Future strategy update: ATLAS

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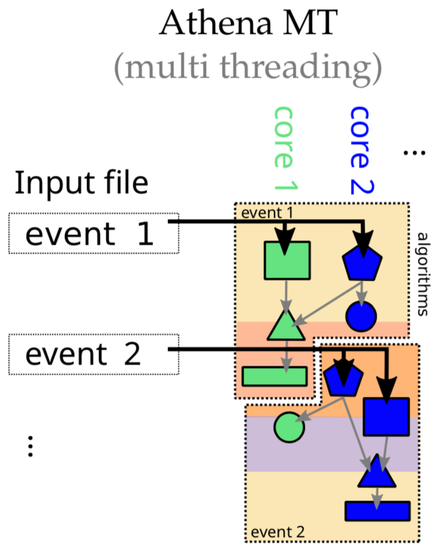
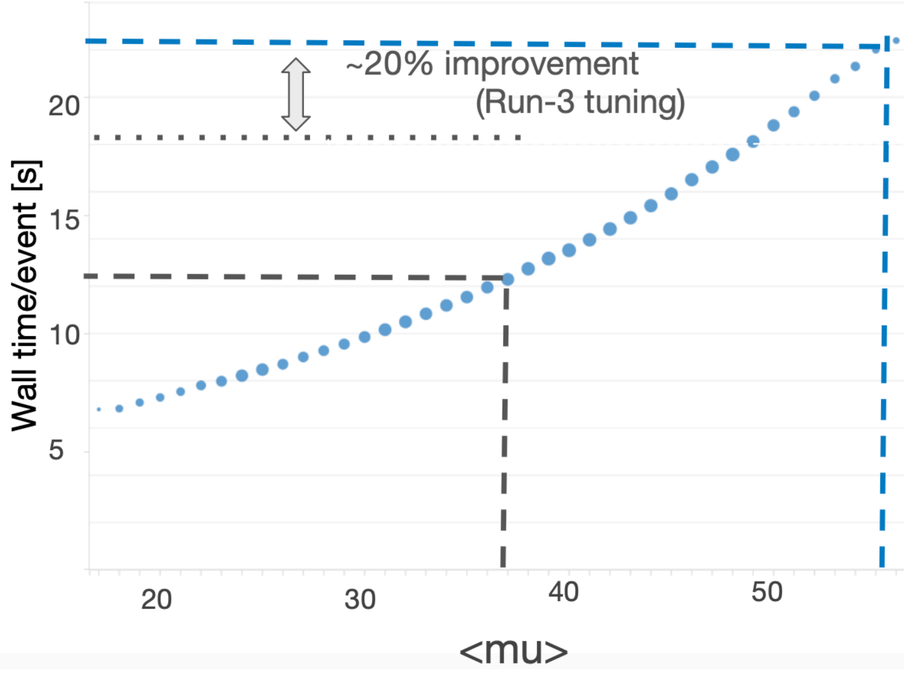
Run 3

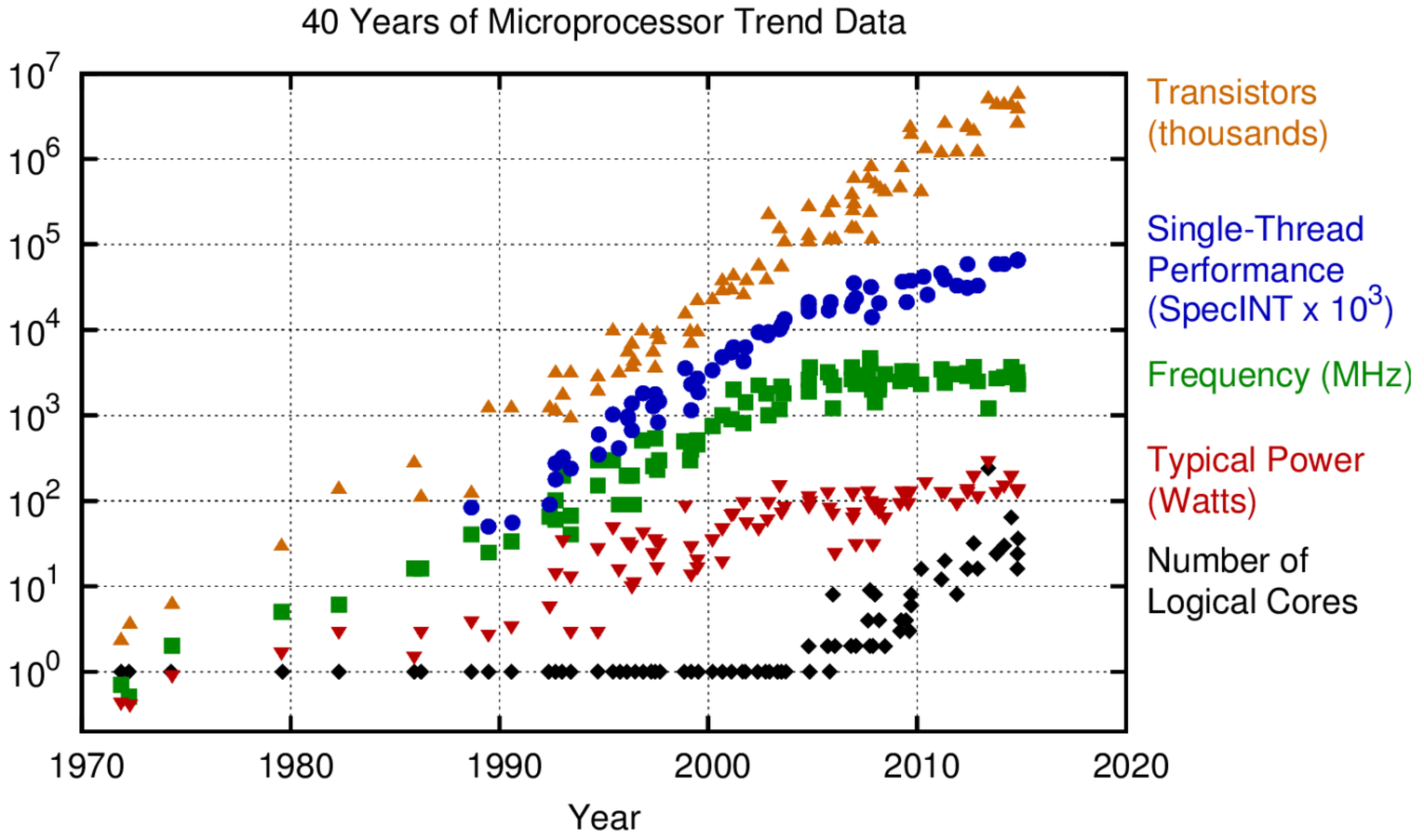
- In Run 3 we will use *multi-threaded* software to ensure we can continue to fully utilise resources as the number of cores per unit memory increases
  - Entails a large scale software development programme which is currently under way
    - Simulation with GeantMT is operational: technical issues being resolved
    - Parts of the reconstruction can also run multi-threaded: expanding the test suite to lead to validation in 2019
- Aim to run 50% of the simulation with FastCaloSimV2: validation under way
- Study group working to reduce disk footprint: preliminary recommendations expected early 2019
- Experimenting with reading AOD (bulk output of reconstruction) from tape
- Review of conditions conducted last year. Follow up in January - migration to a new RESTful interface ongoing
- Expect to need ~50% more capacity at the Tier0 (higher <μ>, slightly higher trigger rate, partly offset by tuning tracking settings (e.g. hits on track)





Towards HL-LHC

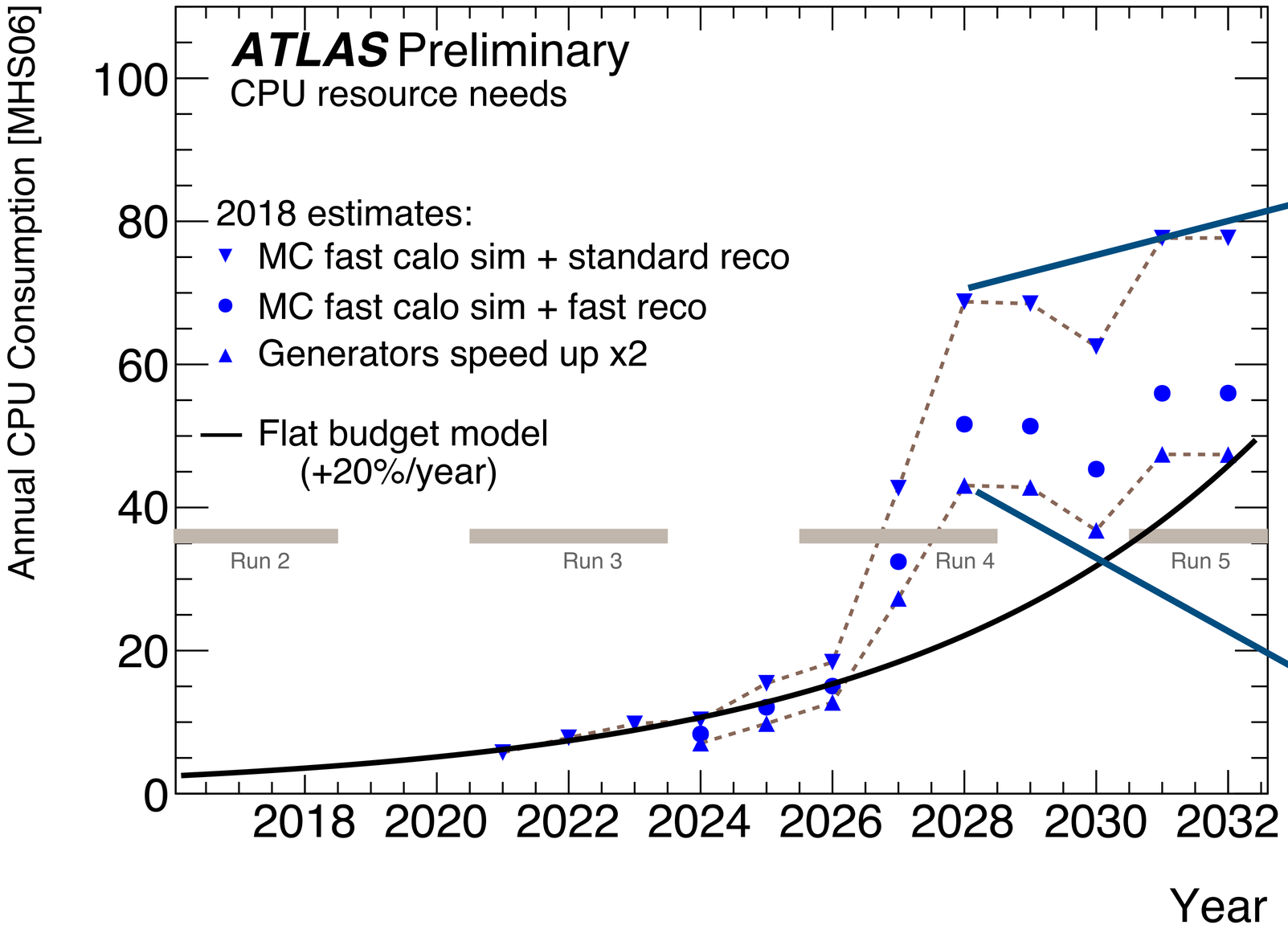
- Waiting for technology improvements alone will not meet HL-LHC computing requirements
- Significant investment in software R&D will be needed before Run 4
- Accelerators (GPUs, FPGAs) are appearing as a major component of new machines
  - Adapting code to efficiently use these architectures is non-trivial
  - They are particularly well suited to training deep neural networks: can such techniques be applied to bulk data processing and simulation in HEP?
- Variety of initiatives in the US and Europe beginning to form (IRIS-HEP in US already recruiting)

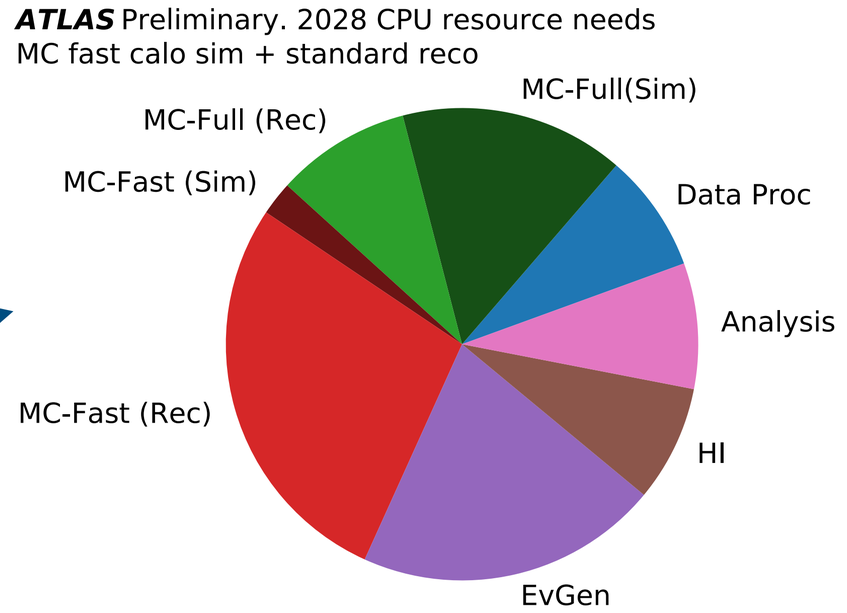


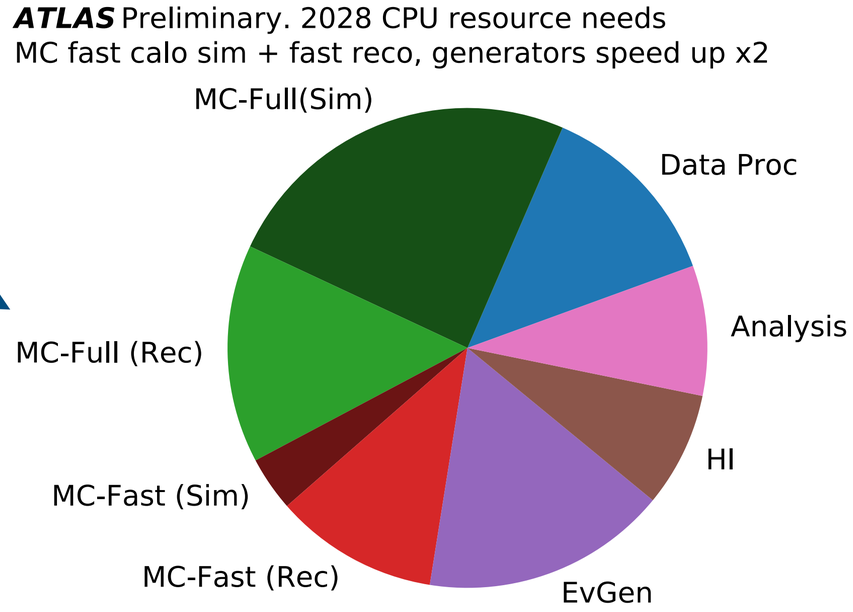
Original data up to the year 2010 collected and plotted by M. Horowitz, F. Labonte, O. Shacham, K. Olukotun, L. Hammond, and C. Batten
New plot and data collected for 2010-2015 by K. Rupp

Run 1: 2010	Run 2: 2015	Run 3:2020	Run 4: 2025
Athena	AthenaMP (multi-process)	AthenaMT (multi-threaded)	???

HL-LHC projections: CPU







HL-LHC projections: disk