



Chapter 5.1: Running TensorFlow On ROCm

ROCm Tutorial | AMD 2020

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Chapter 5.1: Running TensorFlow On ROCm

This hands-on tutorial shows how we can get started with the popular TensorFlow framework as well as train a neural network on the MNIST dataset.

Preparation

1. We will be using the AMD provided TensorFlow(TF) docker container for this tutorial
 - Please ensure that ROCm is correctly installed and docker is also set up using the instructions in our installation guide.
2. First launch the docker container from the image hosted on dockerhub:

```
docker pull rocm/tensorflow
```

```
alias drun='sudo docker run -it --network=host --device=/dev/kfd --device=/dev/dri --  
ipc=host --shm-size 16G --group-add video --cap-add=SYS_PTRACE --security-opt  
seccomp=unconfined -v $HOME/dockerx:/dockerx'
```

```
drun rocm/tensorflow:latest
```

Running the Example

1. Clone the tutorial repo inside the docker image and change to the correct directory:
`cd Chapter5/01_TensorFlow_ROCm`
2. The model for training the MNIST dataset is in the file `mnist_tf.py`
3. Run the model:

- python3 mnist_cnn.py
- The script will download the MNIST dataset and run the training
- You will see a trace of the application running as shown in Figure 1

```

Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz
11493376/11490434 [=====] - 0s 0us/step
2020-07-06 22:19:39.475064: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic library libhip_hcc.so
2020-07-06 22:19:40.542764: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1579] Found device 0 with properties:
pciBusID: 0000:0d:00.0 name: Vega 20 ROCm AMD GPU ISA: gfx906
coreClock: 1.801GHz coreCount: 60 deviceMemorySize: 15.98GiB deviceMemoryBandwidth: -1B/s
2020-07-06 22:19:40.542827: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1579] Found device 1 with properties:
pciBusID: 0000:43:00.0 name: Vega 20 ROCm AMD GPU ISA: gfx906
coreClock: 1.801GHz coreCount: 60 deviceMemorySize: 15.98GiB deviceMemoryBandwidth: -1B/s
2020-07-06 22:19:40.824479: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic library libcblas.so
2020-07-06 22:19:40.825513: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic library libMIOpen.so
2020-07-06 22:19:41.220604: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic library libcufft.so
2020-07-06 22:19:41.222442: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic library libcurand.so
2020-07-06 22:19:41.222581: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1703] Adding visible gpu devices: 0, 1
2020-07-06 22:19:41.246524: I tensorflow/core/platform/profile_utils/cpu_utils.cc:102] CPU Frequency: 3499620000 Hz
2020-07-06 22:19:41.247604: I tensorflow/compiler/xla/service/service.cc:168] XLA service 0x59d42b0 initialized for platform Host (this does not guarantee tha
t XLA will be used). Devices:
2020-07-06 22:19:41.247627: I tensorflow/compiler/xla/service/service.cc:176] StreamExecutor device (0): Host, Default Version
2020-07-06 22:19:41.249920: I tensorflow/compiler/xla/service/service.cc:168] XLA service 0x59d5fe0 initialized for platform ROCm (this does not guarantee tha
t XLA will be used). Devices:
2020-07-06 22:19:41.249940: I tensorflow/compiler/xla/service/service.cc:176] StreamExecutor device (0): Vega 20, AMDGPU ISA version: gfx906
2020-07-06 22:19:41.249947: I tensorflow/compiler/xla/service/service.cc:176] StreamExecutor device (1): Vega 20, AMDGPU ISA version: gfx906
2020-07-06 22:19:41.250105: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1579] Found device 0 with properties:
pciBusID: 0000:0d:00.0 name: Vega 20 ROCm AMD GPU ISA: gfx906
coreClock: 1.801GHz coreCount: 60 deviceMemorySize: 15.98GiB deviceMemoryBandwidth: -1B/s
2020-07-06 22:19:41.250167: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1579] Found device 1 with properties:
pciBusID: 0000:43:00.0 name: Vega 20 ROCm AMD GPU ISA: gfx906
coreClock: 1.801GHz coreCount: 60 deviceMemorySize: 15.98GiB deviceMemoryBandwidth: -1B/s
2020-07-06 22:19:41.250219: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic library libcblas.so
2020-07-06 22:19:41.250235: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic library libMIOpen.so
2020-07-06 22:19:41.250249: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic library libcufft.so
2020-07-06 22:19:41.250263: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic library libcurand.so
2020-07-06 22:19:41.250444: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1703] Adding visible gpu devices: 0, 1
2020-07-06 22:19:41.250471: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1102] Device interconnect StreamExecutor with strength 1 edge matrix:
2020-07-06 22:19:41.250481: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1108] 0 1
2020-07-06 22:19:41.250487: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1121] 0: N N

```

Figure 1: Output trace of the Tensorflow app execution on the MNIST dataset