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." (paraphrased from https://en.wikipedia.org/wiki/HAL_9000)

In your publications and presentations that use results obtained on this system, please include the following statement: "This work utilizes resources supported by the National Science Foundation’s Major Research Instrumentation program, grant #1725729, as well as the University of Illinois at Urbana-Champaign".

Hardware-Accelerated Learning (HAL) cluster

Contact us

Request access to this system: Application

Contact ISL staff: Email Address

Visit: NCSA, room 3050E
<table>
<thead>
<tr>
<th>Host name: hal.ncsa.illinois.edu</th>
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### Hardware
- 16 IBM AC922 nodes
  - IBM 8335-GTH AC922 server
    - 2x 20-core IBM POWER9 CPU @ 2.4 GHz
    - 256 GB DDR4
  - 4x NVIDIA V100 GPUs
    - 5120 cores
    - 16 GB HBM 2
- 2-Port EDR 100 Gb/s IB ConnectX-5 Adapter
- 1 IBM 9006-22P storage node
  - 72TB Hardware RAID array
  - NFS
- 2 DDN GS400NVE Flash Arrays
  - 244 TB usable, NVME SSD-based storage
  - Spectrum Scale File System

### Software
- RHEL 7.6
- CUDA 10.1.105
  - cuDNN 7.5.0
  - NCCL 2.4.2
- IBM XL Fortran and IBM XL Fortran 16.1.1
- Advance toolchain for Linux on Power 12.0
- PGI Community Edition 19.4
- PowerAI 1.6.0
- SLURM 19.05.2

### Documentation
- Job management with SLURM
- Modules management
- Getting started with WMLCE (former IBM PowerAI)
- Using Jupyter Notebook on HAL
- Working with containers
- Installing python packages
- Getting started with HAL OnDemand
- Science on HAL

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To request access: fill out [this form](#). Make sure to follow the link on the application confirmation page to request your actual system account.

### Frequently Asked Questions

#### To report problems: email us.
User group Slack space: [https://join.slack.com/t/hallinoisncsa](https://join.slack.com/t/hallinoisncsa)

#### Real-time system status: [https://hal-monitor.ncsa.illinois.edu:3000/](https://hal-monitor.ncsa.illinois.edu:3000/)
HAL OnDemand portal: [https://hal.ncsa.illinois.edu:8888/](https://hal.ncsa.illinois.edu:8888/)

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

### To connect to the cluster:

```
ssh <username>@hal.ncsa.illinois.edu
```

### To submit a batch job:

```
wsubmit run_script.sbatch
```

### Job Queue time limits:

- "debug" queue: 4 hours
- "gpux<n>" and "cpun<n>" queues: 24 hours

### To load IBM Watson Machine Learning Community Edition (former IBM PowerAI) module:

```
module load wmlce
```

### To see CLI scheduler status:

```
swqueue
```