Science and Technology Facilities Council

RAL experience with HEPScore

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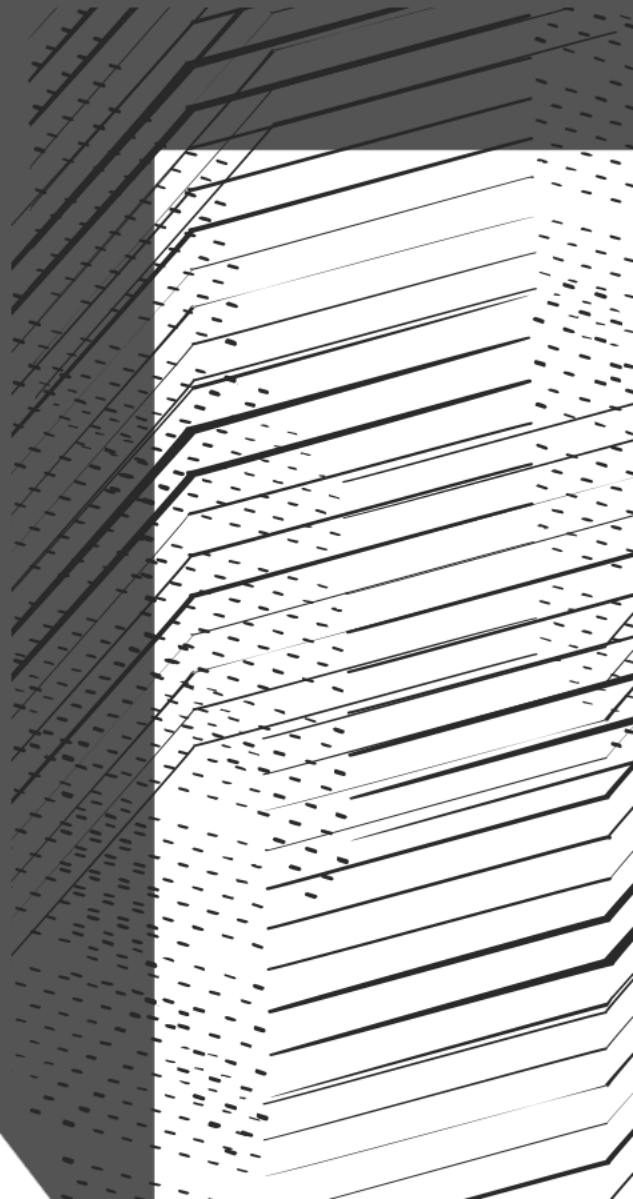
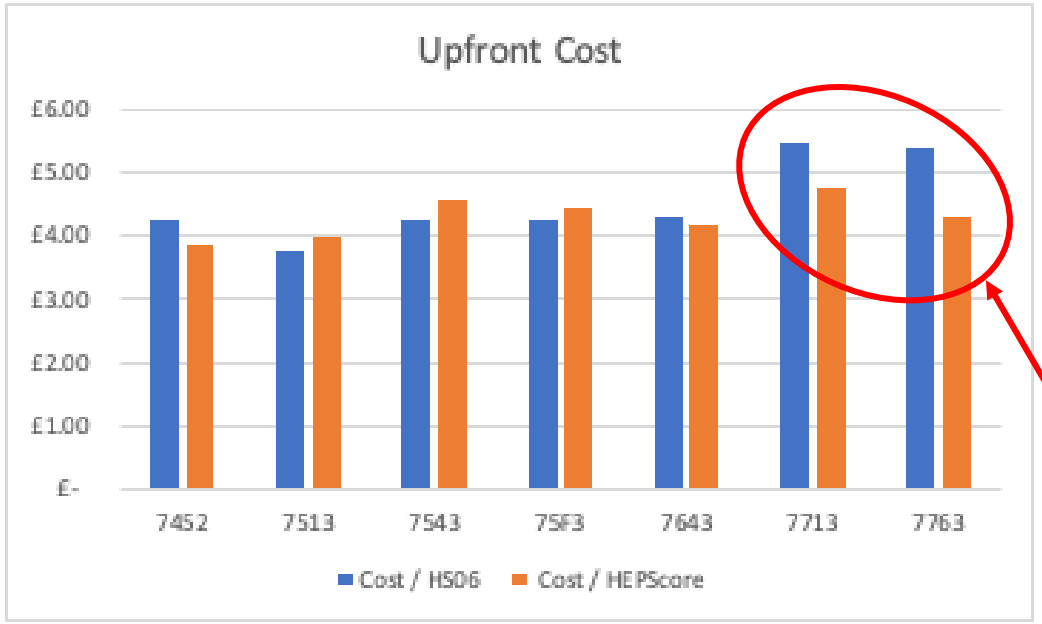
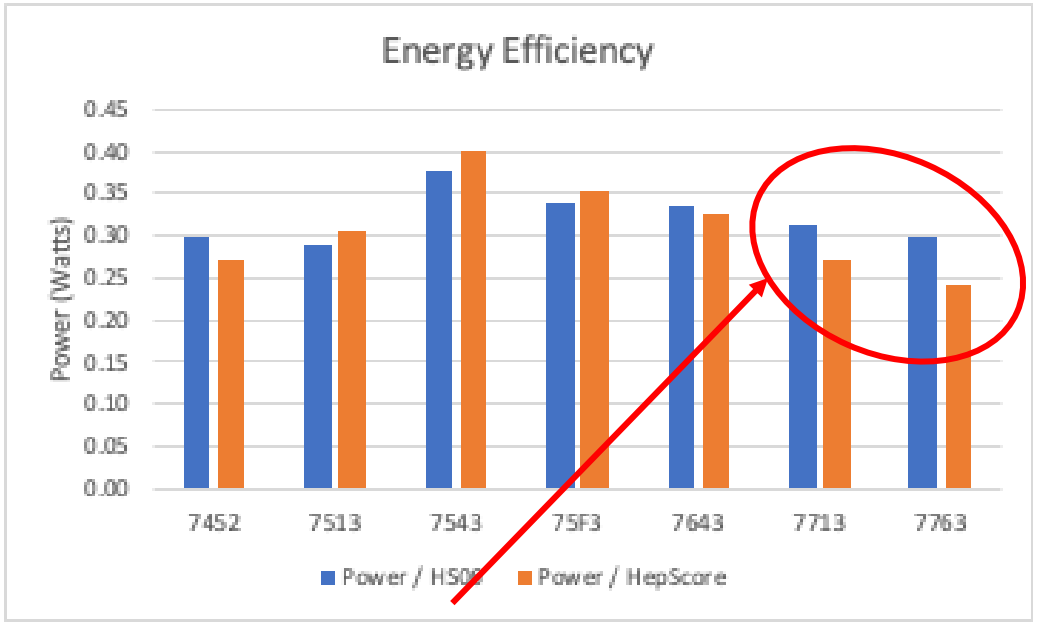


Last year's procurement

- In 2021 the RAL Tier-1 used HEPScore to decide on what hardware to procure:
  - HEPiX Benchmarking WG meeting on 23rd Septembe 2021.
  - HEP-SCORE deployment TF meeting on 6th October 2021.





Significant improvement for top end CPUs

Current Status

- We ordered the hardware required to meet April 2022 pledges in August 2021.
- Most of it turned up in December 2021, unfortunately the network cards didn't arrive until August 2022!
- The hardware went into production at the end of August as part of our HTCondor 9 and Rocky 8 upgrade.
  - We will be re-benchmarking a server from each generation of hardware.

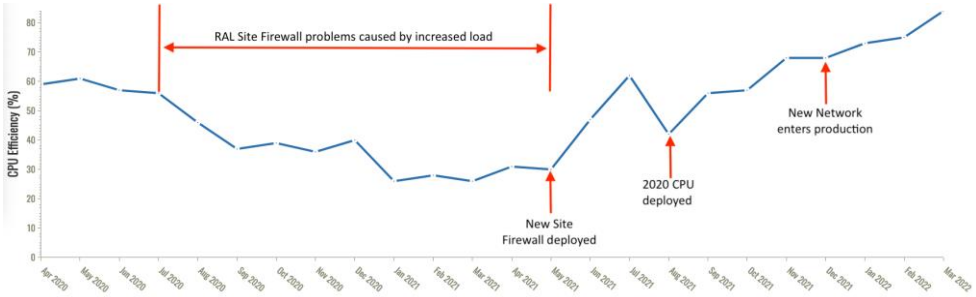
This year's procurement

- This year's procurement was directly awarded again:
  - Supply chain issues were still a big concern.
  - Russia's invasion of the Ukraine added further uncertainty.
- No new high end CPUs were on the market so we purchased the same CPUs as last year.
- We changed from a single 7.68TB SSD to a 480GB SSD for OS and 6.4TB NVMe for local scratch space.
- This year's hardware ordered in July.
  - Using an exchange rate held since May.
- We have delivery date of 10th October.
  - Next years procurement hopefully in production by Christmas!

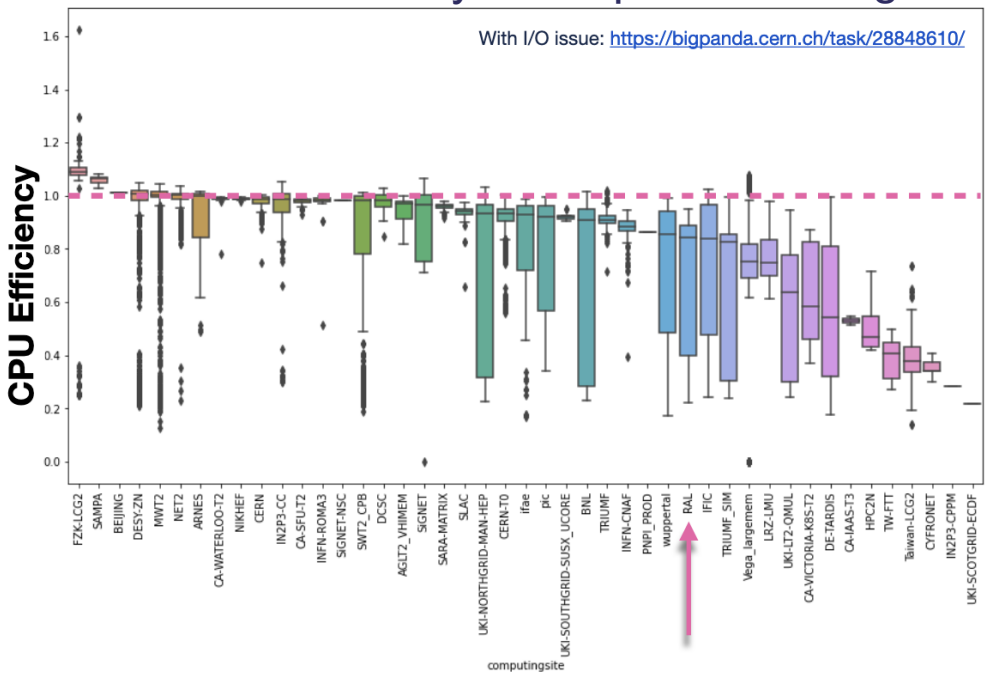
Real jobs

- RAL used to heavily optimize its procurement on HS06.
  - Our Compute was under powered in other areas.
- Real jobs are not on average as CPU intense or as heavily debugged as benchmarks.
- E.g. Recent ATLAS Evgen task was continuously writing a 40byte file.
  - ATLAS fixed the problem once reported.
  - We still ran lower efficiency jobs for a while.

CMS Job Efficiency at RAL April 2020 to March 2022



ATLAS Job Efficiency for a “problem” Evgen task



Next year's procurement

- Next year we hope to return to using a tender.
  - Hope there will be significant competition between new Intel and AMD CPUs.
  - HEPScore will help us select the best CPU, however there are many other requirements.
- I think it is reasonably likely that we will be purchasing Liquid to Chip cooling.
  - Better PUE, performance and density
  - Will we be able to record the type of cooling in the database?

Conclusion / Suggestions

- HEPScore has changed for the better what we decide to purchase.
  - Compared to HS06 it's easier to run, more flexible and more insightful.
  - The 32bit requirement of HS06 was skewing results.
- HEPScore will allow us to compare diverse types of hardware.
  - E.g. x86 vs ARM vs GPU
- HEPScore is still "just" a benchmark and doesn't account for operational reality.
  - E.g. RAL has purchased more memory per core than VOs specify for 5+ years.
- We don't want to over optimize for one fixed benchmark. Suggestion:
  - Release a new HEPScore annually (in April) that sites can use to guide procurement if they so choose.
  - Pick a Golden HEPScore for official use per X years / LHC Run.

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Questions?