Hardware-Accelerated Learning (HAL) Cluster

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Quick Start

Contact Us

Request for HAL Access

Please fill out the following form. Make sure to **follow the link on the application confirmation page** to request an actual system account.

https://forms.illinois.edu/sec/6587313

Submit Tech-Support Ticket

Please submit a tech-support ticket to the admin team.

help+isl@ncsa.illinois.edu

Join HAL Slack User Group

Please join HAL slack user group.

https://join.slack.com/t/halillinoisncsa

Check System Status

Please visit the following website to monitor real-time system status.

https://hal-monitor.ncsa.illinois.edu:3000/

User Guide

Connect to HAL Cluster

There are 2 methods to log on to the HAL system. The first method is to **SSH** via a terminal,

SSH

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

and the second method is to visit the **HAL OnDemand** webpage.

HAL OnDemand

```
https://hal.ncsa.illinois.edu:8888
```

Submit Jobs Using Slurm Wrapper Suite (Recommended)

Submit an interactive job using **Slurm Wrapper Suite**,

```
swrun -p gpux1
```

Submit a batch job using **Slurm Wrapper Suite**,

```
swbatch run_script.swb
```

The run_script.swb example

run_script.swb

```
#!/bin/bash

#SBATCH --job-name="hostname"
#SBATCH --output="hostname.%j.%N.out"
#SBATCH --error="hostname.%j.%N.err"
#SBATCH --partition=gpux1

srun /bin/hostname # this is our "application"
```

Submit Jobs Using Native Slurm

Submit an interactive job using **Slurm** directly.

```
srun --partition=gpux1 --pty --nodes=1 --ntasks-per-node=12 \
  --cores-per-socket=3 --threads-per-core=4 --sockets-per-node=1 \
  --gres=gpu:v100:1 --mem-per-cpu=1500 --time=4:00:00 \
  --wait=0 --export=ALL /bin/bash
```

Submit a batch job using **Slurm** directly.

```
swbatch run_script.sb
```

The run_script.sb example

```
#!/bin/bash

#SBATCH --job-name="hostname"
#SBATCH --output="hostname.%j.%N.out"
#SBATCH --error="hostname.%j.%N.err"
#SBATCH --partition=gpux1
#SBATCH --nodes=1
#SBATCH --ntasks-per-node=1
#SBATCH --export=ALL
#SBATCH -t 04:00:00

srun /bin/hostname # this is our "application"
```

Submit Jobs Using HAL OnDemand (New)

Log in with your own user name and password.

HAL OnDemand
`https://hal.ncsa.illinois.edu:8888`

Files Apps

This Open OnDemand application provides a web-based file explorer that allows the user to remotely interact with the files on the HPC center's local file system. This application uses Node.js as the code base and is based on the CloudCommander file explorer app.

The Files app provides access to create files and folders, view files, manipulate file locations, upload files, and download files. It also provides integrated support for launching the Shell App in the currently browsed directory as well as launching the File Editor App for the currently selected file.

Active Jobs App

This Open OnDemand application provides a web-based view of the current status of all the available jobs on the batch servers hosted by the HPC center. This application is built with the Ruby on Rails web application framework.

The Active Jobs App displays all the available jobs in a dynamically searchable and sortable table. The user can search on job id, job name, job owner, charged account, status of job, as well as the cluster the job was submitted to. Progressive disclosure is used to show further details on individual jobs by clicking in the "right arrow" to the left of a table row.

Job Composer App

This Open OnDemand application provides a web-based utility for creating and managing batch jobs from template directories. This application is built with the Ruby on Rails web application framework.

The Job Composer App attempts to model a simple but common workflow that typical users of an HPC center use. When users create new batch jobs they will follow the given workflow:

1. Copy a directory of a previous job, either one of their previous jobs or a job from a group member
2. Make minor modifications to the input files
3. Submit this new job

Shell Apps

This Open OnDemand application provides a web-based terminal that connects the user through an SSH session to either the local machine or any other machine allowed within the internal network. Typically this will connect the user to a login node. This application uses Node.js for its exceptional support of websockets providing a responsive user-experience as well as its event-driven framework allowing for multiple sessions simultaneously.

The terminal client is an xterm-compatible terminal emulator written entirely in JavaScript. The Shell App uses the Google client hterm for this. It performs reasonably well across most modern browsers on various operating systems. It is currently used by the developers of Open OnDemand quite a bit.

Documentation

System Overview

Hardware Information

Login node

Login Node	IBM	9006-12P	1x
CPU	IBM	POWER9 16 Cores	2x
Network	Mellanox	2 Ports EDR InfiniBand	1x

Compute node

Compute Node	IBM	AC922 8335-GTH	16x
CPU	IBM	POWER9 20 Cores	2x
GPU	NVidia	V100 16GB Memory	4x
Network	Mellanox	2 Ports EDR InfiniBand	1x

Storage Node

Storage Node	IBM	9006-22P	1x
CPU	IBM	POWER9 20 Cores	2x
Storage	WD	NFS	1x
Network	Mellanox	2 Ports EDR InfiniBand	1x

Software Information

Manufacturer	Software Package	Version
IBM	RedHat Linux	7.6
NVidia	CUDA	10.1.105
NVidia	PGI Compiler	19.4
IBM	Advance Toolchain	12.0
IBM	XLC/XLF	16.1.1
IBM	PowerAI	1.6.1
SchedMD	Slurm	19.05.2
OSC	Open OnDemand	1.6.20

Job Management with Slurm

Modules Management

Getting started with WMLCE (former PowerAI)

Using Jupyter Notebook on HAL

Working with Containers

Installing python packages

Frequently Asked Questions