Introduction to CC-IN2P3 Computing Center
CC-IN2P3 presentation
What is the CC-IN2P3?

- a data and computing center for the physicians (LHC...)
- partly opened to other disciplines
- the CZAR role:
  - inform potential users
  - validate account creation requests
  - give a quick formation to new users
CC-IN2P3 computing resources

- N x 1000 servers
  - 48/64 cpu-cores, 128/192GB RAM
- 80 GPUs, 4 GPUs per server
  - 72 NVidia V100/32GB
  - 8 NVidia K80/12GB
- ~400 servers and 80 GPUs available for non-physicians
Types of computation

- cpu
  - multi-cores single-machine (openmp)
  - multi-cores multi-machines (openmp+mpi)

- GPU
  - single-GPU single-machine
  - multi-GPUs single-machine
  - NO multi-GPUs multi-machines

- C/C++, Python, Pytorch, TensorFlow...
Running a job with the job scheduler
Job scheduler - Cluster architecture

Cluster architecture

SSH

Gateway (interactive server)

HTC partition
- Compute node 1
- Compute node 2
- Compute node 3

GPU partition
- Compute node 4
- Compute node 5
- Compute node 6

Storage

LIRIS - Eric Lombardi - 31/05/2022
- demo 1: batch mode
  - this is the standard mode, **NON**-interactive
  - write a minimal shell script to launch the job
  - submit the job with `sbatch` command
  - wait for the job to run
  - job outputs in slurm-nnnn.out file
Job scheduler - Interactive mode

- demo 2: interactive mode
  - submit an interactive session request with `srun` command
  - wait for the session to start
  - run the job interactively
  - very poor hardware usage, do not overuse!
  - for debugging purpose only
  - dedicated partitions htc_interactive and gpu_interactive
Job scheduler - Preinstalled tools

- compilers:
  - C/C++: gcc, intel, pgi
  - Fortran: f95, g95, pgi
  - Haskell: ghc
  - swig
- production: cmake
- programming languages: R, golang, julia, python
- containers: singularity
Alternative solution: Jupyter Notebook
- demo 3: Jupyter Notebook
  - [https://notebook.cc.in2p3.fr](https://notebook.cc.in2p3.fr)
  - CPU only or GPU
  - limits:
    - CPU only: max 2 GB RAM (extensible)
    - GPU: max 44 GB RAM, max 4 K80/12GB GPUs
  - PyTorch and Tensorflow already installed
  - Notebook killed after 24h of inactivity
  - Could replace a Virtual Machine
Final word
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- how to get an account?
  - the procedure is on the [LIRIS intranet](https://liris.cnrs.fr)
  - easy and fast

- computing has a cost, use it with discernment