

Advanced tracking tools – ACTS

Hadrien Grasland

LAL – Orsay

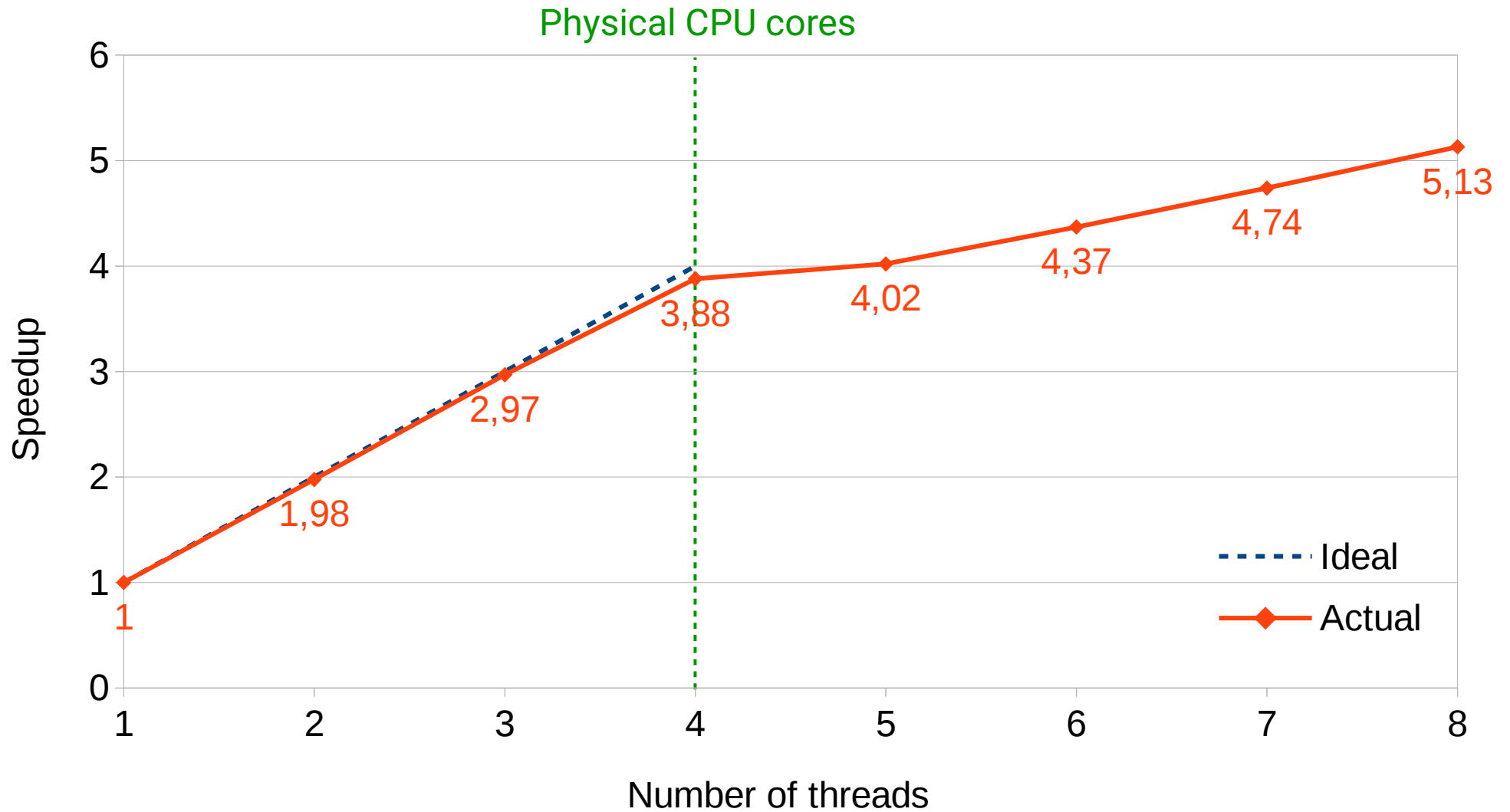
Getting started

- A. Salzburger gave an ACTS tour in September
- Suggested focus: Multi-threading
 - Current ACTS team is lacking expertise in this area
 - ACTS designed for threading, but not tested yet
- Other areas of interest discussed
 - Multi-particle filtering (e.g. GSF)
 - General optimization (Runge-Kutta, geometry)
 - New architectures (GPU, Xeon Phi...)

Parallelization work

- Made the ACTS test framework multithreaded
 - Process multiple events in parallel
 - Good validation scenario (similar to CMSSW, Gaudi)
 - Existing and future ACTS examples now threaded
- Validated thread safety of track extrapolation
 - Manually for now, automating it for CI
- Evaluated CPU scalability
 - 5.1x speedup on a 4-cores/8-threads machine

Detailed CPU scaling



Coming up next

- Validate more ACTS components
 - Waiting for Kalman filter example code...
- Optimize performance bottlenecks
 - Considering VecGeom adoption
 - Studying vectorized Runge-Kutta from GeantV
- Investigate portability to other hardware
 - Lots of GPU tracking activities in ALICE, CMS
 - Contacting stakeholders for more details...

Thanks for your attention