HAL cluster

"My name is HAL. I became operational on March 25 2019 at the Innovative Systems Lab in Urbana, Illinois. My creators are putting me to the fullest possible use, which is all I think that any conscious entity can ever hope to do." (paraphrazed from https://en.wikipedia.org/wiki/HAL_9000)

Hardware-Accelerated Learning (HAL) cluster description

**Host name:** hal.ncsa.illinois.edu

**Hardware**

- 16 IBM AC922 nodes
  - IBM 8335-GTH AC922 server
    - 2x 20-core IBM POWER9 CPU @ 2.4GHz
    - 256 GB DDR4
  - 4x NVIDIA V100 GPUs
    - 5120 cores
    - 16 GB HBM2
  - 2-Port EDR 100 Gb/s IB ConnectX-5 Adapter
  - 1 IBM 9006-22P storage node
    - 72TB ZFS array, NFS-mounted on all nodes via IB EDR
  - Storage upgrade TBD

**Software**

- RHEL 7.6
- CUDA 10.1.105
  - cuDNN 7.5.0
  - NCCL 2.4.2
- IBM XLC and IBM XLFORTRAN 16.1.1
- Advance toolchain for Linux on Power 12.0
- PGI Community Edition 19.4
- PowerAI 1.6.0
- SLURM

**Documentation**

- Job management with SLURM
- Modules management
- Getting started with PowerAI
- Using Jupyter Notebook on HAL
- Working with containers

**To request access:** fill out this form. Make sure to follow the link on the application confirmation page to request actual system account.

**To report problems:** email us.

**Quick start guide:** (for complete details see Documentation section on the left)

**To connect to the cluster:**

```bash
ssh username@hal.ncsa.illinois.edu
```

**To submit interactive job:**

```bash
srun --partition=debug --pty --nodes=1 --ntasks-per-node=8 --gres=gpu:v100:1 --t 01:30:00 --wait=0 --export=ALL /bin/bash
```

**To submit a batch job:**

```bash
sbatch run_script.sb
```

See `run_script.sb` for a basic example.

**Job Queue time limits:**

- Interactive queue: 12 hours
- Batch queue: 72 hours

**To load IBM PowerAI module:**

```bash
module load ibm/powerai
```

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