



EAR ISC2024 tutorial: Monitoring

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Monitoring

- Execution environment; Snellius
- Use cases and scripts in Snellius shared folder and Github
- CPU bound use case: Run and get metrics
- Memory bound use case: Run and get metrics
- GPU kernel use case: Run and get metrics
- Changing CPU frequency
 - CPU cases
- Energy efficiency vs Resource consumption
- Energy efficiency vs architecture



Snellius

Add snellius description here



Exercices



1- Basic EAR monitoring

- Codes in /projects/0/energy-course
- GIT: <https://github.com/sara-nl/ISC-2024-EAR-tutorial/tree/main>
- Get the examples and test them
- Wait for jobs to finalize
- Get the ear metrics
 - module load ear
 - eacct -j jobid1
- Understand the metrics



For each case

- Execute with ear=on and get the metrics
 - Per job
 - Per node (if it applies)
 - Runtime metrics
- Understand application characteristics
 - Is my application CPU bound?
 - Is my application Memory bound?
 - Is it a power hungry application? Are we close to the TDP?
 - Does my application shows IO activity?
 - Does my application shows high MPI percentage?
 - Does my application present phases of execution?
- For GPU application
 - Is my application pure GPU? Or CPU/GPU ?
 - What is the GPU activity and power consumption? Are we close to the TDP?



eacct options

- `eacct -j jobid -l` → show average metrics (per-node)
- `eacct -j jobid -r` → shows runtime metrics (per-node)
- `eacct -j jobid -r c filename` → saves ear metrics in csv file



2- Static energy optimization

- What is the effect of changing my resource requirements?
 - Number of Nodes
 - Number of tasks
 - Ratio tasks/cpus-per-task
 - Ratio tasks per GPU
- What is the effect of changing the CPU frequency?
 - EAR provides its own list of CPU frequencies, use `enode_info` to get the list
 - Is it worth to do it in CPU bound cases?
 - Is it worth to do it in Memory bound cases?

3- Energy efficient architectures

- GENOA nodes consumes more power than ROME nodes but....Are they more energy efficient
 - What is the total energy consumption for the same problem?
 - What's the ratio performance variation vs Energy/Power variation?