

Next Generation of HEP CPU Benchmarks

Tuesday 10 July 2018 14:00 (15 minutes)

Benchmarking is a consolidated activity in High Energy Physics (HEP) computing where large computing power is needed to support scientific workloads. In HEP, great attention is paid to the speed of the CPU in accomplishing high-throughput tasks characterised by a mixture of integer and floating point operations and a memory footprint of few gigabytes.

As of 2009, HEP-SPEC06 (HS06) is the benchmark adopted by the WLCG community to describe experiments' computing requirements, assess data centres' computing capacity and procure new hardware. It has been defined by the HEPiX Benchmarking Working Group and is based on a subset of the industry standard SPEC CPU2006 benchmark suite.

In the recent years, following the evolution of CPU architectures and the adoption of new programming paradigms, such as multi-threading and vectorization, it has turned out that HS06 is less representative of the relevant applications running on the WLCG infrastructure. In the meantime, in 2017 a new SPEC generation of benchmarks (SPEC CPU 2017) for CPU intensive workloads has been delivered.

This report summarises the findings of the HEPiX Benchmarking Working Group in comparing SPEC CPU 2017 as well as other HEP fast benchmarks with the typical WLCG workloads' mixes.

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Session Classification: T8 - Networks and facilities

Track Classification: Track 8 –Networks and facilities