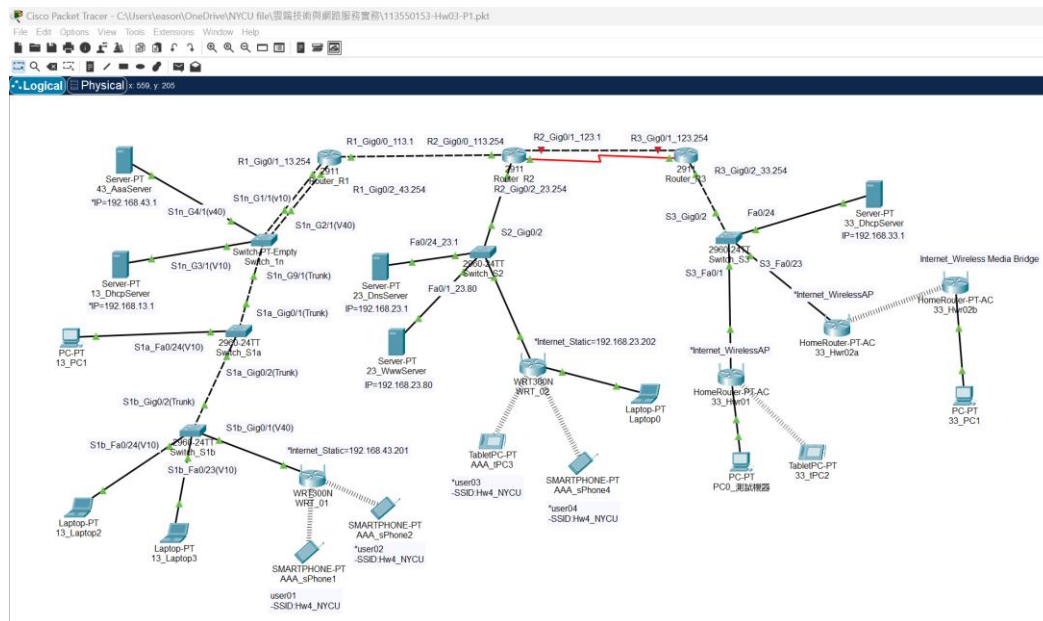


說明: 由於這次的兩份作業指引, 有些少數部分有設備或設定名稱不一致的地方, 如: S1n 或 1n, SSH 的帳號是 userWXYZ 或是 vuserXYZ...etc(還有其他小地方), 我不確定要用哪種, 所以就以製作作業時看到的名稱為準, 請老師見諒~

## 作業 Part 1

### 1. 最終網路拓譜圖成果:



### 2. Switch\_1n 設定:

在製作的過程中, 我發現 cisco 的程式有時會有 bug, vlan 切割在經過幾次連線調整後會壞掉, 這個 bug 在我測試了幾個小時後才被我測出來, 讓我一直以為我接的網路有誤, 重試了非常多次。

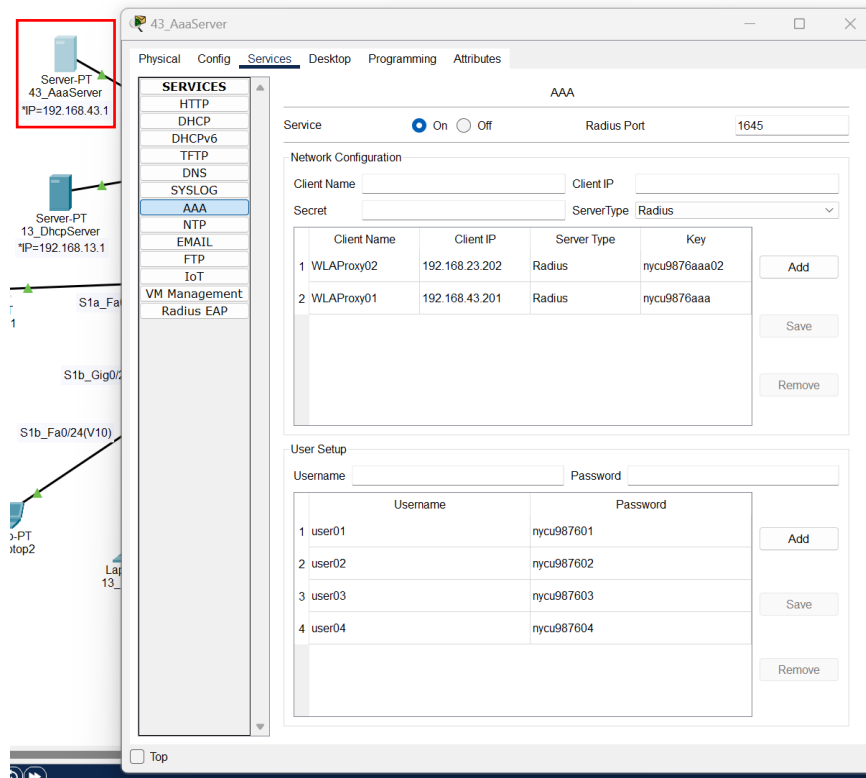
The screenshot shows the configuration window for Switch\_1n. The device name is 'Switch\_1n', the device model is 'Switch-PT-Empty', and the hostname is 'Switch'. The table below shows the status of the interfaces and VLANs.

Port	Link	VLAN	IP Address	MAC Address
GigabitEthernet0/1	Down	1	--	0090.0C60.17E2
GigabitEthernet1/1	Up	10	--	0001.64EE.6051
GigabitEthernet2/1	Up	40	--	0001.428C.67D4
GigabitEthernet3/1	Up	10	--	000C.CF80.0D20
GigabitEthernet4/1	Up	40	--	0007.ECE9.2E46
GigabitEthernet5/1	Down	10	--	0090.211E.3791
GigabitEthernet6/1	Down	40	--	0001.42D5.4E46
GigabitEthernet7/1	Down	10	--	0001.439C.05B4
GigabitEthernet8/1	Down	40	--	0090.2BA8.24A8
GigabitEthernet9/1	Up	--	--	0001.C7AD.2CC4
Vlan1	Down	1	<not set>	0040.0BCE.8B31

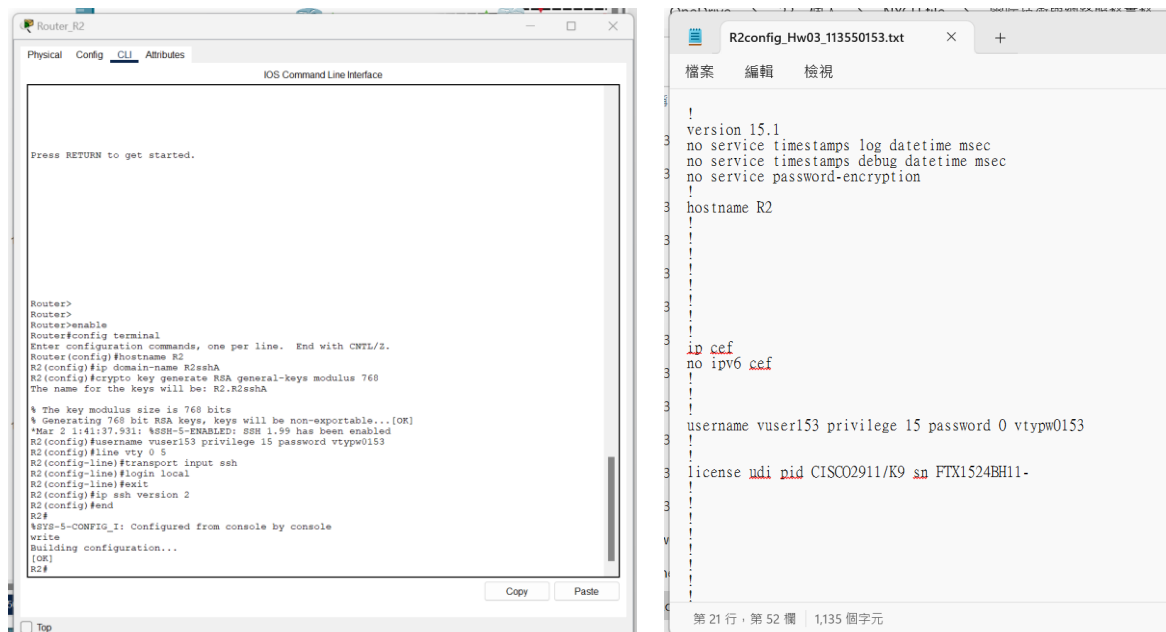
### 3. 43\_AaaServer 設定:

這個伺服器也設定了很久, 結果問題出在前述的 Switch Vlan 有問題 (多次測試後, 推測是 Cisco Packet 本身的問題, 因為我接法沒有變, 就是重接幾次

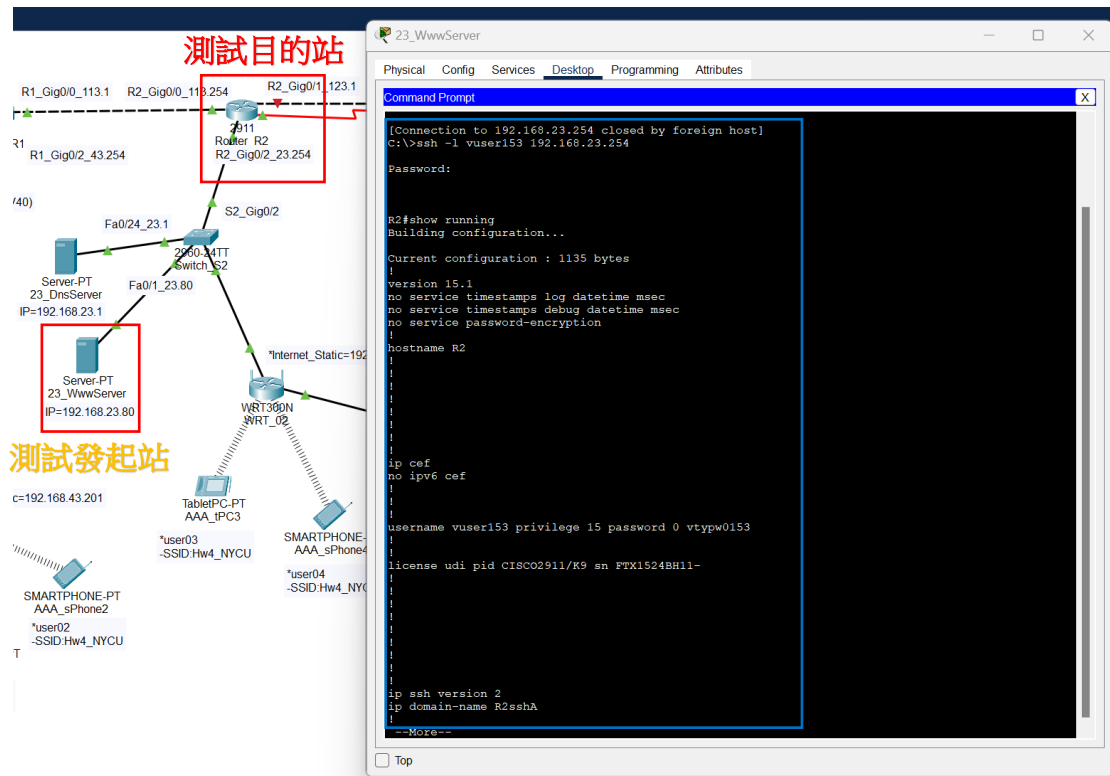
就好了)，最後成果如圖：



4. SSH 服務設定:(以下兩種設定截圖都附上)



## 5. SSH connection test



The diagram shows a network topology with a central router R2 (R2\_Gig0/1 123.1) connected to R1 (R1\_Gig0/0 113.1) and R2\_Gig0/2 23.254. R2 is also connected to S2 (S2\_Gig0/2) and S1 (S1\_Gig0/1). S2 is connected to Server-PT 23\_DnsServer (IP=192.168.23.1) and Server-PT 23\_WwwServer (IP=192.168.23.80). S1 is connected to TabletPC-PT AAA\_IPC3 and SMARTPHONE-PT AAA\_sPhone4. The Command Prompt shows the following configuration for R2:

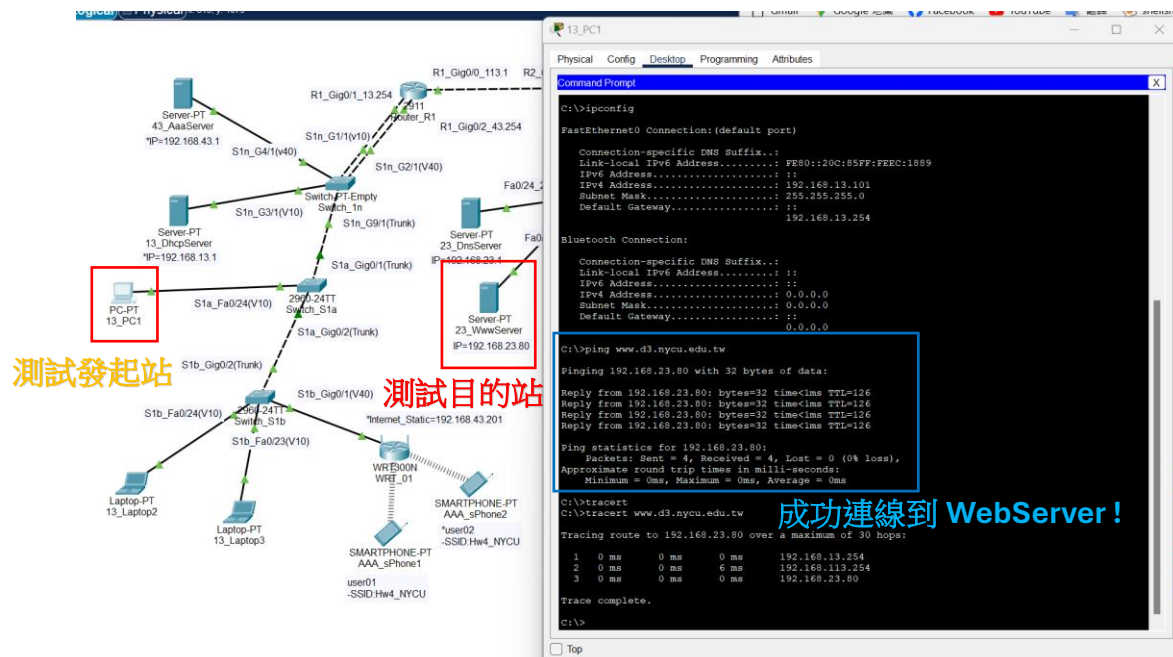
```

[Connection to 192.168.23.254 closed by foreign host]
C:\>ssh -l vuser153 192.168.23.254
Password:

R2#show running
Building configuration...

Current configuration : 1135 bytes
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
hostname R2
!
ip cef
no ipv6 cef
!
username vuser153 privilege 15 password 0 vtypw0153
!
license udi pid CISCO2911/K9 sn FTX1524BH11-
!
ip ssh version 2
ip domain-name R2sshA
--More--
  
```

## 6. Ping test1 – 使用 DNS name: (由 13\_PC1 發起)



The diagram shows a network topology with a central router R1 (R1\_Gig0/1 13.254) connected to R2 (R2\_Gig0/0 113.1) and R1\_Gig0/2 43.254. R1 is also connected to S1 (S1n\_G1/1(V10)) and S2 (S2n\_G1/1(V10)). S1 is connected to Server-PT 13\_AaaServer (IP=192.168.43.1) and Server-PT 13\_DhcpServer (IP=192.168.13.1). S2 is connected to Server-PT 23\_DnsServer (IP=192.168.23.1) and Server-PT 23\_WwwServer (IP=192.168.23.80). The Command Prompt shows the following configuration for 13\_PC1:

```

C:\>ipconfig

FastEthernet0 Connection: (default port)

    Connection-specific DNS Suffix...:
    Link-Local IPv6 Address...: FE80::20C:85FF:FEEC:1869
    IPv6 Address...: ::
    IPv4 Address...: 192.168.13.101
    Subnet Mask...: 255.255.255.0
    Default Gateway...: 192.168.13.254

Bluetooth Connection:

    Connection-specific DNS Suffix...:
    Link-Local IPv6 Address...: ::
    IPv6 Address...: ::
    IPv4 Address...: 0.0.0.0
    Subnet Mask...: 0.0.0.0
    Default gateway...: 0.0.0.0

C:\>ping www.d3.nycu.edu.tw

Pinging 192.168.23.80 with 32 bytes of data:

Reply from 192.168.23.80: bytes=32 time=126ms TTL=126
Reply from 192.168.23.80: bytes=32 time=126ms TTL=126
Reply from 192.168.23.80: bytes=32 time=126ms TTL=126
Reply from 192.168.23.80: bytes=32 time=126ms TTL=126

Ping statistics for 192.168.23.80:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>tracert
C:\>tracert www.d3.nycu.edu.tw

Tracing route to 192.168.23.80 over a maximum of 30 hops:

  0  0 ms  0 ms  0 ms  192.168.13.254
  1  0 ms  0 ms  6 ms  192.168.113.254
  2  0 ms  0 ms  0 ms  192.168.23.80

Trace complete.

C:\>
  
```

## 7. Ping test2 – 使用 DNS name: (由 AAA\_sPhone1 發起)

The network diagram shows a topology with routers R1 and R2, switches, and servers. A red box highlights the 'Server-PT 23\_WwwServer' with IP=192.168.23.80, labeled '測試目的站' (Test Target). Another red box highlights 'AAA\_sPhone1' with SSID:hw4\_NYCU, labeled '測試發起站' (Test Initiator). The Command Prompt window shows the following output:

```

C:\>ipconfig

Wireless0 Connection: (default port)

Connection-specific DNS Suffix...:
Link-local IPv6 Address...: FE80::260:5CFF:FE84:B5AA
IPv6 Address...:
IPv4 Address...: 192.168.0.102
Subnet Mask...: 255.255.255.0
Default Gateway...: 192.168.0.1

3G/4G Cell1 Connection:

Connection-specific DNS Suffix...:
Link-local IPv6 Address...: FE80::2E0:F7FF:FE7A:1753
IPv6 Address...:
IPv4 Address...: 0.0.0.0
Subnet Mask...: 0.0.0.0
Default Gateway...: 0.0.0.0

Bluetooth Connection:
--More--
Connection-specific DNS Suffix...:
Link-local IPv6 Address...:
IPv6 Address...:
IPv4 Address...: 0.0.0.0
Subnet Mask...: 0.0.0.0
Default Gateway...: 0.0.0.0

C:\>ping www.d3.nycu.edu.tw

Pinging 192.168.23.80 with 32 bytes of data:

Reply from 192.168.23.80: bytes=32 time=25ms TTL=125
Reply from 192.168.23.80: bytes=32 time=17ms TTL=125
Reply from 192.168.23.80: bytes=32 time=27ms TTL=125
Reply from 192.168.23.80: bytes=32 time=12ms TTL=125

Ping statistics for 192.168.23.80:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 12ms, Maximum = 27ms, Average = 20ms
  
```

成功連線到 WebServer!

## 8. Tracert test – 使用 DNS testing:

The network diagram shows a topology with routers R1 and R2, switches, and servers. A red box highlights the 'Server-PT 23\_WwwServer' with IP=192.168.23.80, labeled '測試目的站' (Test Target). Another red box highlights '33\_PC1', labeled '測試發起站' (Test Initiator). The Command Prompt window shows the following output:

```

Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection: (default port)

Connection-specific DNS Suffix...:
Link-local IPv6 Address...: FE80::2E0:F9FF:FE9E:6013
IPv6 Address...:
Autoconfiguration IPv4 Address...: 169.254.96.19
Subnet Mask...: 255.255.0.0
Default Gateway...: 0.0.0.0

Bluetooth Connection:

Connection-specific DNS Suffix...:
Link-local IPv6 Address...:
IPv6 Address...:
IPv4 Address...: 0.0.0.0
Subnet Mask...: 0.0.0.0
Default Gateway...: 0.0.0.0

C:\>tracert www.d3.nycu.edu.tw

Tracing route to 192.168.23.80 over a maximum of 30 hops:

 0  0 ms  0 ms  0 ms  192.168.33.254
 1  21 ms  17 ms  15 ms  192.168.133.1
 2  22 ms  16 ms  16 ms  192.168.133.1
 3  *      18 ms  18 ms  192.168.23.80

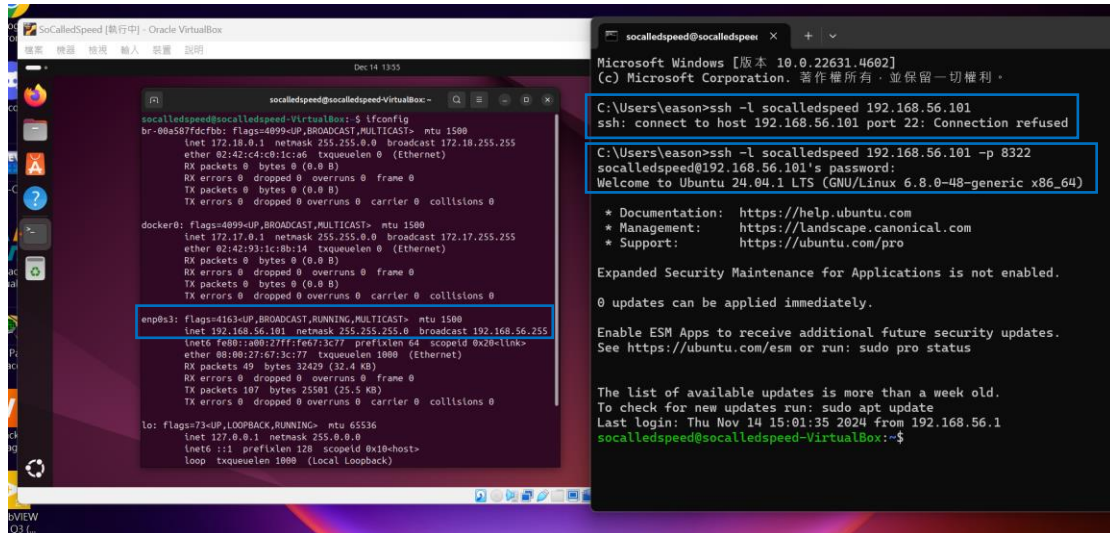
Trace complete.
  
```

成功 Trace 到 WebServer!

## 作業 Part 2

### 1. SSH 的連線測試成果截圖：

圖中可以看到，在一開始使用預設的 port 22 無法成功以 ssh 連線，但經由 -p 語法指定 port 8322 後，程式成功連線到 VM 主機上！



### 2. netstat -lnpt 網路狀態檢查測試成果：

圖中可以看到經過調整 ssh 的連線設定後，目前有 tcp (IPv4)跟 tcp6 (IPv6)兩個位置正在 Listen，等待連線，Port 均為 8322。

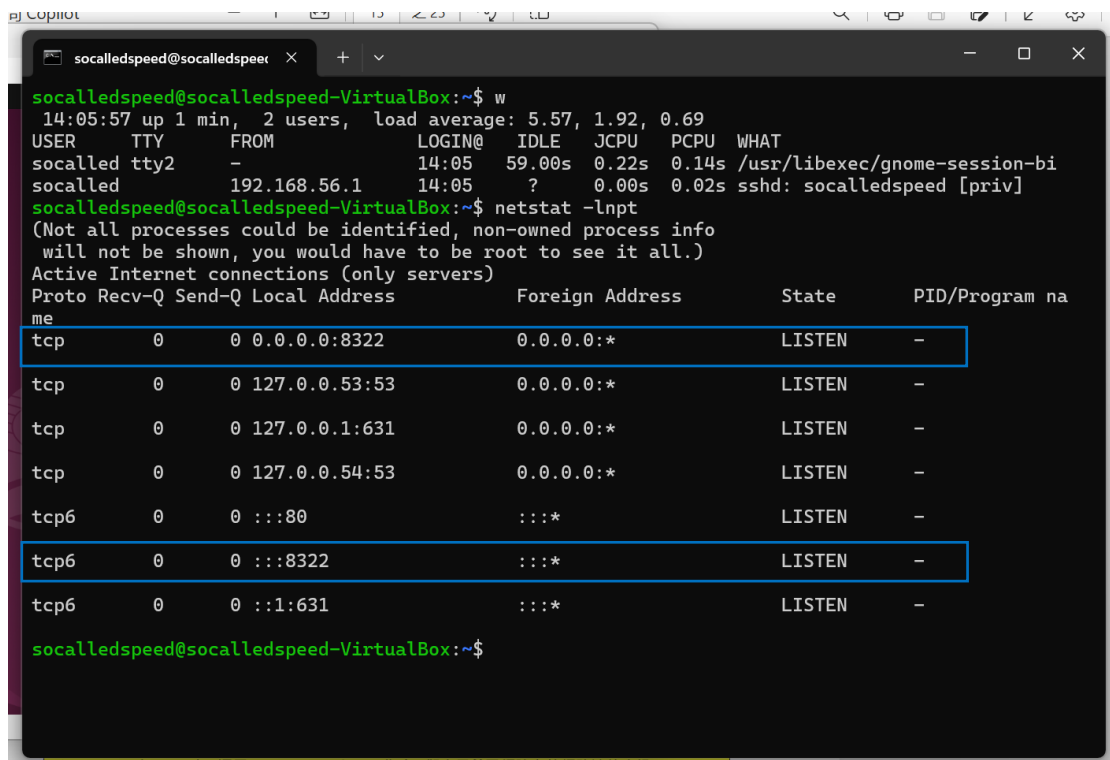
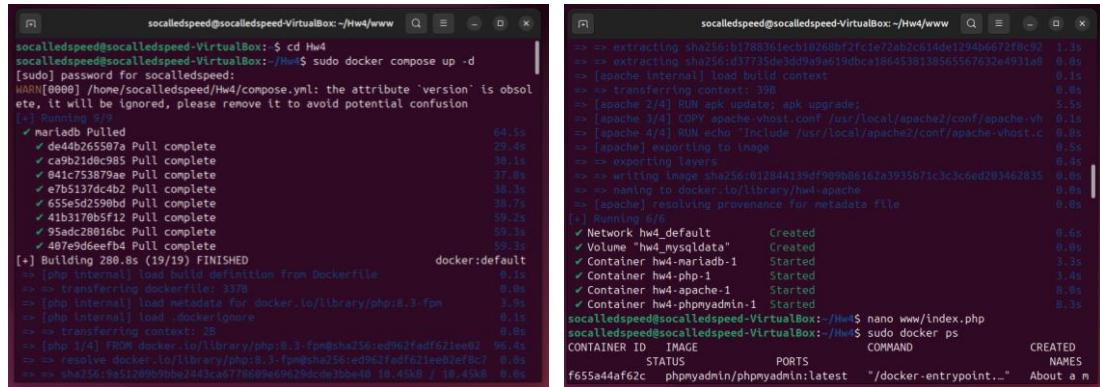


Fig. R1-3: 在 VM 上運用 "netstat -lnpt" 指令，觀察目前已經建立的網路連線資訊

### 3. 建立 docker compose container

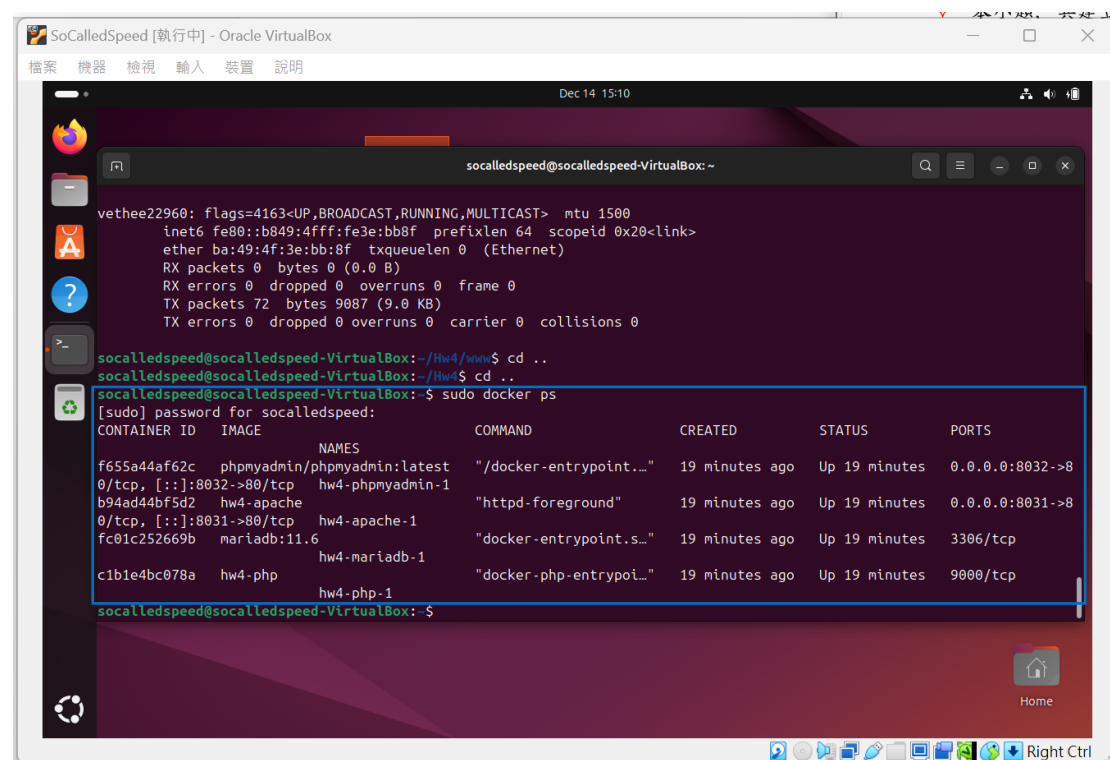
如圖所示，經過了一段時間後，自己設定的 docker compose 成功建立 (右圖)。



```
socalledspeed@socalledspeed-VirtualBox: ~/Hw4/www
socalledspeed@socalledspeed-VirtualBox: ~/Hw4$ sudo docker compose up -d
[sudo] password for socalledspeed:
WARN[0000] /home/socalledspeed/Hw4/compose.yml: the attribute 'version' is obsolete, it will be ignored, please remove it to avoid potential confusion
[+] Running 9/9
  ✓ mariadb Pulled                                64.5s
  ✓ de44b265507a Pull complete                    29.4s
  ✓ ca9b21dc985 Pull complete                     38.1s
  ✓ 041c753879ee Pull complete                    37.8s
  ✓ e7b5137dc4b2 Pull complete                    38.3s
  ✓ 655e5d2598bd Pull complete                    38.7s
  ✓ 41b317b5f12 Pull complete                     59.2s
  ✓ 95adc28016bc Pull complete                    59.3s
  ✓ 407e9d6eeb4 Pull complete                     59.3s
[+] Building 280.8s (19/19) FINISHED                docker:default
=> [php internal] load build definition from Dockerfile
=> [php internal] load metadata for docker.io/library/php:8.3-fpm 0.1s
=> [php internal] load dockerignore 0.1s
=> [php internal] transferring context: 28 0.0s
=> [php 1/4] FROM docker.io/library/php:8.3-fpm@sha256:ed962fadf621ee02 96.4s
=> => resolve docker.io/library/php:8.3-fpm@sha256:ed962fadf621ee02ef8c7 0.0s
=> => sha256:9a51209b0bbe2443ca6778699e69a20dcde3bbe0 18.45kB / 18.45kB 0.0s
=> => extracting sha256:b17883d1ecb10260f71c1e72ab2c61d0e129406672f8c92 1.3s
=> => extracting sha256:d377330a3d0996919dca18641381385567632e4931a0 0.6s
=> [apache internal] load build context 0.1s
=> => transferring context: 390 0.0s
=> [apache 1/4] RUN apk update; apk upgrade; 5.5s
=> [apache 2/4] COPY apache-vhost.conf /usr/local/apache2/conf/apache.vh 0.1s
=> [apache 3/4] RUN echo "include /usr/local/apache2/conf/apache-vhost.c 0.0s
=> [apache] exporting to image 0.5s
=> => exporting layers 0.4s
=> => writing image sha256:01284a139df909606162a3935b71c3c3c6ed203462835 0.0s
=> => naming to docker.io/library/hw4-apache 0.0s
=> [apache] resolving provenance for metadata file 0.0s
[+] Running 6/6
  ✓ Network hw4_default Created                    0.6s
  ✓ Volume "hw4_mysqldata" Created                 0.0s
  ✓ Container hw4-mariadb-1 Started                 3.3s
  ✓ Container hw4-php-1 Started                    3.4s
  ✓ Container hw4-apache-1 Started                 0.8s
  ✓ Container hw4-phpmyadmin-1 Started             0.3s
socalledspeed@socalledspeed-VirtualBox: ~/Hw4$ nano www/index.php
socalledspeed@socalledspeed-VirtualBox: ~/Hw4$ sudo docker ps
CONTAINER ID   IMAGE                                PORTS
f655a44af62c   phpmyadmin/phpmyadmin:latest       "/docker-entrypoint..." About a m
```

### 4. 顯示 docker 執行中的容器

如圖所示，透過 docker ps 指令確認，建立好的 phpmyadmin、apache、mariadb、php 服務均於 docker 容器中正常執行，。

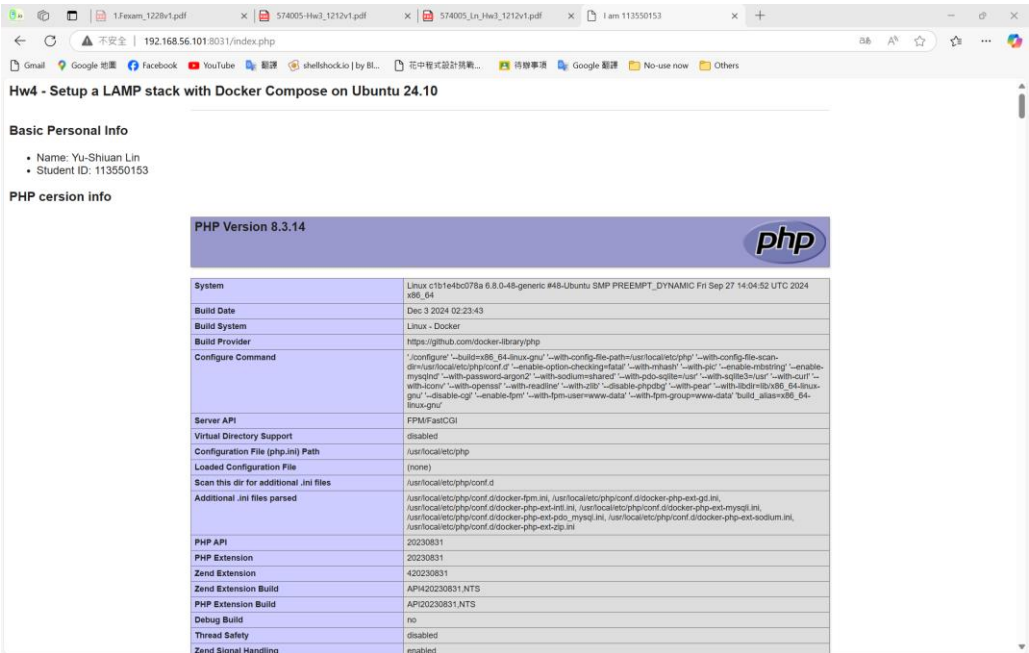


```
socalledspeed@socalledspeed-VirtualBox: ~/Hw4/www$ cd ..
socalledspeed@socalledspeed-VirtualBox: ~/Hw4$ cd ..
socalledspeed@socalledspeed-VirtualBox: ~/Hw4$ sudo docker ps
[sudo] password for socalledspeed:
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS
f655a44af62c   phpmyadmin/phpmyadmin:latest       "/docker-entrypoint..." 19 minutes ago Up 19 minutes 0.0.0.0:8032->80/tcp, [::]:8032->80/tcp
b94ad44bf5d2   hw4-apache                         "httpd -foreground"      19 minutes ago Up 19 minutes 0.0.0.0:8031->80/tcp, [::]:8031->80/tcp
fc01c252669b   mariadb:11.6                       "docker-entrypoint.s..." 19 minutes ago Up 19 minutes 3306/tcp
c1b1e4bc078a   hw4-php                             "docker-php-entrypoi..." 19 minutes ago Up 19 minutes 9000/tcp
               hw4-php-1
```

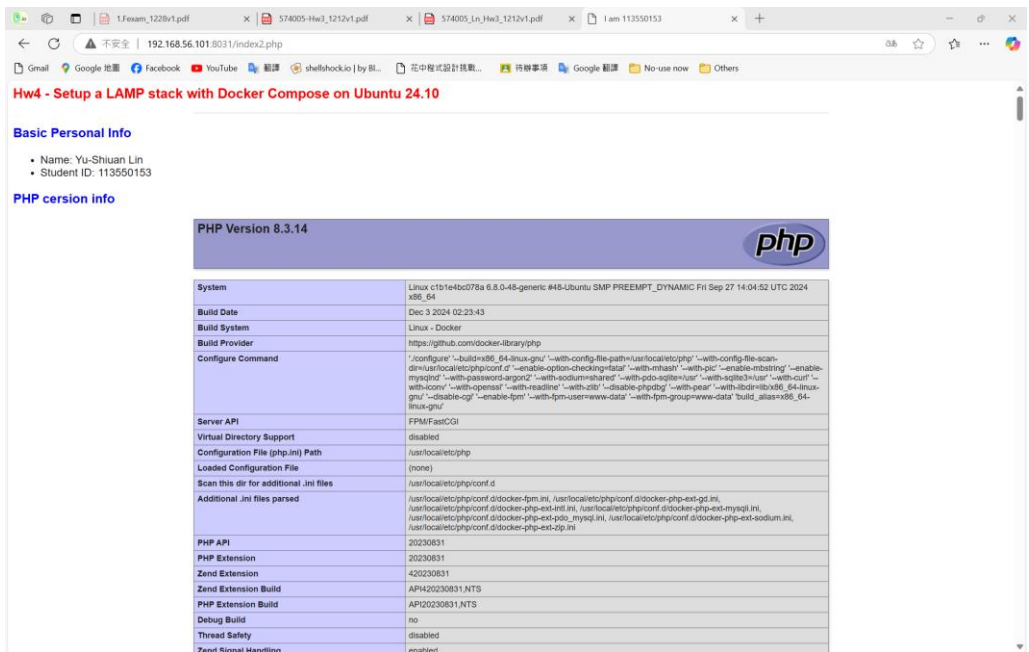


5. 網站連線成果 (含 index 與 index2 兩個網頁)

網頁一 (index.php)



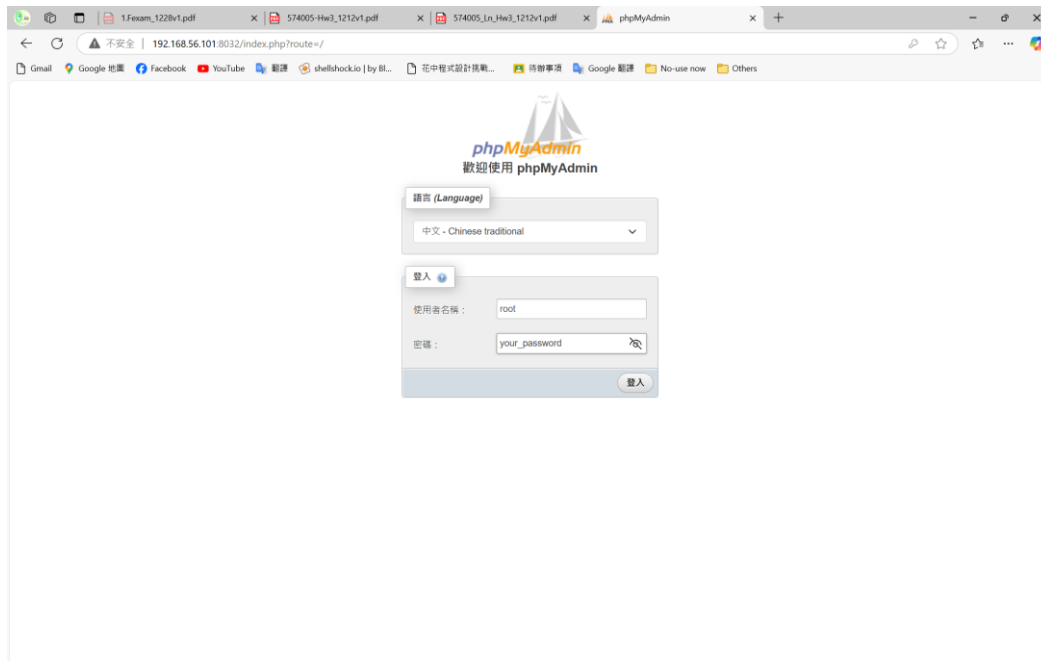
網頁二 (index2.php)



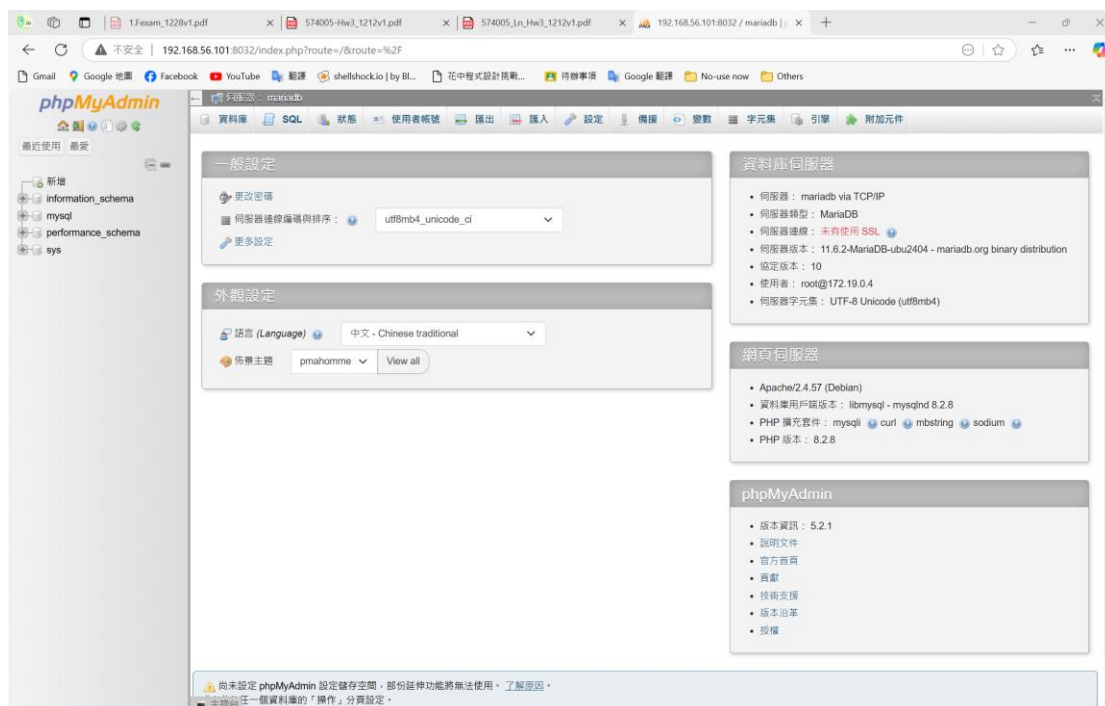
可以看到兩個網頁均正常連上，並且在字體部分的顏色也有所改變!

## 6. phpMyAdmin 服務連線成果

### 登入前的畫面



### 登入後: (登入成功)



以上為本次作業內容，另外，在 Part 1 的 Cisco Packet 的.pkt 檔案中，由於有兩個 Router SSID 都是 Hw4\_NYCU，.pkt 打開時有機率四個 user 都連到某個 Router，故於此補充說明，謝謝老師! 如果作業有疏漏的部分，煩請老師告知，謝謝!