



ilifu Online Training – Introduction to slurm

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Job scheduling & cluster management tool

- Framework : Login node & Compute nodes
- **Login node**
 - Accessed via ssh (\$ ssh <username>@slurm.ilifu.ac.za)
 - Submit jobs and manage work directories
- **Compute nodes**
 - Where processes/code runs
 - via singularity containers or modules
- **Partitions / Queues**

Main, Jupyter, Devel 32 core, ~232GiB RAM	GPU 32 core, ~232GiB RAM, Nvidia GPUs	HighMem 32 core, 503GiB RAM 96 core, 1.5TiB RAM
85 + 12 Nodes	7 nodes	3 nodes

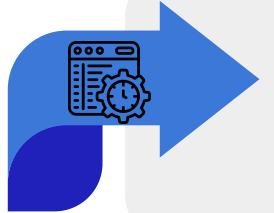

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Login node

Run SLURM & bash commands
cd, mkdir, ls, etc

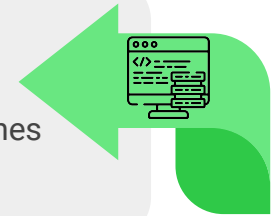


Main partition

Stable, computationally
heavy processing

Jupyter/Dev. node

Development space
New code / workflows / routines
Debugging / testing software



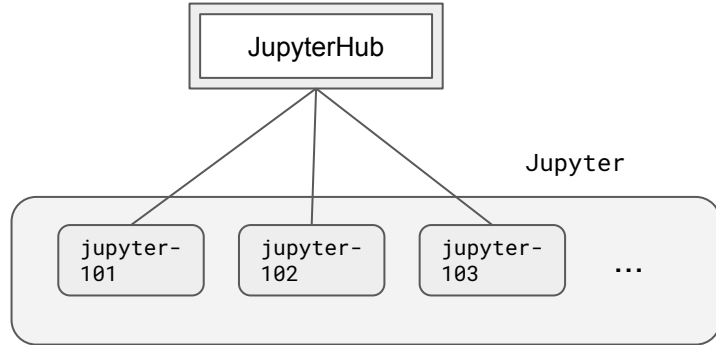
HighMem/GPU

For single-high memory
jobs that can't be split
into multiple jobs for MPI

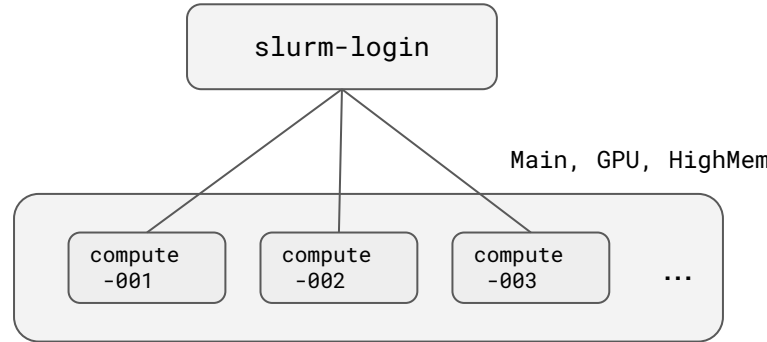




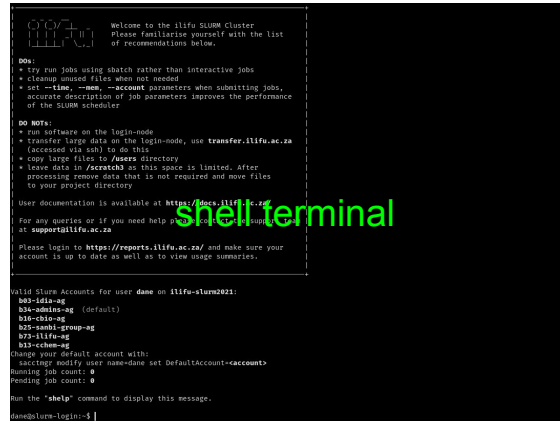
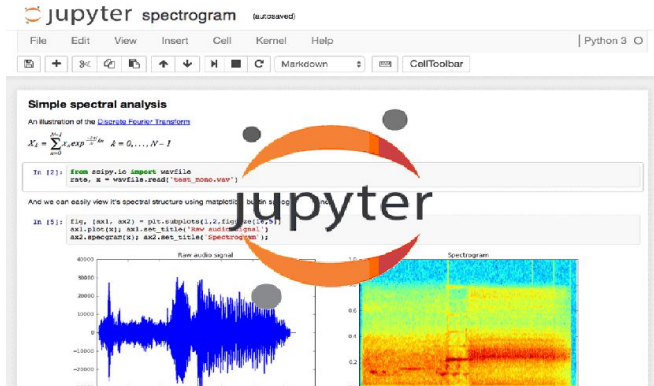
<https://jupyter.ilifu.ac.za>



`$ ssh <username>@slurm.ilifu.ac.za`



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\$ sinfo → shows partitions and resources

\$ squeue → shows all jobs in SLURM queue/partition

\$ squeue -u \$USER → shows your jobs

\$ sbatch slurm_job_script.sh → submit job to SLURM

\$ sbatch --help → info. on job submission parameters

\$ scancel <jobid> → cancel running/pending job

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SLURM - running a job



```
#!/bin/bash  
module add python/3.11.2  
python hello_world.py
```

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https://docs.ilifu.ac.za/#/tech_docs/running_jobs?id=customising-your-job-using-sbatchsrn-parameters

```
-time=0-03:00:00 # 3 hours  
-mem=3G # 3 GiB  
-ntasks=1 # one task  
-nodes=1 # one node  
-partition=Main  
-account=<your default>
```

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SLURM - running a job



https://github.com/ilifu/ilifu_user_training/tree/main/introduction/tutorial2

```
#!/bin/bash
#SBATCH --job-name=tutorial2_R_container
#SBATCH --time=00-00:01:00
#SBATCH --mem=4G
#SBATCH --partition=Main
#SBATCH --output=R_container-%j.stdout
#SBATCH --error=R_container-%j.stderr
#SBATCH --mail-user=YOUR_EMAIL_ADDRESS
#SBATCH --mail-type=BEGIN,END,FAIL,TIME_LIMIT_80
#SBATCH --account=ACCOUNTING_GROUP
```

Describe job parameters / resources

```
singularity exec /software/common/containers/RStudio2023.06.1-524-R4.3.1.sif Rscript hello_world.R
```

container

software

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DEMO TIME!

https://github.com/ilifu/ilifu_user_training/tree/main/introduction/tutorial2

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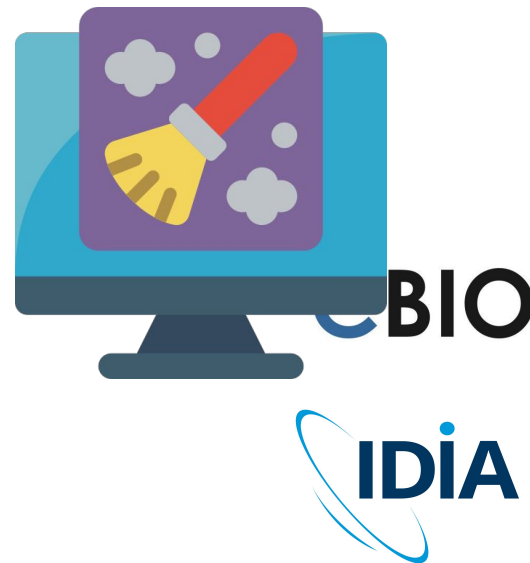


Do's :

- Run jobs using sbatch rather than interactive jobs
- Identify job resources requirements:
 - No. of nodes and CPUs, amount of RAM and wall-time.
- Remove files that aren't needed
 - /scratch3 folder after data processing is complete
 - Old raw data, temporary products , etc.
- Use Singularity (cannot install software on nodes)
- Use username@transfer.ilifu.ac.za for data transfers

Don't:

- Don't run software/heavy processes on login node
- Don't place large files in your home directory (/users)
- Don't transfer using scp/rsync on the login node



Thank you
for coming and for your time.

Happy computing!

<https://docs.ilifu.ac.za/>

support@ilifu.ac.za

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