

Step 1: Submit a node request for interactive job on Sophia

```
[jaiaid@sophia-login-02 ~]$ qsub -A ALCFAITP -q by-node -l select=1 -l walltime=01:00:00,filesystems=eag
e:home -I
qsub: waiting for job 38537.sophia-pbs-01.lab.alcf.anl.gov to start
qsub: job 38537.sophia-pbs-01.lab.alcf.anl.gov ready

[jaiaid@sophia-gpu-22 ~]$
```

Step 2: Setup environment variables indicating proxies

```
[jaiaid@sophia-gpu-22 ~]$ ls
093297.polaris-pbs-01.hsn.cm.polaris.alcf.anl.gov.ER ai-science-training-series
093297.polaris-pbs-01.hsn.cm.polaris.alcf.anl.gov.OU polaris_jupyter.alcf_jupyterhub
[jaiaid@sophia-gpu-22 ~]$ export HTTP_PROXY="http://proxy.alcf.anl.gov:3128"
.gov:3128"
export http_proxy="http://proxy.alcf.anl.gov:3128"
export https_proxy="http://proxy.alcf.anl.gov:3128"
[jaiaid@sophia-gpu-22 ~]$ export http_proxy="http://proxy.alcf.anl.gov:3128"
[jaiaid@sophia-gpu-22 ~]$ export https_proxy="http://proxy.alcf.anl.gov:3128"
[jaiaid@sophia-gpu-22 ~]$ export ftp_proxy="http://proxy.alcf.anl.gov:3128"
[jaiaid@sophia-gpu-22 ~]$
```

Step 3: Clone the repos

```
[jaiaid@sophia-gpu-22 ~]$ git clone https://github.com/saforem2/wordplay
Cloning into 'wordplay'...
remote: Enumerating objects: 884, done.
remote: Counting objects: 100% (87/87), done.
remote: Compressing objects: 100% (45/45), done.
remote: Total 884 (delta 38), reused 67 (delta 27), pack-reused 797 (from 1)
Receiving objects: 100% (884/884), 14.37 MiB | 40.52 MiB/s, done.
Resolving deltas: 100% (404/404), done.
[jaiaid@sophia-gpu-22 ~]$ cd wordplay/
[jaiaid@sophia-gpu-22 wordplay]$ git clone https://github.com/saforem2/ezpz deps/ezpz
Cloning into 'deps/ezpz'...
remote: Enumerating objects: 2468, done.
remote: Counting objects: 100% (697/697), done.
remote: Compressing objects: 100% (241/241), done.
remote: Total 2468 (delta 395), reused 592 (delta 348), pack-reused 1771 (from 1)
Receiving objects: 100% (2468/2468), 4.38 MiB | 22.34 MiB/s, done.
Resolving deltas: 100% (1315/1315), done.
[jaiaid@sophia-gpu-22 wordplay]$
```

Step 4: Create Conda environment

```

[jaiaid@sophia-gpu-22 wordplay]$ ls
assets  deps  favicon.svg  index.qmd  pyproject.toml  README.md  src
data    docs  _format.yml  notebooks  _quarto.yml    references.bib  _website.yml
[jaiaid@sophia-gpu-22 wordplay]$ ls deps/
ezpz
[jaiaid@sophia-gpu-22 wordplay]$ export PBS_O_WORKDIR=$(pwd) && source deps/ezpz/src/ezpz/bin/utils.sh
Using WORKING_DIR: /home/jaiaid/wordplay
[jaiaid@sophia-gpu-22 wordplay]$ ezpz_setup_python
No conda_prefix OR virtual_env found in environment...
Setting up conda...
Found conda at: /soft/applications/conda/2024-08-08/mconda3
No VIRTUAL_ENV found in environment!
  - Trying to setup from /soft/applications/conda/2024-08-08/mconda3
  - Using VENV_DIR=/home/jaiaid/wordplay/venvs/2024-08-08

  - Creating a new virtual env on top of 2024-08-08 in /home/jaiaid/wordplay/venvs/2024-08-08
[python] Using /home/jaiaid/wordplay/venvs/2024-08-08/bin/python3
(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$ ezpz_setup_job

[🔍 ezpz/bin/utils.sh]
  • USER=jaiaid
  • MACHINE=sophia
  • HOST=sophia-gpu-22
  • TSTAMP=2024-11-27-053458

[ezpz_setup_host_pbs]
  • Using hostfile: /var/spool/pbs/aux/38537.sophia-pbs-01.lab.alcf.anl.gov
  • Found in environment:

[HOSTS]
  • [host:0] - sophia-gpu-22.lab.alcf.anl.gov

[DIST INFO]
  • NGPUS=8
  • NHOSTS=1
  • NGPU_PER_HOST=8
  • HOSTFILE=/var/spool/pbs/aux/38537.sophia-pbs-01.lab.alcf.anl.gov
  • DIST_LAUNCH=mpirun -n 8 -N 8 --hostfile /var/spool/pbs/aux/38537.sophia-pbs-01.lab.alcf.anl.gov -x
PATH -x LD_LIBRARY_PATH

[LAUNCH]:
  • To launch across all available GPUs, use: launch

    launch = mpirun -n 8 -N 8 --hostfile /var/spool/pbs/aux/38537.sophia-pbs-01.lab.alcf.anl.gov -x PA
TH -x LD_LIBRARY_PATH

(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$

```

Step 5: Needed modification of `pyproject.toml` to avoid issue with installation. Commented out “license” field.

```

(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$ python3 -m pip install -e deps/ezpz --re
quire-virtualenv
Obtaining file:///home/jaiaid/wordplay/deps/ezpz
Installing build dependencies ... done
Checking if build backend supports build_editable ... done
Getting requirements to build editable ... done
Installing backend dependencies ... done
Preparing editable metadata (pyproject.toml) ... done
Collecting ambivalent@ git+https://github.com/saforem2/ambivalent (from ezpz==0.2)
Cloning https://github.com/saforem2/ambivalent to /var/tmp/pbs.38537.sophia-pbs-01.lab.alcf.anl.gov/p
-install-pkfd0_8t/ambivalent_d164d82094724831bcc9852f22874801

```

```

wheels/b3/57/90/f3324177d75cbc607a034b5b8e66d5b3d35dcf087967430718
Successfully built wordplay ezpz
Installing collected packages: tiktoken, ezpz, wordplay
  Attempting uninstall: ezpz
    Found existing installation: ezpz 0.2
    Uninstalling ezpz-0.2:
      Successfully uninstalled ezpz-0.2
Successfully installed ezpz-0.2 tiktoken-0.8.0 wordplay-0.0.1

[notice] A new release of pip is available: 24.0 -> 24.3.1
[notice] To update, run: pip install --upgrade pip
(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$

```

Step 6: Went for the disabled option

```

(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$ wandb login
wandb: Logging into wandb.ai. (Learn how to deploy a W&B server locally: https://wandb.me/wandb-server)
wandb: You can find your API key in your browser here: https://wandb.ai/authorize
wandb: Paste an API key from your profile and hit enter, or press ctrl+c to quit:
Aborted!
(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$ export WANDB_DISABLED=1
(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$

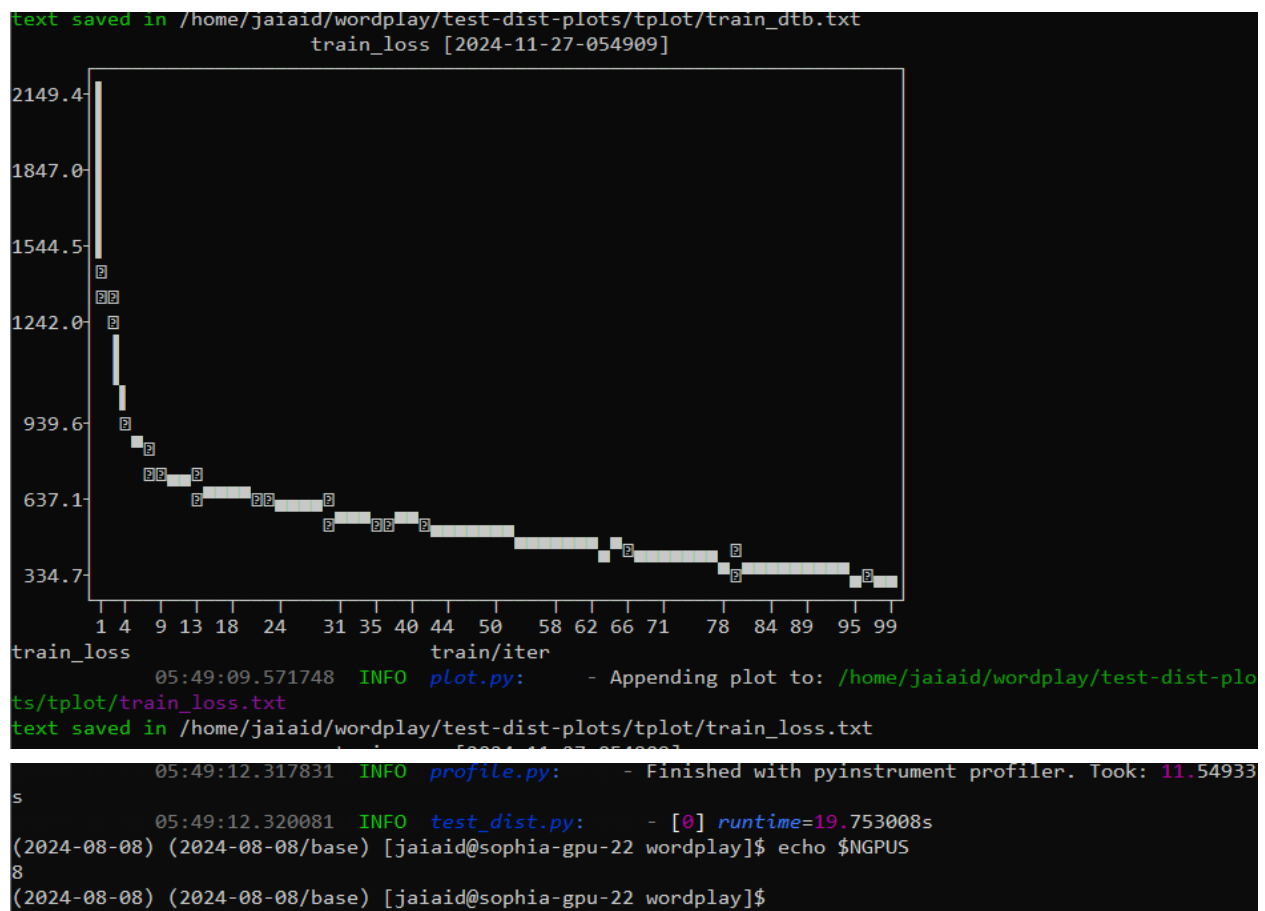
```

Step 7: Run distributed test

```

Aborted!
(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$ export WANDB_DISABLED=1
(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$ mpirun -n "${NGPUS}" python3 -m ezpz.test_dist

```



Step 8: Prepared Data

```
(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$ python3 data/shakespeare_char/prepare.py
Using HF_DATASETS_CACHE=/home/jaiaid/wordplay/data/shakespeare_char/.cache/huggingface
length of dataset in characters: 1,115,394
all the unique characters:
!$&',-.3:;?ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
vocab size: 65
train has 1,003,854 tokens
val has 111,540 tokens
(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$
```

Step 9: Training is run

```
(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$ mpirun -n "${NGPUS}" python3 -m wordplay \
\
l=100 \
    data=shakespeare \
    train.dtype=bf16 \
    >    train.backend=DDP \
>    train.eval_interval=100 \
>    data=shakespeare \
>    train.dtype=bf16 \
ters=1000>    model.batch_size=64 \
    train.l>    model.block_size=1024 \
>    train.max_iters=1000 \
ile=fal>    train.log_interval=10 \
>    train.compile=false
```

```
05:51:00.055594 INFO trainer.py: Startup time: 10.9659
Training Legend
```

| abbr | desc |
|-------------|--------------------------------|
| step | Current training iteration |
| loss | Loss value |
| dt | Elapsed time per training step |
| dtf | Elapsed time per forward step |
| dtb | Elapsed time per backward step |
| sps | Samples per second |
| sps_per_gpu | Samples per second (per GPU) |
| tps | Tokens per second |
| tps_per_gpu | Tokens per second (per GPU) |
| mfu | Model flops utilization |

```

05:52:00.352778 INFO trainer.py: - ['prompt']: 'What is an LLM?'
05:52:00.354904 INFO trainer.py: - ['response']:

What is an LLM?K$r' ' !Vr&-$ &vvbbkE;-MvghhhY'K:BMI! 3ZZ33r ROMI r r$ AeRKTkZu SK?$gAAMMCr ARR$g$MOM
JAKrK hBUR UUUl$RKg;;Sv M$K?g3lCS- OMM:g000;
OgBfBZMvYrvlyrr$eRvIIh000MMMMMC ggORqrM:R gRVPgrSKKM3MMMRK;RIUIe MeMRzM-S:MeMlOz RAK3RRBUUI :$H RAA S
R

ZZ33SUUrB
```

```
wandb: Training/loss 0.03638
wandb: Training/loss_tot 0.03638
wandb: Training/lr 0.0006
wandb:
wandb: You can sync this run to the cloud by running:
wandb: wandb sync /home/jaiaid/outputs/runs/pytorch/DDP/2024-11-27/05-51-48/wandb/offline-run-20241127_0
55156-bffymd73
wandb: Find logs at: ./wandb/offline-run-20241127_055156-bffymd73/logs
wandb: WARNING The new W&B backend becomes opt-out in version 0.18.0; try it out with `wandb.require("co
re")`! See https://wandb.me/wandb-core for more information.
(2024-08-08) (2024-08-08/base) [jaiaid@sophia-gpu-22 wordplay]$
```

Training log file can be found at `./wandb/offline-run-20241127_055156-bffymd73/logs`