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 publications and presentations that use results obtained on this system, please include the following acknowledgement: "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

Effective May 19, 2020, two-factor authentication via NCSA Duo is now required for SSH logins on HAL. See https://go.ncsa.illinois.edu/2fa for instructions to sign up.

Contact us

Request access to this system: Application

Contact ISL staff: Email Address

Visit: NCSA, room 3050E
### Host name:
hal.ncsa.illinois.edu

### 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
- **3 DDN GS400NVE Flash Arrays**
  - 360 TB usable, NVMe SSD-based storage
  - Spectrum Scale File System

### Software
- **RedHat 8.4**
- **CUDA 11.2.2**
  - cuDNN 8.1.1
  - NCCL 2.8.3
- **Nvidia HPC-SDK 21.5**
- **PowerAI 1.7.0**
- **OpenCE 1.3.1**
- **SLURM 20.02.3**

### Documentation
- Job Management with SLURM
- Module Management with LMod
- Getting started with HAL OnDemand
- Getting started with OpenCE (former WMLCE)
- Getting started with WMLCE (former PowerAI)
- How to Customize Python Environment on HAL
- Working with Containers
- Profiling GPU Programs
- Data Movement In/Out of HAL
- Distributed Training on HAL System

### Science on HAL

### Software for HAL

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**To request access:** fill out [this form](#). Make sure to follow the link in the confirmation email to request actual system account.

### Frequently Asked Questions

**To report problems:** email us

For our new users: [New User Guide for HAL System](#)

User group Slack space: [https://join.slack.com/t/halillinoisncsa](https://join.slack.com/t/halillinoisncsa)

Real-time system status: [https://hal-monitor.ncsa.illinois.edu](https://hal-monitor.ncsa.illinois.edu)

HAL OnDemand portal: [https://hal-ondemand.ncsa.illinois.edu/](https://hal-ondemand.ncsa.illinois.edu/)

Globus Endpoint: ncsa#hal

**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
swrun -p gpux1
```

**To submit a batch job:**

```bash
swbatch run_script.swb
```

**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:**

```bash
module load wmlce
```

**To see CLI scheduler status:**

```bash
swqueue
```