

TensorFlow Job 使用說明

請登入 glogin1 節點(glogin1.twnia.nchc.org.tw)，以下示範 anaconda3 的操作。

1. 首先請確定您有載入正確的環境變數，以便於使用這些軟體時，有正確的路徑。

```
$ module load cuda/9.1.85
$ module load anaconda3/5.1.10
$ nvidia-smi
Wed Jul 18 20:57:00 2018
+-----+
| NVIDIA-SMI 387.26      Driver Version: 387.26      |
+-----+-----+-----+
| GPU  Name            Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute M. |
+-----+-----+-----+-----+
| 0   Tesla P100-SXM2...  On           | 00000000:3D:00.0 Off |          0   |
| N/A   27C    P0   41W / 300W | 15844MiB / 16276MiB |    0%    Default |
+-----+-----+-----+-----+
| 1   Tesla P100-SXM2...  On           | 00000000:3E:00.0 Off |          0   |
| N/A   31C    P0   41W / 300W | 3517MiB / 16276MiB |    0%    Default |
+-----+-----+-----+-----+
| 2   Tesla P100-SXM2...  On           | 00000000:B1:00.0 Off |          0   |
| N/A   29C    P0   41W / 300W | 3517MiB / 16276MiB |    0%    Default |
+-----+-----+-----+-----+
| 3   Tesla P100-SXM2...  On           | 00000000:B2:00.0 Off |          0   |
| N/A   31C    P0   40W / 300W | 3517MiB / 16276MiB |    0%    Default |
+-----+-----+-----+-----+

+-----+
| Processes:                        GPU Memory |
| GPU      PID  Type  Process name                               Usage |
+-----+-----+-----+-----+
+-----+
+-----+-----+-----+-----+
```

備註: 登入節點與計算節點都有 4 張 GPU 卡，使用相同驅動程式。

2. 建立您自己家目錄下的 virtualenv

```
$conda create --prefix /home/username/condapy3 python=3 anaconda
$source activate /home/username/condapy3
(/home/username/condapy3) [username@glogin1 ~]$
```

3. 安裝您需要的 package

```
(/home/username/condapy3) [username@glogin1 ~]$conda install tensorflow=1.8.0
tensorflow-gpu=1.8.0 -y
```

備註: tensorflow-gpu 要指定安裝與目前系統上 CUDA Toolkit 與 GPU 驅動程式相容的版本(1.8.0 或 1.9.0)

4. 以下是操作歷程，跑一個 TF 的計算，分別使用 CPU 與 GPU，請參考

```
(/home/username/condapy3) [username@glogin1 ~]$ cat tf-cpu.py
import sys
import numpy as np
import tensorflow as tf
from datetime import datetime

device_name="/cpu:0"

shape=(int(10000),int(10000))

with tf.device(device_name):
    random_matrix = tf.random_uniform(shape=shape, minval=0, maxval=1)
    dot_operation = tf.matmul(random_matrix, tf.transpose(random_matrix))
    sum_operation = tf.reduce_sum(dot_operation)

    startTime = datetime.now()
    with tf.Session(config=tf.ConfigProto(log_device_placement=True)) as session:
        result = session.run(sum_operation)

    print(result)

    print("\n" * 2)
    print("Shape:", shape, "Device:", device_name)
    print("Time taken:", datetime.now() - startTime)
(/home/username/condapy3) [username@glogin1 ~]$
```

```
(/home/username/condapy3) [username@glogin1 ~]$ python tf-cpu.py3
```

```
[中略]
```

```
Shape: (10000, 10000) Device: /cpu:0
```

```
Time taken: 0:01:24.651614
```

```
(/home/username/condapy3) [username@glogin1 ~]$ cat tf-gpu.py
```

```
import sys
```

```
import numpy as np
```

```
import tensorflow as tf
```

```
from datetime import datetime
```

```
device_name="/gpu:3"
```

```
shape=(int(10000),int(10000))
```

```
with tf.device(device_name):
```

```
    random_matrix = tf.random_uniform(shape=shape, minval=0, maxval=1)
```

```
    dot_operation = tf.matmul(random_matrix, tf.transpose(random_matrix))
```

```
    sum_operation = tf.reduce_sum(dot_operation)
```

```
    startTime = datetime.now()
```

```
with tf.Session(config=tf.ConfigProto(log_device_placement=True)) as session:
```

```
    result = session.run(sum_operation)
```

```
print(result)
```

```
print("\n" * 2)
```

```
print("Shape:", shape, "Device:", device_name)
```

```
print("Time taken:", datetime.now() - startTime)
```

```
(/home/username/condapy3) [username@glogin1 ~]$
```

```
(/home/username/condapy3) [username@glogin1 ~]$ python tf-gpu.py3
```

```
[中略]
```

```
Shape: (10000, 10000) Device: /gpu:3
```

```
Time taken: 0:00:28.988475
```

```
(/home/username/condapy3) [username@glogin1 ~]$ source deactivate
```

```
[username@glogin1 ~]$
```

5.如果您在 glogin1 執行上述的工作都正確無誤。可以考慮將計算以批次的方式，向後端 GPU 計算節點投交。job script 範例如下：

```
#####  
###          TensorFlow job script example          ###  
#####  
#!/bin/bash  
#PBS -l select=1:ncpus=40:ngpus=4  
#PBS -N tensorflow  
#PBS -q gp4  
#PBS -P <您要扣帳的 project id>  
#PBS -j eo  
  
module purge  
module load cuda/9.1.85  
module load anaconda3/5.1.10  
  
source activate <您的 conda 虛擬環境>  
python <您的 python 程式>  
source deactivate
```

(完)