

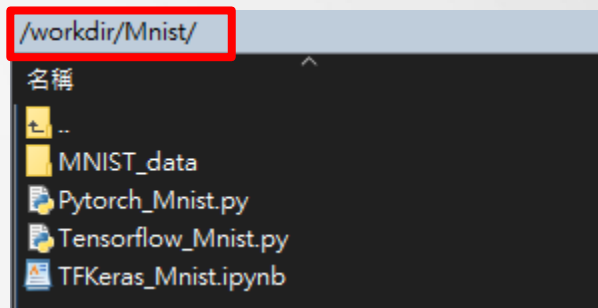
# 上機演練一

## Container Service操作

Video link : <https://youtu.be/WYuznbyTWUw>

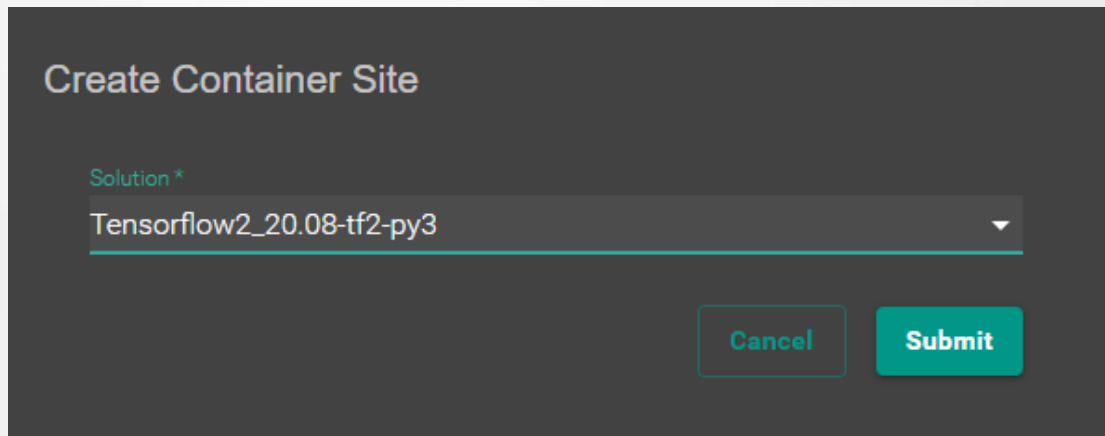
# 上機演練 Container Service 操作

- 請到雲端空間將Mnist壓縮檔下載，連結：<https://reurl.cc/V54QeA>
- 將壓縮檔解壓縮後，使用FTP工具將檔案上傳至帳號用戶空間  
(將Mnist資料夾上傳到/workdir目錄下)
- Mnist資料夾內檔案：
  - Pytorch\_Mnist.py
  - Tensorflow\_Mnist.py
  - TFKeras\_Mnist.ipynb
  - MNIST\_data資料夾
- 上傳完成後，在路徑/workdir目錄下，可找到上傳的檔案  
(無論使用 Container Job 或 Container Service)



# Exercise 1: Container Service 實作 TF Keras 手寫數字辨識 (使用 Jupyter Notebook)

1. 建立 Container Site，選擇 Tensorflow2.0 的 Image



Create Container Site

Solution \*

Tensorflow2\_20.08-tf2-py3

Cancel Submit

# Exercise 1: Container Service 實作 TF Keras 手寫數字辨識 (使用 Jupyter Notebook)

## 2. 建立 Container Site 設定

(1) 請輸入以下資訊

Description	自行設定 (例:Keras Mnist Training)
Password	自行設定 (Jupyter Notebook 登入使用)
Image	harbor.gemini.com:30003/tensorflow/tensorflow2:20.08-tf2-py3
Flavor	4CPU_30GRAM_1GPU (CPU: 4 Core, Memory: 30000 MB, GPU: 1 Core)

(2) 輸入完成後請提交完成建立

<b>3</b> Overview	
Basic Info	
Name	duncanwang-1633311488986
Description	
default	
password	password
Image	harbor.gemini.com:30003/tensorflow/tensorflow2:20.08-tf2-py3
Flavor	4CPU_30GRAM_0GPU (CPU: 4 Core, Memory: 30000 MB, GPU: 0 Core)

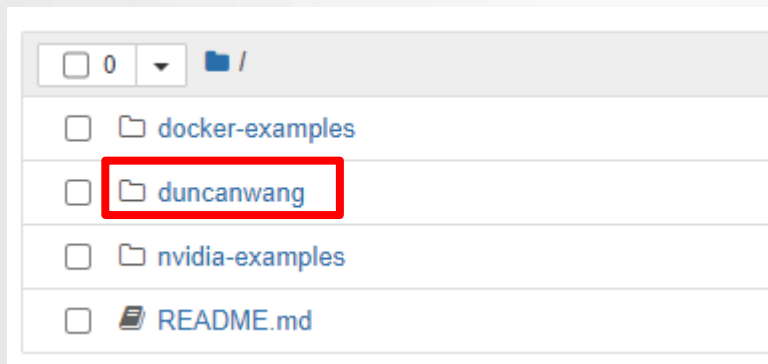
# Exercise 1: Container Service實作TF Keras手寫數字辨識 (使用Jupyter Notebook)

3. 選取建立的Site，切換到Service Info，點選web link

Service Info	Site Parameter
Public IP	140.138.175.9:31522 (ssh), 140.138.175.9:32325 (tensorboard), 140.138.175.9:31421 (web)
User	duncanwang
Created Time	2021-10-04 09:31:09

# Exercise 1: Container Service 實作 TF Keras 手寫數字辨識 (使用 Jupyter Notebook)

4. 輸入自行設定的密碼，即進入到 Jupyter Notebook 介面
5. 點選帳戶名的資料夾後，即可看到帳戶用戶空間 workdir 目錄



# Exercise 1: Container Service 實作 TF Keras 手寫數字辨識 (使用 Jupyter Notebook)

## 6. Mnist 資料夾，開啟 TFKeras\_Mnist.ipynb，執行程式

```
In [1]: #import tensorflow
import tensorflow as tf
```

```
In [2]: mnist = tf.keras.datasets.mnist
(x_train, y_train), (x_test, y_test) = mnist.load_data()
x_train, x_test = x_train / 255.0, x_test / 255.0
print(len(x_train))
print(x_train[0].shape)

Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz
11493376/11490434 [=====] - 0s 0us/step
60000
(28, 28)
```

```
In [6]: model = tf.keras.models.Sequential([
    tf.keras.layers.Flatten(input_shape=(28, 28)),
    tf.keras.layers.Dense(128, activation='relu'),
    tf.keras.layers.Dropout(0.2),
    tf.keras.layers.Dense(10, activation='softmax')
])

# model 每寫完定義好後需要經過compile
model.compile(optimizer='adam',
              loss='sparse_categorical_crossentropy',
              metrics=['accuracy'])
model.summary()
```

Model: "sequential\_2"

Layer (type)	Output Shape	Param #
flatten_2 (Flatten)	(None, 784)	0
dense_4 (Dense)	(None, 128)	100480

# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

有兩種方法使用 Terminal:

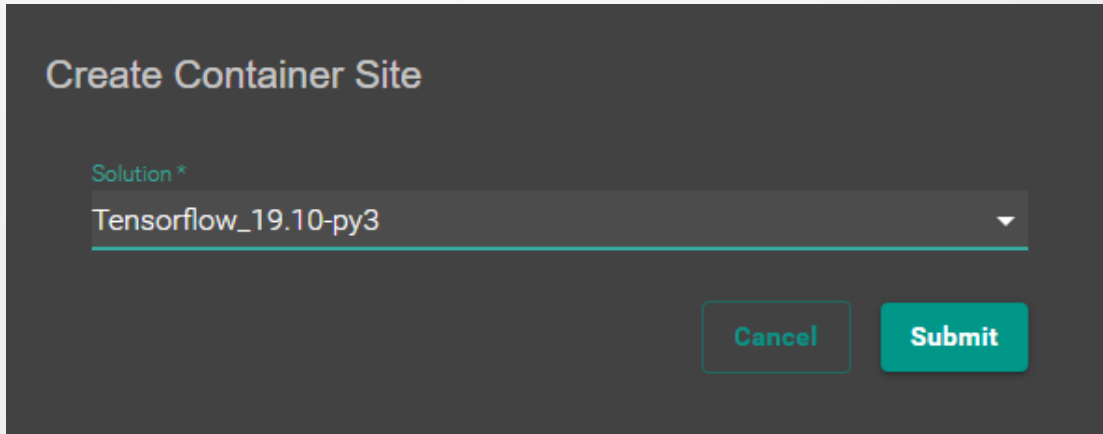
- 方法1：使用 ssh 連線至 Container 內部
- 方法2：使用 Jupyter Notebook 內部 Terminal



# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

- 方法1：使用 ssh 連線至 container 內部

1. 建立 Container Site，選擇 Tensorflow 1.0 的 Image



Create Container Site

Solution \*

Tensorflow\_19.10-py3

Cancel Submit

# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

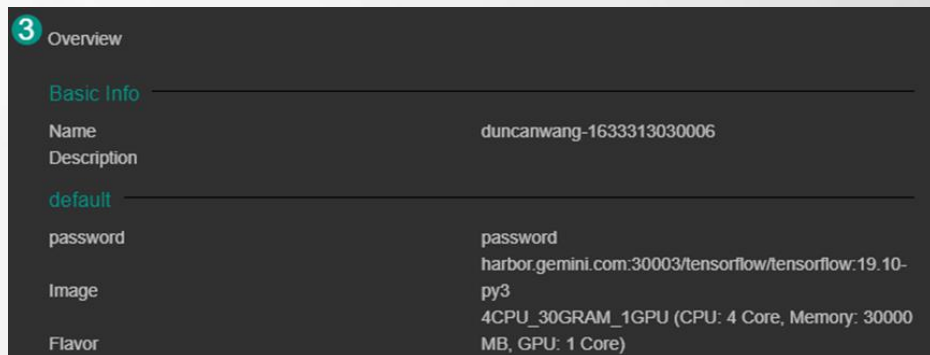
- 方法1：使用 ssh 連線至 container 內部

## 2. Container Site 設定

(1) 請輸入以下資訊

Description	自行設定(例:Mnist Training)
Password	自行設定(ssh登入使用)
Image	harbor.gemini.com:30003/tensorflow/tensorflow:19.10-py3
Flavor	4CPU_30GRAM_1GPU (CPU: 4 Core, Memory: 30000 MB, GPU: 1 Core)

(2) 輸入完成後請提交完成建立



# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

- 方法1：使用ssh連線至container內部

3. 選取建立的Site，切換到Service Info，可看到ssh遠端連線ip和port

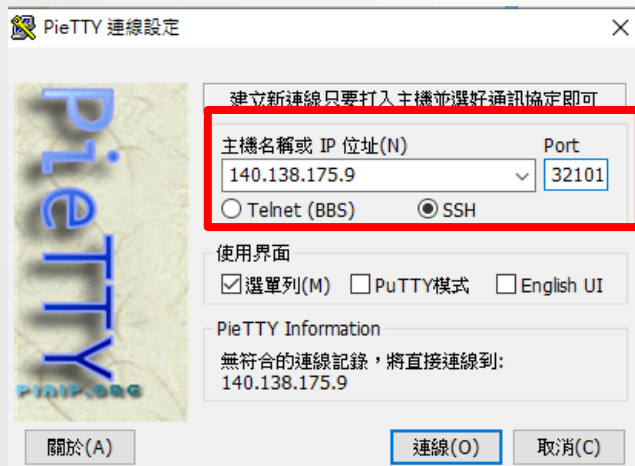
```
Service Info      Site Parameter
-----
Public IP 140.138.175.9:31336 (tensorboard), 140.138.175.9:32101 (ssh), 140.138.175.9:32601 (web)
User duncanwang
Created Time 2021-10-04 13:17:44
```

# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

- 方法1：使用 ssh 連線至 container 內部

## 4. 使用 ssh 連線工具，輸入 ip 和 port 進行遠端連線

(PieTTY)



(Mac 使用者，可直接開啟終端機遠端連線)

```
wanghsiaolun — root@lafdrtduncanwang-1633325250777-spdtl:~ ssh root@140.138.175.9 -p 32101
(base) wangxiaolundeMacBook-Air:~ wanghsiaolun ssh root@140.138.175.9 -p 32101
[root@140.138.175.9's password:
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 4.15.0-47-generic x86_64)

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

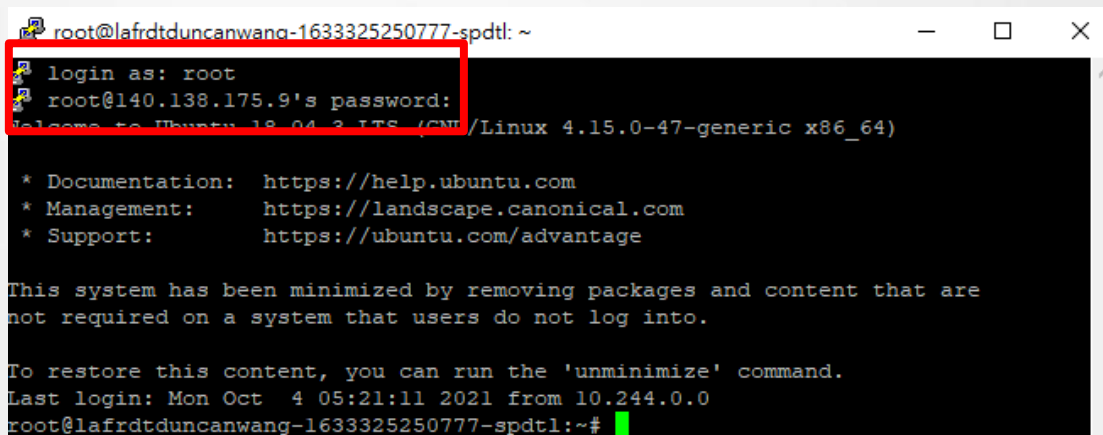
This system has been minimized by removing packages and content that are
not required on a system that users do not log into.

To restore this content, you can run the 'unminimize' command.
Last login: Mon Oct  4 07:59:24 2021 from 10.244.0.0
root@lafdrtduncanwang-1633325250777-spdtl:~#
```

# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

- 方法1：使用 ssh 連線至 container 內部

5. 以 root 登入，並輸入自行設定的密碼

A terminal window showing a successful login as root. The prompt is root@lafrdtduncanwang-1633325250777-spdtl: ~. The user enters 'root' and the password is accepted. The terminal displays the Ubuntu 18.04 LTS (GNU/Linux 4.15.0-47-generic x86\_64) logo and system information. A red box highlights the login prompt and password input area.

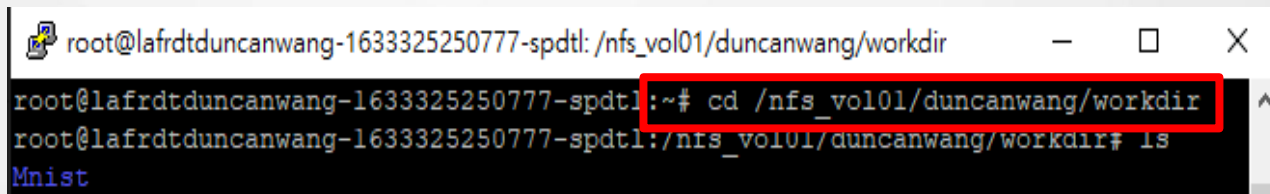
```
root@lafrdtduncanwang-1633325250777-spdtl: ~  
login as: root  
root@140.138.175.9's password:  
Welcome to Ubuntu 18.04.2 LTS (GNU/Linux 4.15.0-47-generic x86_64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:       https://ubuntu.com/advantage  
  
This system has been minimized by removing packages and content that are  
not required on a system that users do not log into.  
  
To restore this content, you can run the 'unminimize' command.  
Last login: Mon Oct  4 05:21:11 2021 from 10.244.0.0  
root@lafrdtduncanwang-1633325250777-spdtl:~#
```

# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

- 方法1：使用ssh連線至container內部

6. 成功登入後，進入到帳戶用戶空間workdir目錄

指令: `cd /nfs_vol01/帳號名/workdir/`

A terminal window screenshot showing a user at the root of a container. The prompt is root@lafrrtduncanwang-1633325250777-spdtl:~/#. The user enters the command cd /nfs\_vol01/duncanwang/workdir, which is highlighted with a red box. The prompt changes to root@lafrrtduncanwang-1633325250777-spdtl:/nfs\_vol01/duncanwang/workdir#. The user then enters the command ls, and the output Mnist is displayed in blue text.

```
root@lafrrtduncanwang-1633325250777-spdtl:~/# cd /nfs_vol01/duncanwang/workdir
root@lafrrtduncanwang-1633325250777-spdtl:/nfs_vol01/duncanwang/workdir# ls
Mnist
```

# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

- 方法1：使用ssh連線至container內部

7. 再進入Mnist資料夾內，執行Tensorflow\_Mnist.py

指令：`python3 Tensorflow_Mnist.py` (請使用python3執行py檔)

```
root@lafirdtduncanwang-1633325250777-spdtl: /nfs_vol01/duncanwang/workdir/Mnist
root@lafirdtduncanwang-1633325250777-spdtl: /nfs_vol01/duncanwang/workdir# cd Mnist
root@lafirdtduncanwang-1633325250777-spdtl: /nfs_vol01/duncanwang/workdir/Mnist# ls
MNIST_data  Pytorch_Mnist.py  TFKeras_Mnist.ipynb  Tensorflow_Mnist.py
root@lafirdtduncanwang-1633325250777-spdtl: /nfs_vol01/duncanwang/workdir/Mnist# python3 Tensorflow_Mnist.py
```

# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

- 方法1：使用ssh連線至container內部

8. 執行結果，訓練100個epoch，準確率有提升，loss有下降

```
Train Epoch: 90 Loss= 1.6719 Accuracy= 0.97
Train Epoch: 91 Loss= 1.6358 Accuracy= 0.9698
Train Epoch: 92 Loss= 1.5792 Accuracy= 0.9696
Train Epoch: 93 Loss= 1.5632 Accuracy= 0.9698
Train Epoch: 94 Loss= 1.6421 Accuracy= 0.9702
Train Epoch: 95 Loss= 1.5896 Accuracy= 0.9688
Train Epoch: 96 Loss= 1.5296 Accuracy= 0.9702
Train Epoch: 97 Loss= 1.5179 Accuracy= 0.9728
Train Epoch: 98 Loss= 1.6063 Accuracy= 0.9704
Train Epoch: 99 Loss= 1.6737 Accuracy= 0.9694
Train Epoch: 100 Loss= 1.5871 Accuracy= 0.9718
Final Accuracy: 0.9699
root@lafirdtduncanwang-1633325250777-spdtd1:/nfs_vol01/duncanwang/workdir/Mnist# █
```



# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

- 方法2: 使用 Jupyter Notebook 內部 Terminal

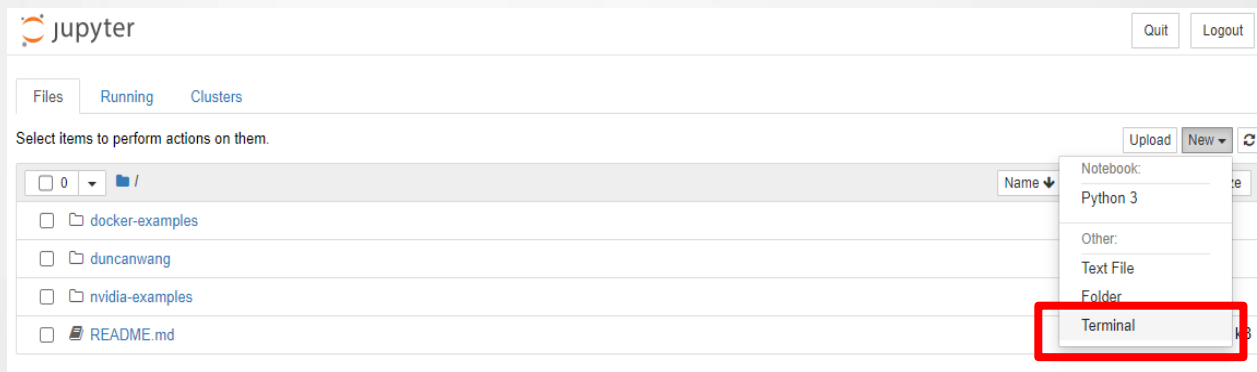
1. 點擊建立的 Site，切換到 Service Info，點選 web link 登入

```
Service Info      Site Parameter
-----
Public IP 140.138.175.9:31336 (tensorboard), 140.138.175.9:32101 (ssh), 140.138.175.9:32601 (web)
User duncanwang
Created Time 2021-10-04 13:17:44
```

# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

- 方法2: 使用 Jupyter Notebook 內部 Terminal

2. 頁面右上 New，開啟 Terminal



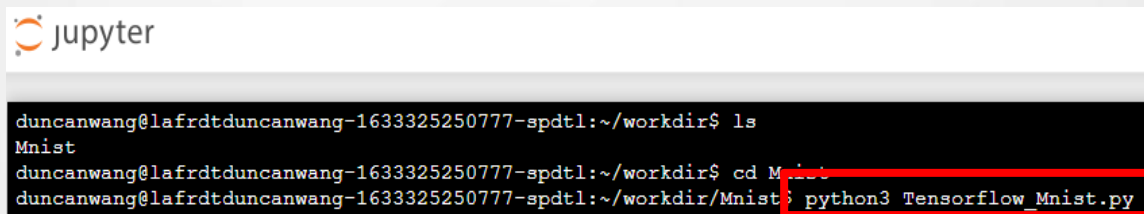
# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

- 方法2: 使用 Jupyter Notebook 內部 Terminal

3. 在 Mnist 目錄下，執行 Tensorflow\_Mnist.py

指令: `cd /nfs_vol01/帳號名/workdir/`

指令: `python3 Tensorflow_Mnist.py` (請使用 python3 執行 py 檔)

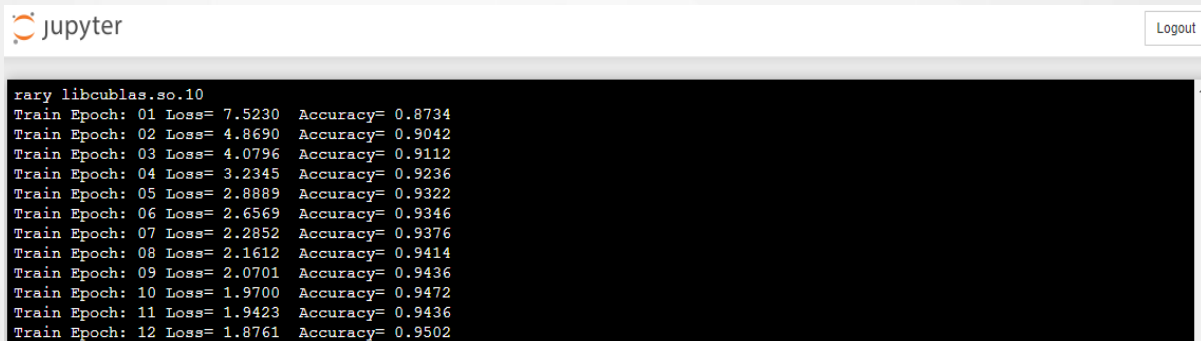


```
jupyter  
duncanwang@lafirdtduncanwang-1633325250777-spdtl:~/workdir$ ls  
Mnist  
duncanwang@lafirdtduncanwang-1633325250777-spdtl:~/workdir$ cd Mnist  
duncanwang@lafirdtduncanwang-1633325250777-spdtl:~/workdir/Mnist$ python3 Tensorflow_Mnist.py
```

# Exercise 1.2: Container Service 實作 TensorFlow 手寫數字辨識 (使用 Terminal 方式執行)

- 方法2: 使用 Jupyter Notebook 內部 Terminal

4. 和方法1一樣，可看出執行結果



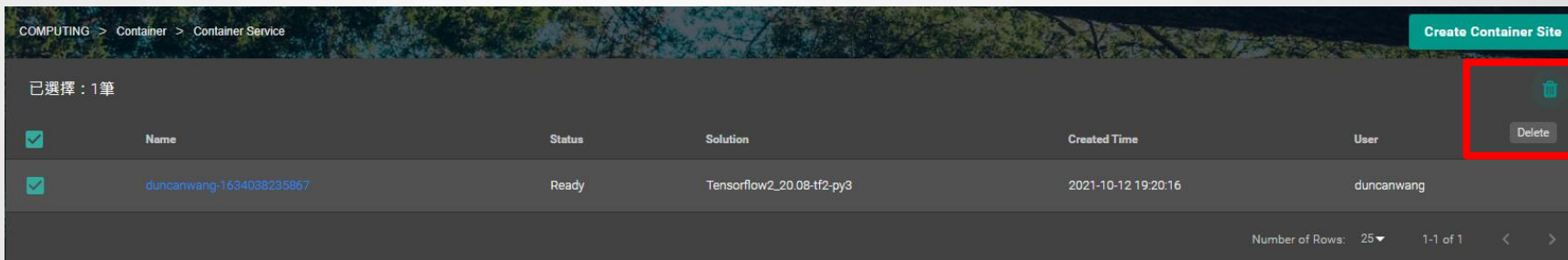
```

rary libcublas.so.10
Train Epoch: 01 Loss= 7.5230 Accuracy= 0.8734
Train Epoch: 02 Loss= 4.8690 Accuracy= 0.9042
Train Epoch: 03 Loss= 4.0796 Accuracy= 0.9112
Train Epoch: 04 Loss= 3.2345 Accuracy= 0.9236
Train Epoch: 05 Loss= 2.8889 Accuracy= 0.9322
Train Epoch: 06 Loss= 2.6569 Accuracy= 0.9346
Train Epoch: 07 Loss= 2.2852 Accuracy= 0.9376
Train Epoch: 08 Loss= 2.1612 Accuracy= 0.9414
Train Epoch: 09 Loss= 2.0701 Accuracy= 0.9436
Train Epoch: 10 Loss= 1.9700 Accuracy= 0.9472
Train Epoch: 11 Loss= 1.9423 Accuracy= 0.9436
Train Epoch: 12 Loss= 1.8761 Accuracy= 0.9502

```

# 上機演練 Container Service 操作

- Container Site 使用完畢後，請手動刪除，避免資源佔據



COMPUTING > Container > Container Service Create Container Site

已選擇：1筆

<input checked="" type="checkbox"/>	Name	Status	Solution	Created Time	User	<input type="checkbox"/>	Delete
<input checked="" type="checkbox"/>	duncanwang-1634038235867	Ready	Tensorflow2_20.08-tf2-py3	2021-10-12 19:20:16	duncanwang	<input type="checkbox"/>	Delete

Number of Rows: 25 1-1 of 1