TH Computing — Status & Needs

(what we use) (medium-long term)

Computing: different applications ⇝ different requirements

A. Monte Carlo, phenomenology, … (often embarrassingly parallel, mainly CPUs)
   - ↪ $\mathcal{O}(10\,000)$ nodes on `lxbatch`
   - ⇝ essential to maintain, possibly even increase (gradually add GPUs)

B. Lattice QCD (massively parallel, high-speed interconnect *essential*)
   - ↪ dedicated 72-node CPU HPC cluster, replacement in 2023 with new CPU or GPU solution
   - ⇝ critical to have continued support (direct contacts), future upgrades

C. Amplitudes, … (symbolic & numerical calculations w/ huge expressions ↔ memory)
   - ↪ 2 × dedicated machines (1 TB memory, 126 cores)
   - ⇝ new machine(s) with even higher specs (especially memory)

D. Machine Learning, phenomenology, … (increased demand for GPUs)
   - ↪ same shared GPU resources as available to everyone on `lxbatch`
   - ⇝ build up TH quota for GPU nodes (combined with "A.")
     & dedicated machine(s) (similar setup to "C.") for development, etc.

TH Computing — Status & Needs

(what we use) (medium-long term)

Services & Infrastructure

- Support
  - ↪ Hosting, management & technical support (HPC, high-memory machines, …)
  - ⇝ very happy & essential for us
  - ↪ INSPIRE, HEPData, and all open data initiatives & indico
  - ⇝ essential for our research and day-to-day work
  - ↪ TH website ⇝ need for professional support → central contact in IT?
  - ↪ CERN Linux distro ⇝ desktops @ TH ↔ compatibility
- Storage: AFS & EOS/CERNbox (events, grid tables, intermediate results, …)
  - ⇝ potential increase in EOS space demands
    & improved EOS compatibility with `lxbatch`
- Software environment / development
  - ↪ cvmfs, LCG, gitlab+ci, …
- Software licences
  - ↪ Mathematica, Maple,
  - ⇝ Mathematica on the cluster → more (unlimited?) licenses