Toward a new HEP CPU Benchmark

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HS06:

➔ Benchmark to measure the CPU performance:

- Pledges
- Procurements
- Accounting

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HS06:

➔ Benchmark details:

- Based on industry standard benchmark suite (SPEC CPU2006)
  - Inexpensive for academic use
  - Vendors are familiar with it
- A subset of 7 benchmarks is used for HS06 scoring (= all C++ packages coming with SPEC CPU2006)
  - 3 integer, 4 floating point
  - Matches the percentage of floating point operations in HEP job mix

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HS06:

➔ Benchmark details (cont.):

- Running 1 benchmark copy per job slot of the system under test

  - Analogous to the LRMS

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HS06:

➔ Deployment:

- HEPiX Benchmark Working Group

  - Selection of benchmark tools and configs

  - Proof of scaling with SPECint2000 scores

- WLCG Benchmark Task Force

  - Proof whether the benchmark scores scale with mix of HEP applications

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Next generation benchmark:

➔ Since the hardware has become more and more powerful
(faster chips, increased number of cores, huge cache size)
the benchmark should be redesigned from time to time
to bring it up to date

➔ The Open Systems Group (OSG) of SPEC is working on
the next generation of CPU benchmark

- Will probably become available by end of 2014

➔ Good candidate for HS14 benchmark!

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HS14:

➔ Requirements:

- Should scale with (mix of) real HEP applications
  - ◆ HS06: Proven by WLCG benchmark task force
  - ◆ HS14: Identify suitable applications to check

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HS14:

➔ Requirements (cont.):

- Easy to use

  - ◆ Prefer standard benchmark which is widely used like replacement of SPEC CPU2006

  - ◆ Inexpensive for academic use

  - ◆ Vendors must be familiar with it

  - ◆ Acceptable execution time of benchmark runs

- Benchmark must be "good enough"

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Time scale:

➔ The SPEC OSG is working on 'CPUv6' benchmark (CPU2014?), preliminary kits are available to SPEC OSG members

- KIT is SPEC OSG Associate
  - ◆ Will have an early look on it

➔ The final benchmark will probably become available by end of 2014

- Sorry:
  - ◆ No public domain, users are required to ask for license
  - ◆ The preliminary kit is also closed source

➔ First investigations by small team (HEPiX team?) 2014/2015

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Time scale (cont.):

➔ Recommendation of benchmark candidate(s) by mid 2015

➔ Validation of benchmark by VOs till end of 2015

➔ Creation and support of wiki of benchmark scores

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First steps:

➔ Looking for VO representatives
(Michele Michelotto)

- Should we ask

  - non-WLCG HEP VOs, e.g. Belle-II

  - non-HEP VOs

  to join the benchmark (validation) team?

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First steps (cont.):

➔ Agreement on

- Hardware platform
  - ◆ HS06: x86_64

- Compiler
  - ◆ HS06: gcc (default compiler)

- Compiler flags
  - ◆ HS06: -O2 -pthread -fPIC -m32
  - ◆ HS14: At least switch to 64bit applications

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First steps (cont.):

➔ Selection of representative HEP applications to compare with benchmark scores

- Benchmark will meter CPU speed, but neither disk performance, nor the network bandwith

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