



# HEPScore23

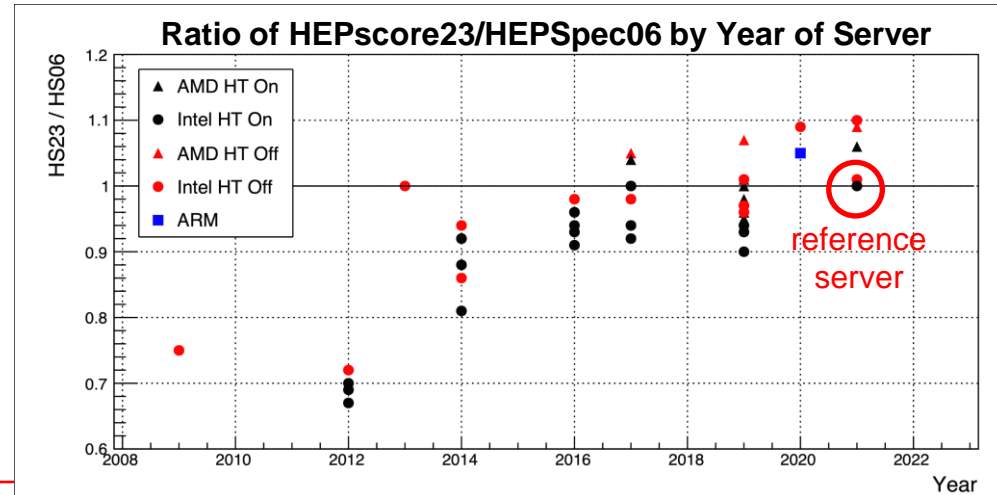
# A new CPU benchmark for WLCG computing

- CPU benchmarks are an important part of the WLCG infrastructure
  - Experiment requests and site pledges
  - Accounting of CPU usage
  - Procurement of new hardware
- The current WLCG benchmark, HEPSpec06 (2009), has several drawbacks
  - Not representative of HEP workloads:
    - HEP workloads are more performant on newer hardware
  - HEPSpec06 is the 32bit version
  - SPEC stopped supporting the underlying SPEC-CPU 2006 benchmark (2018)
- WLCG needs a benchmark for other processors (ARM and GPUs)
  - We have HEP workloads for ARM from a number of experiments
  - Workloads with GPUs are just emerging:
    - ALICE is performing asynch reconstruction on GPUs

# HEPScore23 (HS23)

- Based on set of real workloads provided by seven experiments (not only LHC) in 2021-2022:
  - ALICE, ATLAS, CMS, LHCb, Belle II, Gravity Wave (LIGO/VIRGO) and JUNO
  - Typically, event generation and digitization, MC simulation and reconstruction
- Updated for the latest software and ARM-compatibility in 2023
- Validated with measurements from a variety of servers
- Fixed  $HS23 == HS06$  on a modern reference machine (Gold 6326 @ 2.90GHz with HT on) for a simpler transition
- HS23 benchmark replaced HS06 from April 1st and at the October 2023 RRB HS23 will be used
- Ongoing efforts to develop a benchmark for GPUs and power consumption

[Randall Sobie @ CHEP 2023](#)



# Transition plan

- Plan presented at the WLCG Lancaster Workshop:
  - For the accounting perspective see [Julia Andreeva @ WLCG workshop](#)
- **Timescales are driven by the WLCG cycle for pledges (scrutiny group)**
  - Preliminary requests for resources for FY2025 are made in Oct 2023
- **Sites are expected to run HEPscore23 on newly procured hardware**
  - Prior to the pledge deadline, see [how to run HEPscore23 benchmark](#)
  - Existing hardware need not be re-benchmarked
- Sites will publish their information to the Accounting Group
  - See [the accounting procedures](#)
- HEPscore23 is normalized to HEPSPEC06 on the reference machine to simplify the calculation (and to allow for smooth transition of tables and plots)
- Documentation: <https://w3.hepix.org/benchmarking.html>