dock... 0.0 2.40 17 0 Apple 0.0 0.00 33620 gavin
System: 3.84%
User: 19.74%
Idle: 76.42%
CPU LOAD
Threads: 3,464
Processes: 582
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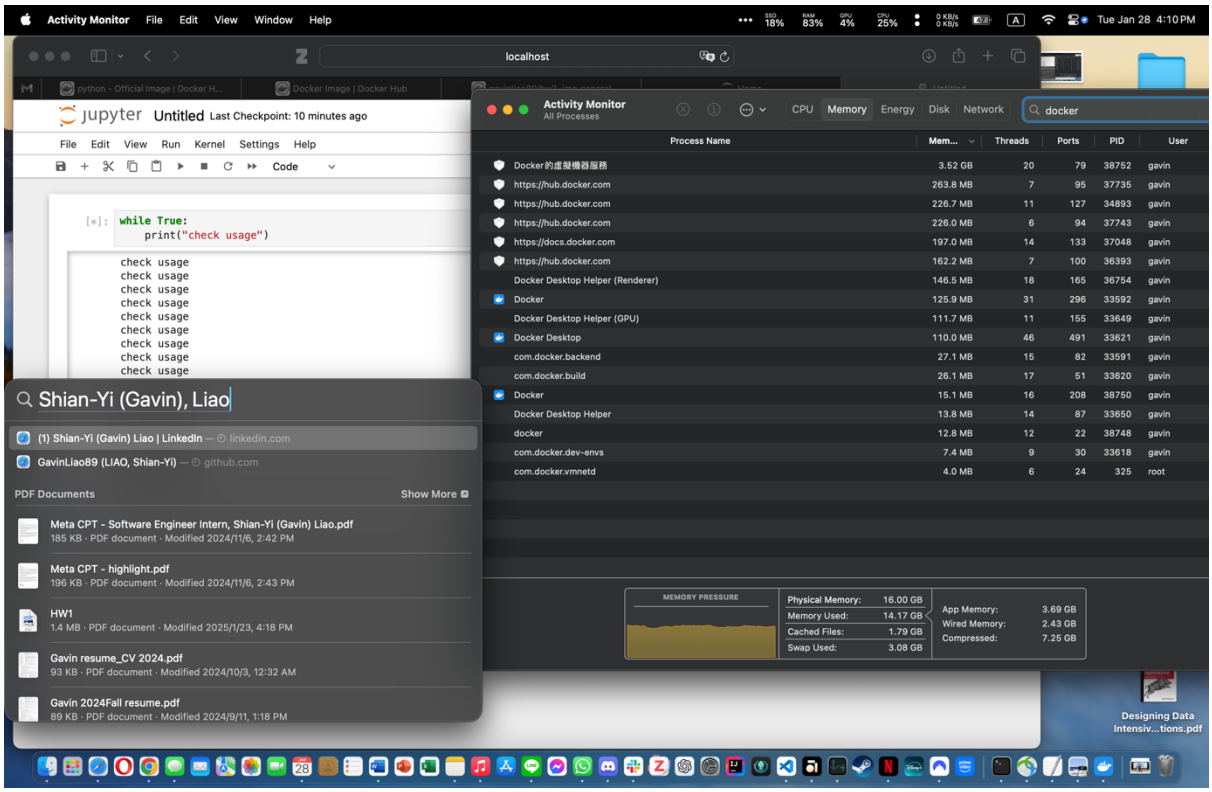
Activity Monitor File Edit View Window Help
Tue Jan 28 4:10 PM
localhost
jupyter Untitled Last Checkpoint: 10 minutes ago
File Edit View Run Kernel Settings Help
Code
while True:
print("check usage")
check usage
Activity Monitor
All Processes
CPU Memory Energy Disk Network
docker
Process Name Mem... Threads Ports PID User
Docker的虛擬機器服務 3.52 GB 20 79 38752 gavin
https://hub.docker.com 263.8 MB 7 95 37735 gavin
https://hub.docker.com 226.7 MB 11 127 34893 gavin
https://hub.docker.com 226.0 MB 6 94 37743 gavin
https://docs.docker.com 197.0 MB 14 133 37048 gavin
https://hub.docker.com 162.2 MB 7 100 36393 gavin
Docker Desktop Helper (Renderer) 146.5 MB 18 165 36754 gavin
Docker 125.9 MB 31 296 33592 gavin
Docker Desktop Helper (GPU) 111.7 MB 11 155 33649 gavin
Docker Desktop 110.0 MB 46 491 33621 gavin
com.docker.backend 27.1 MB 15 82 33591 gavin
com.docker.build 26.1 MB 17 51 33620 gavin
Docker 15.1 MB 16 208 38750 gavin
Docker Desktop Helper 13.8 MB 14 87 33650 gavin
docker 12.8 MB 12 22 38748 gavin
com.docker.dev-envs 7.4 MB 9 30 33618 gavin
com.docker.vmnetd 4.0 MB 6 24 325 root
MEMORY PRESSURE
Physical Memory: 16.00 GB
Memory Used: 14.17 GB
Cached Files: 1.79 GB
Swap Used: 3.08 GB
App Memory: 3.69 GB
Wired Memory: 2.43 GB
Compressed: 7.25 GB
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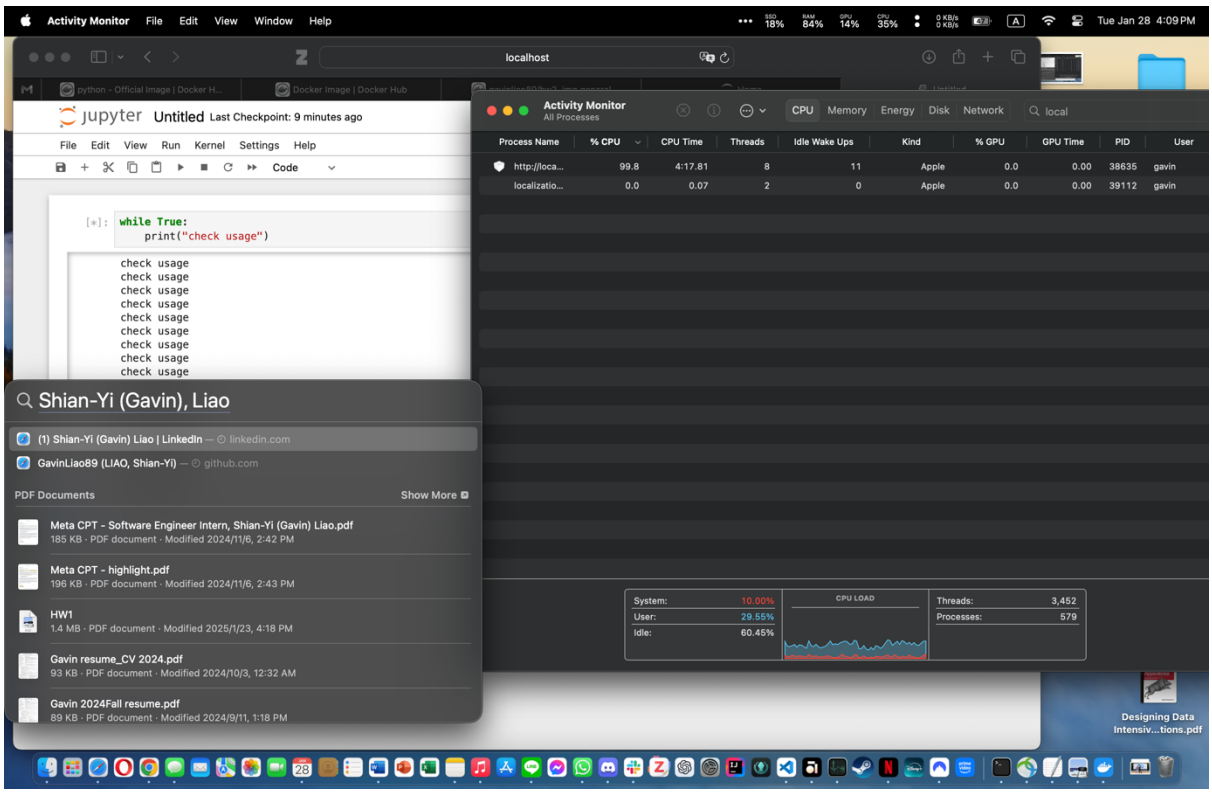
Activity Monitor File Edit View Window Help
Tue Jan 28 4:09 PM
localhost
jupyter Untitled Last Checkpoint: 9 minutes ago
File Edit View Run Kernel Settings Help
Code
while True:
print("check usage")
check usage
Activity Monitor
All Processes
CPU Memory Energy Disk Network
local
Process Name % CPU CPU Time Threads Idle Wake Ups Kind % GPU GPU Time PID User
http://loca... 99.8 4:17.81 8 11 Apple 0.0 0.00 38635 gavin
localizatio... 0.0 0.07 2 0 Apple 0.0 0.00 39112 gavin
System: 10.00%
User: 29.55%
Idle: 60.45%
CPU LOAD
Threads: 3,452
Processes: 579
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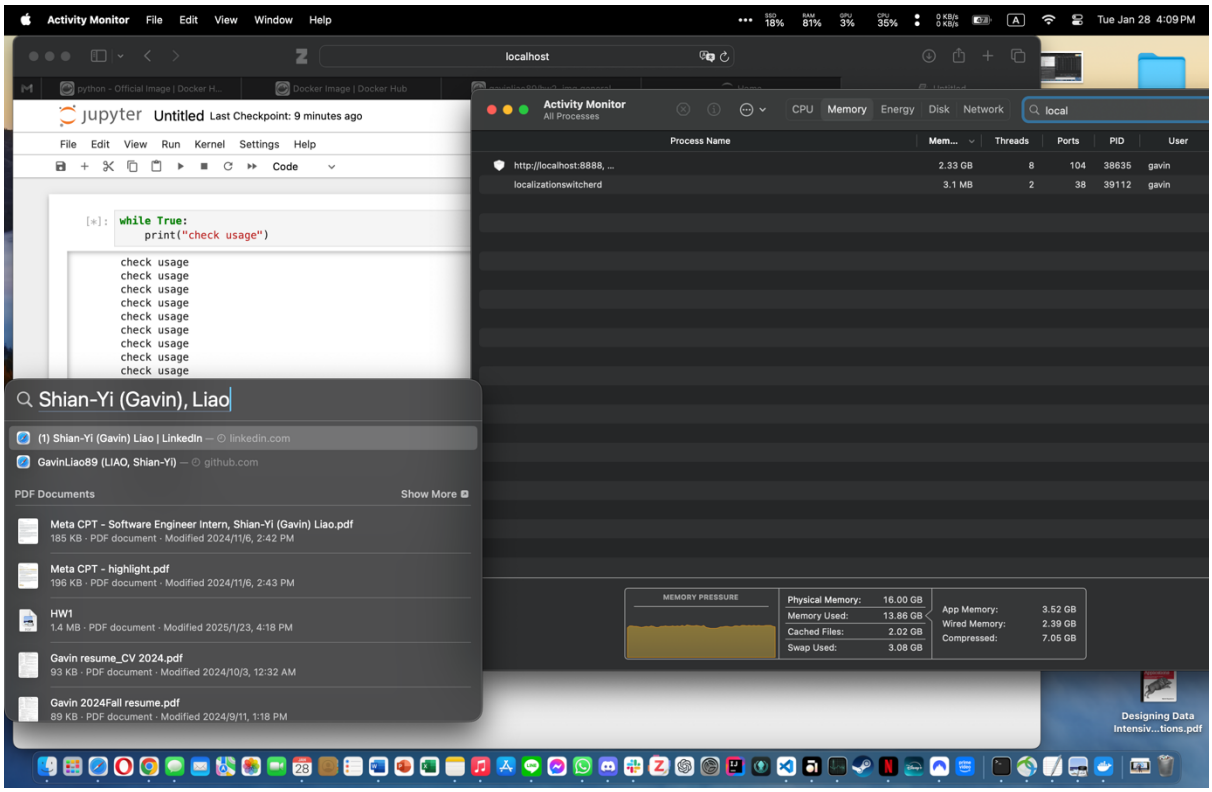
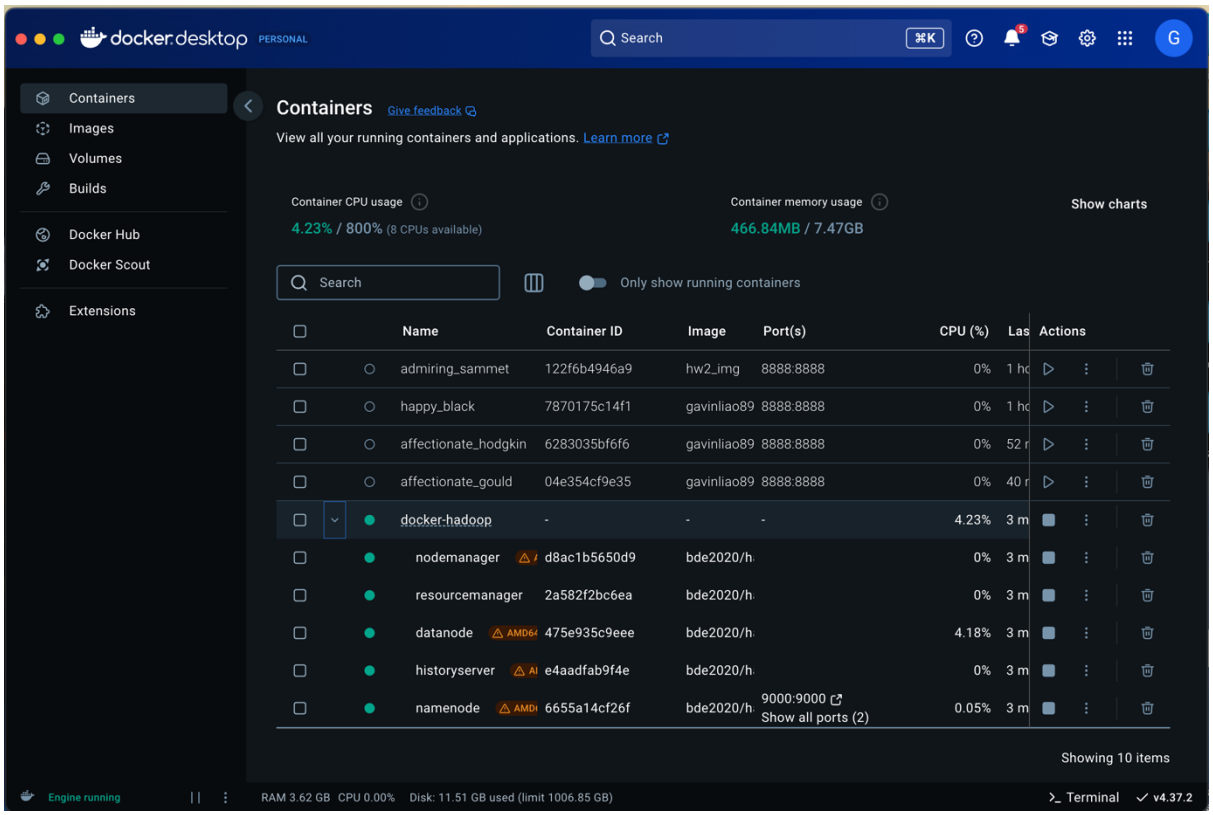
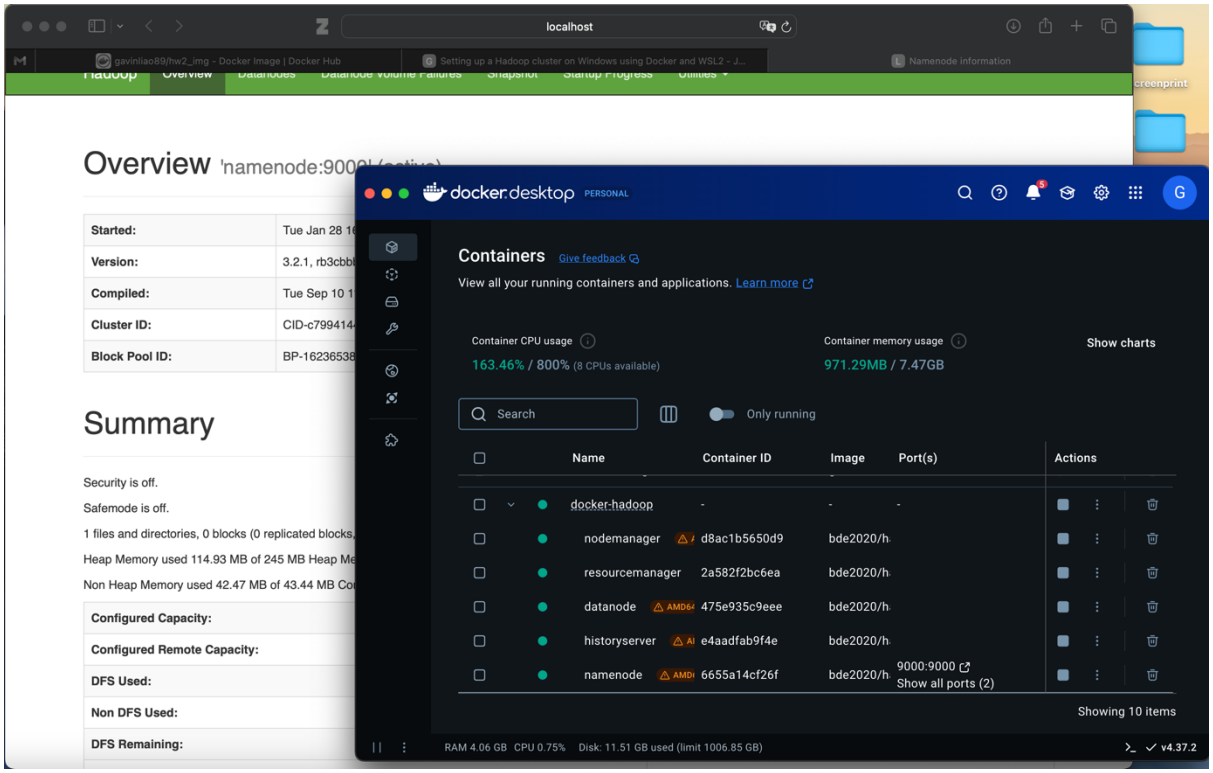


4. Both screenshots are shown below:




localhost
Namenode information
Overview 'namenode:9000' (active)
Started:
Version:
Compiled:
Cluster ID:
Block Pool ID:
Summary
Security is off.
Safemode is off.
Configured Capacity:
Configured Remote Capacity:
DFS Used:
Non DFS Used:
DFS Remaining:
docker desktop PERSONAL
Containers
Give feedback
View all your running containers and applications. Learn more
Container CPU usage
163.46% / 800% (8 CPUs available)
Container memory usage
971.29MB / 7.47GB
Show charts
Search
Only running
Name
Container ID
Image
Port(s)
Actions
docker-hadoop
nodemanager d8ac1b5650d9 bde2020/h
resourcemanager 2a582f2bc6ea bde2020/h
datanode 475e935c9eee bde2020/h
historyserver e4aadfab9f4e bde2020/h
namenode 6655a14cf26f bde2020/h 9000:9000
Show all ports (2)
Showing 10 items
RAM 4.06 GB CPU 0.75% Disk: 11.51 GB used (limit 1006.85 GB)
v4.37.2