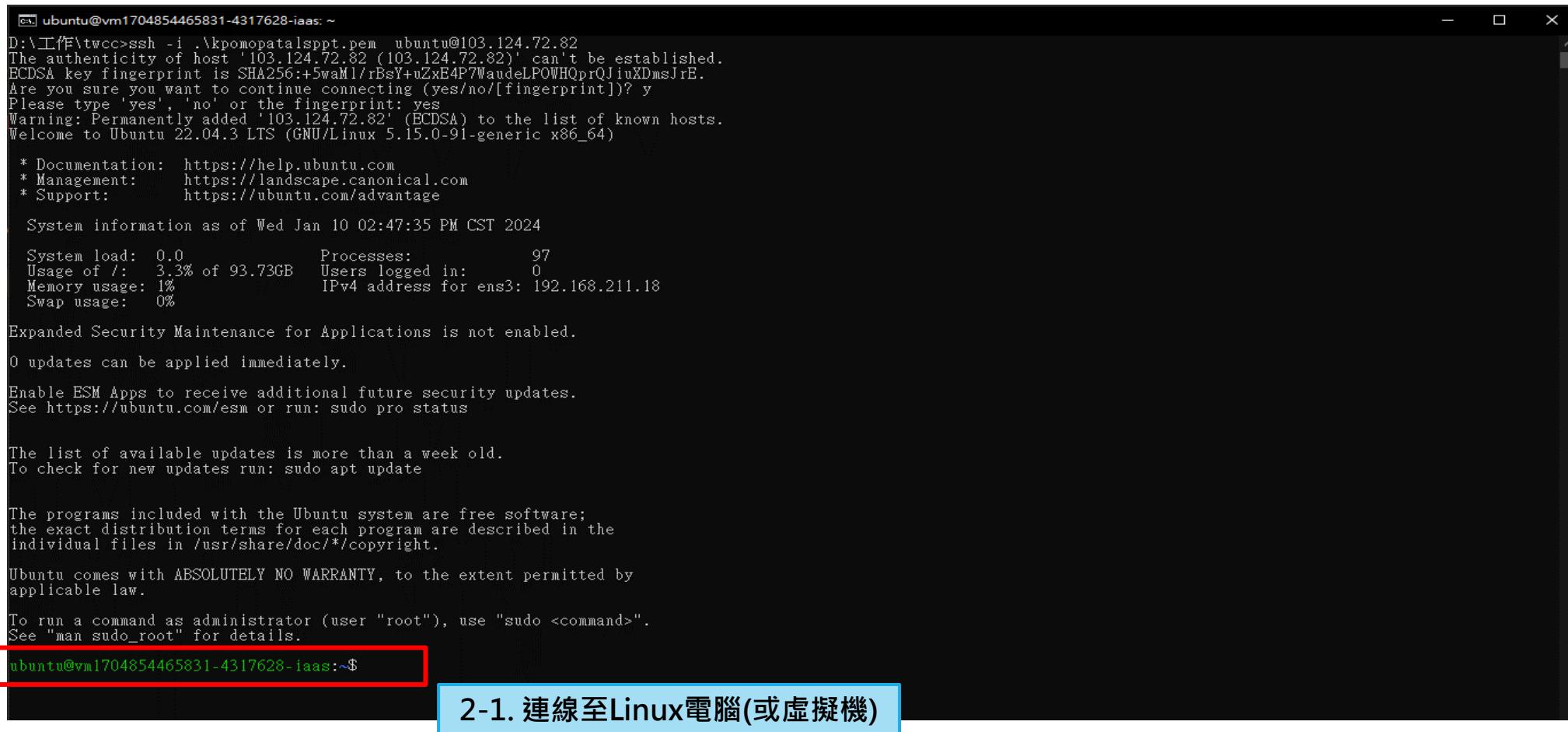


# Smart on FHIR Server

---

LINUX

# 1. 準備一台Linux環境的電腦(或虛擬機)



```
ubuntu@vm1704854465831-4317628-iaas:~$ D:\工\#F\twcc>ssh -i .\kpomopatalsppt.pem ubuntu@103.124.72.82
The authenticity of host '103.124.72.82 (103.124.72.82)' can't be established.
ECDSA key fingerprint is SHA256:+5wam1/rBsY+uZxE4P7WaudeLPOWHQprQJiuXDmsJrE.
Are you sure you want to continue connecting (yes/no/[fingerprint])? y
Please type 'yes', 'no' or the fingerprint: yes
Warning: Permanently added '103.124.72.82' (ECDSA) to the list of known hosts.
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 5.15.0-91-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

 System information as of Wed Jan 10 02:47:35 PM CST 2024

 System load: 0.0      Processes:          97
 Usage of /: 3.3% of 93.73GB  Users logged in:  0
 Memory usage: 1%          IPv4 address for ens3: 192.168.211.18
 Swap usage:  0%

 Expanded Security Maintenance for Applications is not enabled.

 0 updates can be applied immediately.

 Enable ESM Apps to receive additional future security updates.
 See https://ubuntu.com/esm or run: sudo pro status

 The list of available updates is more than a week old.
 To check for new updates run: sudo apt update

 The programs included with the Ubuntu system are free software;
 the exact distribution terms for each program are described in the
 individual files in /usr/share/doc/*/*copyright.

 Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
 applicable law.

 To run a command as administrator (user "root"), use "sudo <command>".
 See "man sudo_root" for details.

ubuntu@vm1704854465831-4317628-iaas:~$
```

2-1. 連線至Linux電腦(或虛擬機)

## 2. 安裝SmartonFHIR Server

```
ubuntu@vm1704954932033-4320973-iaas: ~
Expanded Security Maintenance for Applications is not enabled.
0 updates can be applied immediately.
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
The list of available updates is more than a week old.
To check for new updates run: sudo apt update
Last login: Thu Jan 11 14:59:00 2024 from 120.97.100.11
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
ubuntu@vm1704954932033-4320973-iaas:~$ sudo snap install docker
Download snap "core22" (1033) from channel "stable"
```

2-1. 輸入 `sudo snap install docker`

```
ubuntu@vm1704954932033-4320973-iaas: ~
IPv4 address for docker0: 172.17.0.1
IPv4 address for ens3: 192.168.211.23
* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
  just raised the bar for easy, resilient and secure K8s cluster deployment.
  https://ubuntu.com/engage/secure-kubernetes-at-the-edge
Expanded Security Maintenance for Applications is not enabled.
8 updates can be applied immediately.
To see these additional updates run: apt list --upgradable
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

*** System restart required ***
Last login: Fri Jan 12 10:32:11 2024 from 120.97.100.9
ubuntu@vm1704954932033-4320973-iaas:~$ git clone https://github.com/smart-on-fhir/smart-dev-sandbox.git
Cloning into 'smart-dev-sandbox'...
```

2-2. 輸入 `git clone https://github.com/smart-on-fhir/smart-dev-sandbox.git` (剛剛的網址)  
並且可以輸入 `ls` 確認是否有下載成功

```
Resolving deltas: 100% (556/556), done.
ubuntu@vm1704954932033-4320973-iaas:~$ ls
hapi-fhir-jpaserver-starter persistence.json smart-dev-sandbox
ubuntu@vm1704954932033-4320973-iaas:~$
```

## 2. 安裝SmartonFHIR Server

```
ubuntu@vm1704954932033-4320973-iaas:~$ git clone https://github.com/smart-on-fhir/smart-dev-sandbox.git
Cloning into 'smart-dev-sandbox'...
remote: Enumerating objects: 1058, done.
remote: Counting objects: 100% (146/146), done.
remote: Compressing objects: 100% (80/80), done.
remote: Total 1058 (delta 80), reused 115 (delta 63), pack-reused 912
Receiving objects: 100% (1058/1058), 150.36 MiB | 24.24 MiB/s done
Resolving deltas: 100% (556/556), done.
ubuntu@vm1704954932033-4320973-iaas:~$ ls
hapi-fhir-jpaserver-starter persistence.json smart-dev-sandbox
ubuntu@vm1704954932033-4320973-iaas:~$ cd smart-dev-sandbox
ubuntu@vm1704954932033-4320973-iaas:~/smart-dev-sandbox$
```

2-3. 輸入cd smart-dev-sandbox 進入剛剛下載的資料夾中

```
ubuntu@vm1704954932033-4320973-iaas:~$ cd smart-dev-sandbox
ubuntu@vm1704954932033-4320973-iaas:~/smart-dev-sandbox$ ls
docker-compose.yml LICENSE patient-browser README.md screenshot.png www
ubuntu@vm1704954932033-4320973-iaas:~/smart-dev-sandbox$ nano .env
ubuntu@vm1704954932033-4320973-iaas:~/smart-dev-sandbox$ nano .env
```

2-4. 輸入nano .env 修改設定

## 2. 安裝SmartonFHIR Server

```
ubuntu@vm1704954932033-4320973-iaas: ~/smart-dev-sandbox
GNU nano 6.2 .env
#
# Host Machine
#
# The host that everything runs on. By default this is "localhost" but can
# be changed if you want to deploy this in different domain. Can also be an
# IP address. For example you could find what your IP is within your LAN,
# set it here and the sandbox will be accessible from any machine within
# that network
HOST=localhost

# HAPI R4 FHIR Server
#
# Must be 1 to enable the server or 0 to disable it
R4_ENABLED=1

# Server PORT
R4_PORT=4004

# Memory limit for this server
R4_MEMORY=2g

# CPU limit for this server
R4_THREADS=2

[ Read 135 lines ]
```

### 2-5. 將localhost改成你的IP

```
ubuntu@vm1704954932033-4320973-iaas: ~/smart-dev-sandbox
GNU nano 6.2 .env *
#
# Host Machine
#
# The host that everything runs on. By default this is "localhost" but can
# be changed if you want to deploy this in different domain. Can also be an
# IP address. For example you could find what your IP is within your LAN,
# set it here and the sandbox will be accessible from any machine within
# that network
HOST=203.145.214.76

# HAPI R4 FHIR Server
#
# Must be 1 to enable the server or 0 to disable it
R4_ENABLED=1

# Server PORT
R4_PORT=4004

# Memory limit for this server
R4_MEMORY=2g

# CPU limit for this server
R4_THREADS=2

[ Read 135 lines ]
```

2-5-1. 如果要把資料庫清空，可以往下滑，把  
R4\_IMAGE=smartonfhir/hapi-5:r4-synthea  
改成  
R4\_IMAGE=smartonfhir/hapi-5:r4-empty

```
# example: `sudo docker rm hapi-r4 && docker volume rm smart-dev-sandbox
R4_IMAGE=smartonfhir/hapi-5:r4-synthea

[ Help Write Out Where Is Cut Execute Location M-U
  Exit Read File Replace Paste J Justify Go To Line M-E ]
```

### 2-6. 要存檔可以先ctrl+X

```
# WARNING: When you change this to another
# the current docker volume (if any) will be lost
# example: `sudo docker rm hapi-r4 && docker volume rm smart-dev-sandbox
R4_IMAGE=smartonfhir/hapi-5:r4-synthea
```

### 2-7. Y

Save modified buffer?

Y Yes

N No

File Name to Write: .env

[ Help Read File Replace Paste J Justify Go To Line M-E ]

### 2-8. Enter

## 2. 安裝SmartonFHIR Server

```
ubuntu@vm1704954932033-4320973-iaas: ~/smart-dev-sandbox
```

```
GNU nano 6.2
fhir-viewer: #
  container_name: fhir-viewer
  image: smartonfhir/fhir-viewer
  scale: $FHIR_VIEWER_ENABLED
  ports:
    - "${FHIR_VIEWER_PORT}:80"

patient-browser: #
  container_name: patient-browser
  image: smartonfhir/patient-browser:latest
  volumes:
    - ./patient-browser:/usr/share/nginx/html/config
  environment:
    HOST: "${HOST}"
    FHIR_VIEWER_PORT: "${FHIR_VIEWER_PORT}"
    R2_PORT: "${R2_PORT}"
    R3_PORT: "${R3_PORT}"
    R4_PORT: "${R4_PORT}"
  ports:
    - $PATIENT_BROWSER_PORT:80
  command: ["sh", "-c", "
    envsubst < /usr/share/nginx/html/config/r2.tpl > /usr/share/nginx/html/config/r2-local.json5 &&
    envsubst < /usr/share/nginx/html/config/r3.tpl > /usr/share/nginx/html/config/r3-local.json5 &&
    envsubst < /usr/share/nginx/html/config/r4.tpl > /usr/share/nginx/html/config/r4-local.json5 &&
    nginx -g 'daemon off;'" ]
  scale: $PATIENT_BROWSER_ENABLED
```

```
docker-compose.yml
```

```
ubuntu@vm1704954932033-4320973-iaas:~/smart-dev-sandbox$ docker-compose.yml LICENSE patient-browser README.md screenshot.png www
ubuntu@vm1704954932033-4320973-iaas:~/smart-dev-sandbox$ nano docker-compose.yml
```

2-10. 往下滑找到這裡，把\刪除

2-9. nano docker-compose.yml 修改檔案

```
3-4320973-iaas: ~/smart-dev-sandbox
```

```
docker-compose.yml *
r-viewer
fhir-viewer
_ENABLED
PORT:80"

patient-browser
patient-browser:latest
patient:/usr/share/nginx/html/config
HOST: "${HOST}"
FHIR_VIEWER_PORT: "${FHIR_VIEWER_PORT}"
R2_PORT: "${R2_PORT}"
R3_PORT: "${R3_PORT}"
R4_PORT: "${R4_PORT}"
ports:
  - $PATIENT_BROWSER_PORT:80
command: ["sh", "-c", "
  envsubst < /usr/share/nginx/html/config/r2.tpl > /usr/share/nginx/html/config/r2-local.json5 &&
  envsubst < /usr/share/nginx/html/config/r3.tpl > /usr/share/nginx/html/config/r3-local.json5 &&
  envsubst < /usr/share/nginx/html/config/r4.tpl > /usr/share/nginx/html/config/r4-local.json5 &&
  nginx -g 'daemon off;'" ]
scale: $PATIENT_BROWSER_ENABLED
```

```
^G Help      ^O Write Out  ^W Where Is  ^K Cut      ^T Execute  ^C Location  M-U Undo  M-A Set Mark
^X Exit      ^R Read File  ^V Replace   ^U Paste    ^J Justify  ^I Go To Line M-B Redo  M-6 Copy
```

## 2. 安裝SmartonFHIR Server

```
ubuntu@vm1704954932033-4320973-iaas: ~/smart-dev-sandbox
GNU nano 6.2
  docker-compose.yml *
  envsubst < /usr/share/nginx/html/config/r3.tpl > /usr/share/nginx/html/config/r3-local.json5 &&
  envsubst < /usr/share/nginx/html/config/r4.tpl > /usr/share/nginx/html/config/r4-local.json5 &&
  nginx -g 'daemon off;"'
  scale: $PATIENT_BROWSER_ENABLED

index: # -----
  container_name: home-page
  image: nginx:alpine
  volumes:
    - ./www:/usr/share/nginx/html
  ports:
    - $CONTROL_PANEL_PORT:80
  environment:
    HOST: "${HOST}"
    R2_PORT: "${R2_PORT}"
    R4_PORT: "${R4_PORT}" ->
    R3_PORT: "${R3_PORT}"
    R4_PORT: "${R4_PORT}"
    PATIENT_BROWSER_PORT: "${PATIENT_BROWSER_PORT}"
    FHIR_VIEWER_PORT: "${FHIR_VIEWER_PORT}"
    LAUNCHER_PORT: "${LAUNCHER_PORT}"
    R2_ENABLED: "${R2_ENABLED}"
    R3_ENABLED: "${R3_ENABLED}"
    R4_ENABLED: "${R4_ENABLED}"
    PATIENT_BROWSER_ENABLED: "${PATIENT_BROWSER_ENABLED}"
    FHIR_VIEWER_ENABLED: "${FHIR_VIEWER_ENABLED}"

^G Help      ^O Write Out  ^W Where Is  ^K Cut      ^T Execute  ^C Location  M-U Undo
^X Exit      ^R Read File  ^V Replace   ^U Paste    ^J Justify  ^I Go To Line M-E Redo
```

### 2-11. 多一行R4\_PORT

: "\${R4\_PORT}" 把它整行刪除

```
ubuntu@vm1704954932033-4320973-iaas: ~/smart-dev-sandbox
GNU nano 6.2
  docker-compose.yml *
  envsubst < /usr/share/nginx/html/config/r3.tpl > /usr/share/nginx/html/config/r3-local.json5 &&
  envsubst < /usr/share/nginx/html/config/r4.tpl > /usr/share/nginx/html/config/r4-local.json5 &&
  nginx -g 'daemon off;"'
  scale: $PATIENT_BROWSER_ENABLED

index: # -----
  container_name: home-page
  image: nginx:alpine
  volumes:
    - ./www:/usr/share/nginx/html
  ports:
    - $CONTROL_PANEL_PORT:80
  environment:
    HOST: "${HOST}"
    R2_PORT: "${R2_PORT}"
    R3_PORT: "${R3_PORT}"
    R4_PORT: "${R4_PORT}"
    PATIENT_BROWSER_PORT: "${PATIENT_BROWSER_PORT}"
    FHIR_VIEWER_PORT: "${FHIR_VIEWER_PORT}"
    LAUNCHER_PORT: "${LAUNCHER_PORT}"
    R2_ENABLED: "${R2_ENABLED}"
    R3_ENABLED: "${R3_ENABLED}"
    R4_ENABLED: "${R4_ENABLED}"
    PATIENT_BROWSER_ENABLED: "${PATIENT_BROWSER_ENABLED}"
    FHIR_VIEWER_ENABLED: "${FHIR_VIEWER_ENABLED}"
    LAUNCHER_ENABLED: "${LAUNCHER_ENABLED}"

^G Help      ^O Write Out  ^W Where Is  ^K Cut      ^T Execute  ^C Location  M-U Undo
^X Exit      ^R Read File  ^V Replace   ^U Paste    ^J Justify  ^I Go To Line M-E Redo  M-A Set Mark  M-6 Copy
```

### 2-12. 儲存方法如步驟2-6.至2-8.

## 2. 安裝SmartonFHIR Server

```
ubuntu@vm1704954932033-4320973-iaas: ~/smart-dev-sandbox
just raised the bar for easy, resilient and secure K8s cluster deployment.

https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

8 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

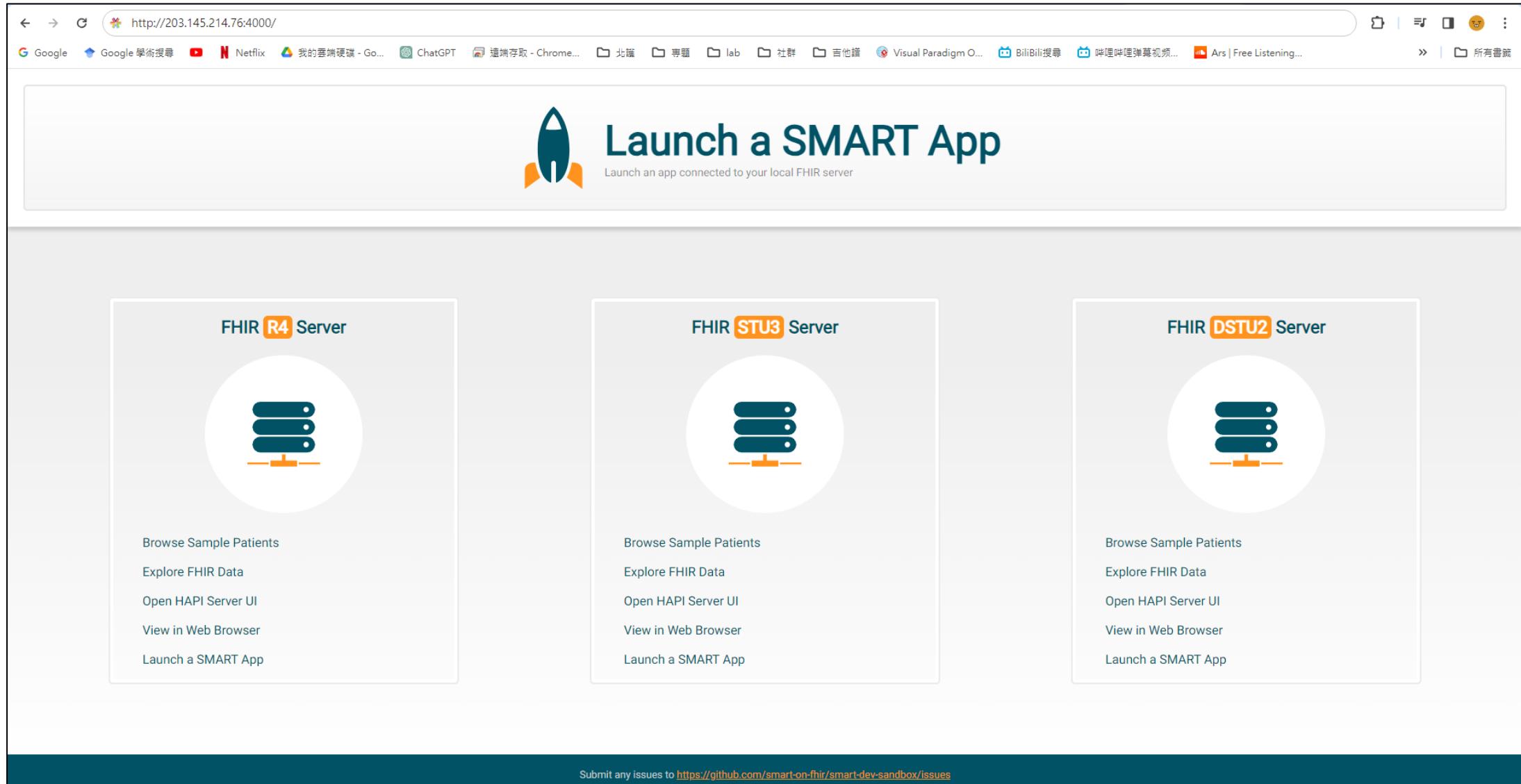
*** System restart required ***
Last login: Tue Jan 16 15:11:50 2024 from 120.97.100.9
ubuntu@vm1704954932033-4320973-iaas:~$ nano docker-compose.yml
ubuntu@vm1704954932033-4320973-iaas:~$ ubuntu@vm1704954932033-4320973-iaas:~$ ls
hapi-fhir-jpaserver-starter persistence.json smart-dev-sandbox
ubuntu@vm1704954932033-4320973-iaas:~$ cd
.cache/ .local/ .ssh/
hapi-fhir-jpaserver-starter/ smart-dev-sandbox/
ubuntu@vm1704954932033-4320973-iaas:~$ cd smart-dev-sandbox/
ubuntu@vm1704954932033-4320973-iaas:~/smart-dev-sandbox$ ls
docker-compose.yml LICENSE patient-browser README.md screenshot.png www
ubuntu@vm1704954932033-4320973-iaas:~/smart-dev-sandbox$ nano docker-compose.yml
ubuntu@vm1704954932033-4320973-iaas:~/smart-dev-sandbox$ LS
LS: command not found
ubuntu@vm1704954932033-4320973-iaas:~/smart-dev-sandbox$ ls
docker-compose.yml LICENSE patient-browser README.md screenshot.png www
ubuntu@vm1704954932033-4320973-iaas:~/smart-dev-sandbox$ sudo docker-compose up -d
```

2-13. sudo docker-compose up -d 開始執行伺服器

```
ubuntu@vm1704954932033-4320973-iaas: ~/smart-dev-sandbox
[+] Running 19/25          ] 0B/0B   Pulling
[+] Running 18/25          ] 453.9kB/45.34MB Pulling
[+] Running 18/25          ] 16.99MB/45.34MB Pulling
[+] Running 18/25          ] 28MB/45.34MB Pulling
r2 13 layers [u]          ] 0B/0B   Pulling
r3 1 layers [ ]          ] 0B/0B   Pulling
r4 1 layers [ ]          ] 0B/0B   Pulling
fhir-viewer 2 layers [ ]  0B/0B   Pulling
✓ patient-browser 3 layers [###] 0B/0B   Pulled
: index 8 layers [ ]     0B/0B   Pulling
: index 8 layers [ ]     0B/0B   Pulling
smart-launcher 15 layers [##.#####] 786.4kB/4.34MB Pulling
8.7s
8.8s
8.9s
9.0s
```

### 3. 檢查是否安裝成功

可以去瀏覽器查看是否架設成功  
<http://203.145.214.76:4000/>



The screenshot shows a web browser window with the URL <http://203.145.214.76:4000/> in the address bar. The page title is "Launch a SMART App" with a rocket icon. Below the title, it says "Launch an app connected to your local FHIR server". The page displays three server options: "FHIR R4 Server", "FHIR STU3 Server", and "FHIR DSTU2 Server", each with a server icon and a list of actions: "Browse Sample Patients", "Explore FHIR Data", "Open HAPI Server UI", "View in Web Browser", and "Launch a SMART App". At the bottom, there is a dark footer bar with the text "Submit any issues to <https://github.com/smart-on-fhir/smart-dev-sandbox/issues>".