

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

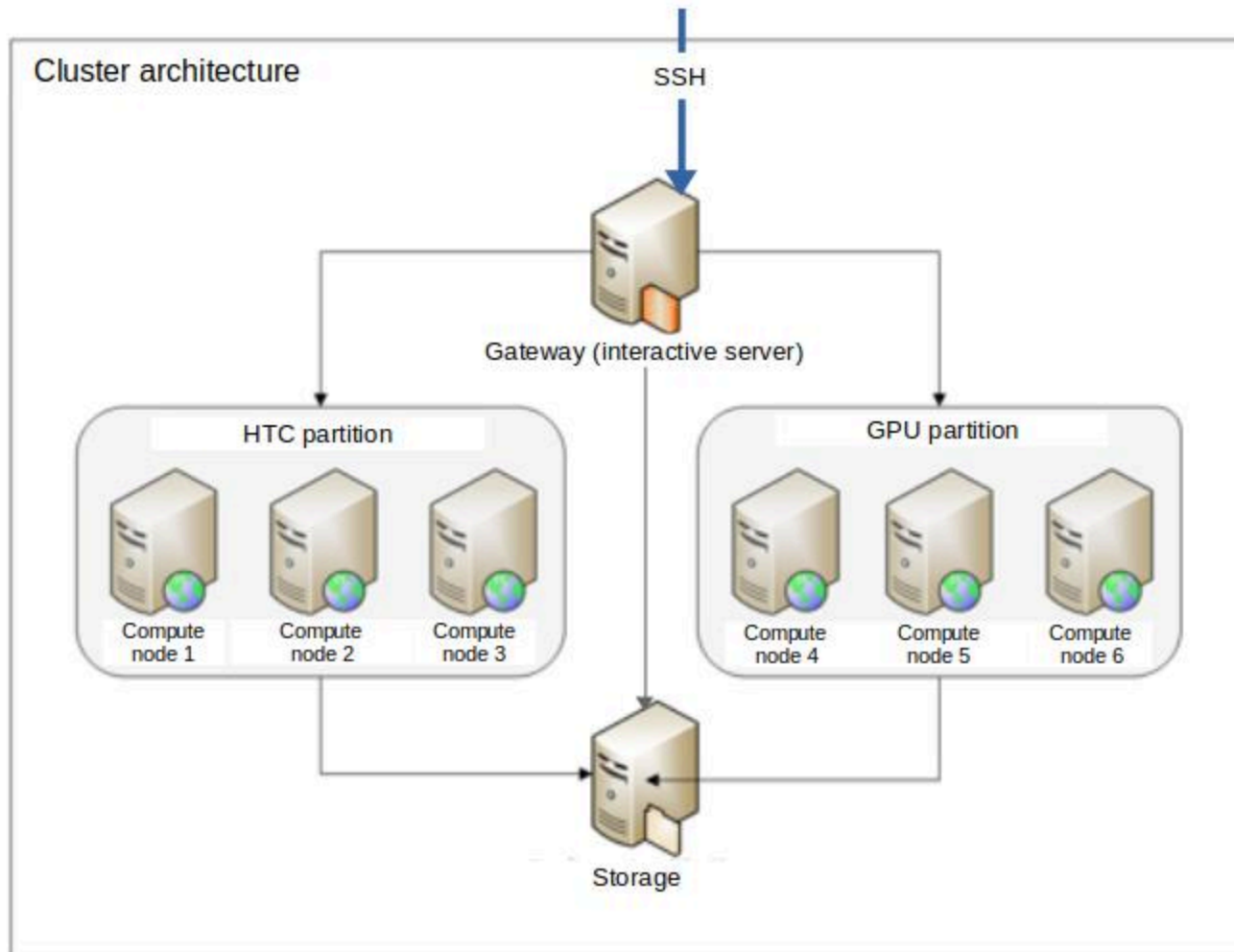
- N x 1000 servers
 - 48/64 cpu-cores, 128/192GB RAM
- 80 GPUs, 4 GPUs per server
 - 72 NVidia V100/32GB
 - 8 NVidia K80/12GB
- ~400 servers and 80 GPUs available for non-physicians

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



Job scheduler - Batch mode

- 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

Jupyter Notebook

- demo 3 : Jupyter Notebook
 - <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