Guidance to run PyTorch BERT-Large PreTraining on Intel Max 1100 GPUs

Login to ACES cluster and run the commands below.

$cd $SCRATCH
$mkdir pvc-benchmarks
$cd pvc-benchmarks
$git clone -b r2.12.1 https://github.com/IntelAI/models.git
$ml purge
$ml GCCcore/11.2.0 Python/3.9.6
$python3 -m venv bert-large-pt-training-trial
$source bert-large-pt-training-trial/bin/activate
$pip install torch==2.1.0.post0 torchvision==0.16.0.post0 torchaudio==2.1.0.post0 intel_extension_for_pytorch==2.1.20+xpu oneccl-bind-pt==2.1.200 deepspeed==0.14.0 --extra-index-url https://pytorch-extension.intel.com/release-whl-aitools/
$cd models
$chmod 755 quickstart/language_modeling/pytorch/bert_large/training/gpu/*.sh
$pip install -r models/language_modeling/pytorch/bert_large/training/gpu/requirements.txt
$wget https://s3.amazonaws.com/models.huggingface.co/bert/bert-base-uncased-vocab.txt -O models/language_modeling/pytorch/bert_large/training/gpu/data/vocab.txt
$deactivate
create a slurm job file test_pytorch_bert_large.slurm and copy and paste the content below to it.

$ vim test_pytorch_bert_large.slurm

#!/bin/bash
##NECESSARY JOB SPECIFICATIONS

#SBATCH --job-name=<your_job_name>

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#SBATCH --time=2:00:00                  # the wallclock time for a job
#SBATCH --nodes=1                       # total number of nodes
#SBATCH --ntasks=1                      # total number of processes
#SBATCH --mem=60G
#SBATCH --output=<your_job_output>.%j # output of your slurm job
#SBATCH --gres=gpu:pvc:1                  # for 2 gpus, set --gres=gpu:pvc:2
#SBATCH --partition=pvc                 # partition should be pvc for intel gpus


echo "Hostname: $(hostname)"

# Print the node name
echo "Node name: $SLURMD_NODENAME"
sinfo -N -p pvc -o "%8n %10f %G"


# This command is used to get stats of Max GPU utilization
xpumcli dump -m 0,1,2,3,4,5,6,17,18,19,20,35 > <your_job>_Max_GPU_stats.log &

# This command is used to get stats of how many CPU cores are being used
watch -n 5 ps -u $USER  > <your_job>_Max_CPU_stats.log &


# load all the necessary modules module purge
ml purge
ml GCCcore/11.2.0 Python/3.9.6


source $SCRATCH/pvc-benchmarks/bert-large-pt-training-trial/bin/activate
source /sw/hprc/sw/oneAPI/2024.0/setvars.sh

# set environment variales
export
DATASET_DIR=/scratch/data/pytorch-language-modelling-datasets/mlcommons-datase
t
export
PROCESSED_DATASET_DIR=/scratch/data/pytorch-language-modelling-datasets/proc
essed_mlcommons_dataset
export BATCH_SIZE=32
export NUM_ITERATIONS=10000
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export TF_ENABLE_ONEDNN_OPTS=0



cd $SCRATCH/pvc-benchmarks/models

# a tool on ACES cluster to get graph from stats of GPU and CPU utilization
jobstats &

export OUTPUT_DIR=$SCRATCH/pvc-benchmarks/output_logs
bash
quickstart/language_modeling/pytorch/bert_large/training/gpu/bf16_training_plain_forma
t.sh

jobstats

$sbatch test_pytorch_bert_large.slurm
```