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
<table>
<thead>
<tr>
<th><strong>Host name:</strong> hal.ncsa.illinois.edu</th>
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<td><strong>Hardware</strong></td>
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| - 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** |
| - RedHat 8.4  
- CUDA 11.0.221  
- cuDNN 8.0.5  
- NCCL 2.11.4  
- NVidia HPC-SDK 21.5  
- PowerAI 1.7.0  
- OpenCE 1.2.2  
- SLURM 20.02.3 |
| **Documentation** |
| - Job management with SLURM  
- Modules management  
- Getting started with WMLCE (former PowerAI)  
- Working with containers  
- Installing python packages  
- Getting started with HAL OnDemand  
- Profiling GPU Programs  
- Data Movement In/Out of HAL |
| **Science on HAL** |
| **Software for HAL** |

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/halilinoisncsa

Real-time system status: https://hal-monitor.ncsa.illinois.edu:3000/

HAL OnDemand portal: 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:

```
ssh <username>@hal-login2.ncsa.illinois.edu
```

To submit interactive job:

```
swrun -p gpux1
```

To submit a batch job:

```
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:

```
module load wmlce
```

To see CLI scheduler status:

```
swqueue
```