

Spectre v2 microcode path

HEPiX Benchmarking Working Group

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Reminder: Tools

- To run benchmarks
 - Benchmarking suite (for details see <https://indico.cern.ch/event/671504/>)
 - Benchmarks: HS06 (32 bits, 64 bits), Atlas KV (Geant4 100 Single muon events), SPEC2017 (only C++ benchmarks)
 - NB: in KV athena 17.8.0.9 is used
- NB: each benchmark runs in the most pessimistic scenario
 - all logical cores busy running simultaneously the same workload
 - as the approach adopted in HS06

Reminder from January tests

- ~89% (7500 servers) of the CERN OpenStack cloud (including batch resources) covered by 6 CPU models (↔3 combinations of CPU family/model/stepping)
- Tests performed on at least few servers of each CPU generation
 - Other data points will be available soon including additional models available in the datacentre (e.g. Skylake)
- Benchmark score ratio respect to unpatched configuration

CPU family - model - stepping	Microcode fix	Processor name(s)	Meltdown/Spectre1 patch			Spectre2 patch		
			HS06 32bits	HS06 64bits	KV	HS06 32bits	HS06 64bits	KV
06-3f-02	covered	E5-2630 v3 @ 2.40GHz	-0.20%	-0.10%	-0.20%	-0.50%	-0.30%	-6.80%
		E5-2640 v3 @ 2.60GHz						
06-4f-01	covered	E5-2630 v4 @ 2.20GHz	-0.40%	-0.70%	-0.10%	-1.00%	-1.20%	-8.20%
		E5-2650 v4 @ 2.20GHz						
06-3e-04	hopefully, but not yet	E5-2650 v2 @ 2.60GHz	(*)-1.20%	-0.80%	-0.50%			

* Running on SLC6

Performance impact of Spectre v2 patch

- Selected a single server, already under continuous benchmarking
 - Intel(R) Xeon(R) CPU E5-2630 v3 @ 2.40GHz
- Applied patch to the hypervisor
 - Guidelines from Manfred
 - <https://indico.cern.ch/event/693200/contributions/2956961/note/>
- Run on same VMs (no destroy/create new) and run the benchmarks
 - The performance **degradation** in VM is within **1-2%** for all the benchmark tested

	microcode	HS06 32 bit	HS06 64 bits	SPEC2017	KV
VM-16-SLC6	before upgrade	10.428	12.256	1.407	0.74
	after upgrade	10.264	12.091	1.389	0.727
	ratio	0.98	0.99	0.99	0.98
VM-8-SLC6	before upgrade	10.538	12.428	1.44	0.802
	after upgrade	10.399	12.232	1.421	0.779
	ratio	0.99	0.98	0.99	0.97

