# 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](https://en.wikipedia.org/wiki/HAL_9000))

## Hardware-Accelerated Learning (HAL) cluster description

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<th>Hardware</th>
<th>To request access: fill out this form. Make sure to follow the link on the application confirmation page to request an actual system account.</th>
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<tr>
<td>• 16 IBM AC922 nodes</td>
<td><strong>To report problems:</strong> email us.</td>
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<td>• IBM 8335-GTH AC922 server</td>
<td><strong>Quick start guide:</strong> (for complete details see Documentation section on the left)</td>
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<tr>
<td>• 2x 20-core IBM POWER9 CPU @ 2.4 GHz</td>
<td><strong>To connect to the cluster:</strong></td>
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</table>
| • 256 GB DDR4 | ```
  ssh username@hal.ncsa.illinois.edu
``` |
| • 4x NVIDIA V100 GPUs | **To submit interactive job:** |
| • 5120 cores | ```
  srun --partition=debug --pty --nodes=1 \
  --ntasks-per-node=8 --gres=gpu:v100:1 \
  -t 01:30:00 --wait=0 \
  --export=ALL /bin/bash
``` |
| • 16 GB HBM 2 | **To submit a batch job:** |
| • 2-Port EDR 100 Gb/s IB ConnectX-5 Adapter | ```
  sbatch run_script.sb
``` |
| • 1 IBM 9006-22P storage node | **See run_script.sb for a basic example.** |
| • 72TB ZFS array, NFS-mounted on all nodes via IB EDR | **Job Queue time limits:** |
| • Storage upgrade TBD | • Interactive queue: 12 hours |

## Software

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

## Documentation

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

## Contact us

Request access to ISL resources: Application

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Visit: NCSA, room 3050E