EAR ISC2024 tutorial: Monitoring

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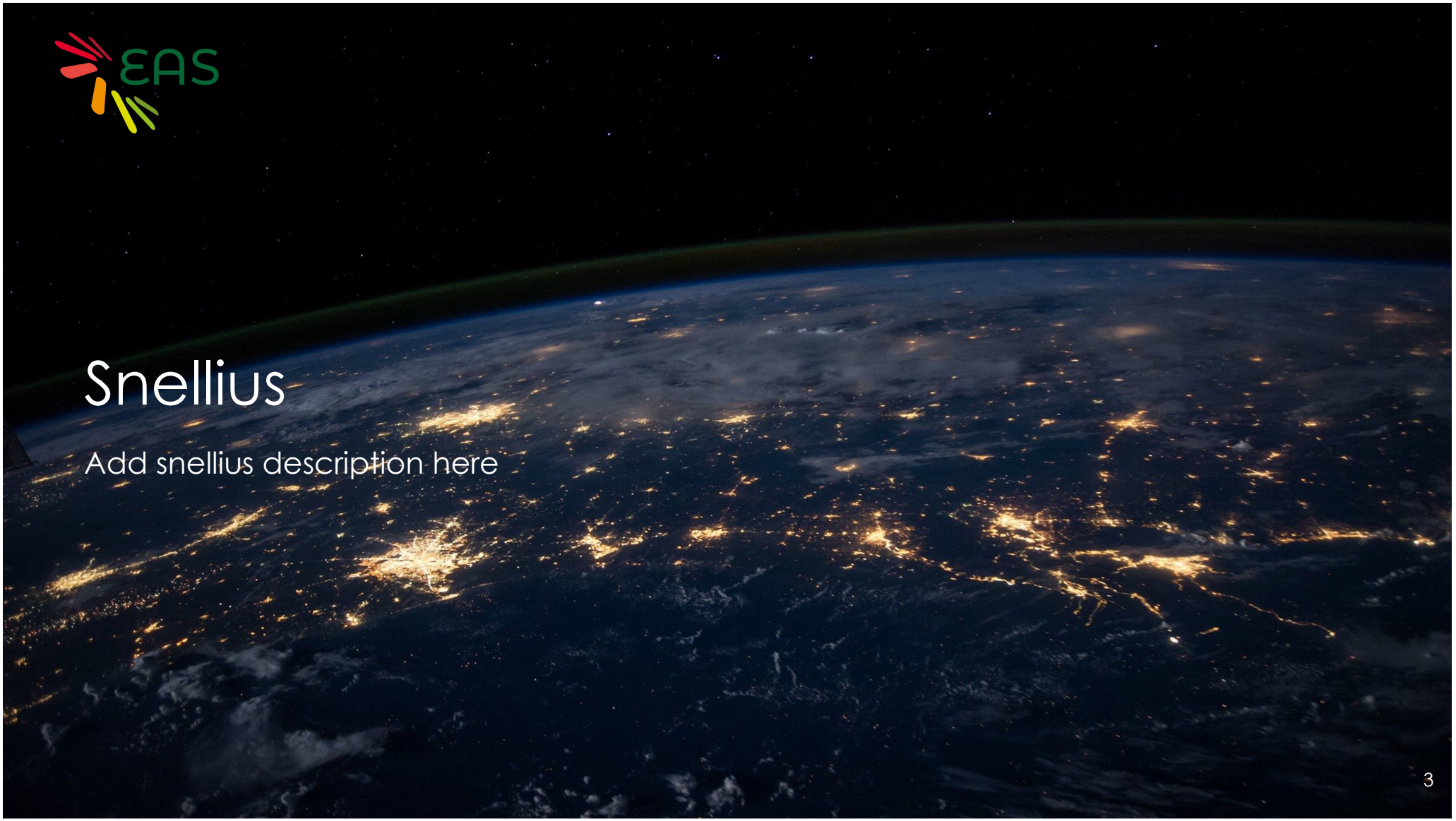
Monitoring

- Execution environment; Snellius
- Use cases and scripts in Snellius shared folder and Github
  - CPU use cases
  - GPU use cases
- Changing CPU frequency
  - CPU cases
- Energy efficiency vs Resource consumption
- Energy efficiency vs architecture


EAS
Snellius
Add snellius description here


EAS
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
  - https://github.com/sara-nl/ISC-2024-EAR-tutorial/tree/main/tutorials/monitoring_ear
  - NPB CPU use cases
  - GROMACS-CPU
  - GROMACS-GPU
- 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?