

ATLAS plans for assessment of impact of SPECTRE and MELTDOWN patches

ATLAS Software Performance and Optimisation Team

Bare metal tests

- ATLAS has a bare-metal machine dedicated to performance tests
 - In “laboratory conditions”, not used for any other tasks, carefully managed
 - 32-core, 128/64 GB w/ 2x2.8 TB SSD on 10.X private network
- Runs reconstruction automatically with every nightly software build and publishes the results (CPU, malloc, vmem)
- We will add two simulation jobs to the tests for the purposes of the SPECTRE/MELTDOWN evaluation
 - G4 simulation (“full sim”)
 - ATLFast simulation (“fast sim”)

Bare metal tests

- We will make measurements under the following conditions, for each of the three tests (1 x reco, 2 x simulation):
 - Unprotected (e.g. current situation)
 - Reboot the kernel to include the kernel patch but not the microcode (fixes MELTDOWN and one of the SPECTRE issues)
 - Include the microcode fixes to give a fully protected machine
- Software release will be fixed for these tests (to avoid performance-relevant changes unrelated to the patches from perturbing the results)
- This should give us a measure of the impact for
 - higher CPU, lower I/O (simulation)
 - higher I/O, lower CPU jobs (reco) under lab conditions
- Should have the numbers by early next week once the tests have run
- We will also run tests of the impacts on release building, but the plans aren't concrete yet

Preliminary & provisional
assessment
(Thomas Hartmann)

HS06 benchmarks

PRELIMINARY/PROVISIONAL

HS06

- > on new nodes running HEPSpec for burn in
- > re-installed/re-benched from a few nodes each series/purchase
 - installed kernel bugfixes and (if available) CPU microcode patches
 - (old benchmarks results from some kernel versions ago...)
 - don't see any significant impact on Intels (and AMDs ✓)

CPU	HS06 old	HS06 new
AMD Opteron(TM) Processor 6234	483	480.5 ± 0.6
AMD Opteron(tm) Processor 6378	643	651.6 ± 2.9
Intel(R) Xeon(R) CPU E5-2450 v2 2.50GHz	369	375.6 ± 0.7
Intel(R) Xeon(R) CPU E5-2640 v3 2.60GHz	433	437.4 ± 0.9
Intel(R) Xeon(R) CPU E5-2640 v4 2.40GHz	515	516.2 ± 4.3
Intel(R) Xeon(R) CPU E5-2640 v4 2.40GHz	518	518.4 ± 1.2
Intel(R) Xeon(R) CPU E5-2640 v4 2.40GHz	515	517.2 ± 3.5

Transform Job Run Times **PRELIMINARY/PROVISIONAL**

XtoY jobs

- > got transform jobs as more I/O bound —————> **RECONSTRUCTION**
 - Panda JOB ID **3778081287**
- > drained nodes and downloaded input/started jobs manually
- > only nodes from series with Intel(R) Xeon(R) CPU E5-2640 v3 @ 2.60GHz
- > rebooted with installed patches and rerun the same job
- > see ~3.9% longer run times

job	wall time old	wall time new
1	6334.82	6538.09
2	6775.26	7110.4
3	6307.7	6547.42
4	6343.9	6520.6

Transform Job Run Times **PRELIMINARY/PROVISIONAL**

just to be sure: jobs' run times by eye

