



COMPUTATIONAL RESEARCH



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DRAFT

June 2016 Results

Here are the results for the fourth order (operators.fv4.c) HPGMG-FV implementation (v0.3). Each machine was allowed to use any amount of memory per node, but three problem sizes were benchmarked: h(max), 2h(max/8), and 4h(max/64). Note, 'OMP' represents the number of OpenMP (or other) threads per process while 'ACC' represents the number of accelerators per process. Multiple entries represent baseline and optimized implementations.

Unfortunately, due to scheduling and allocation limitations, some machines only evaluated at limited concurrency (%s). Currently, these machines are ranked based on peak DOF/s (almost invariably h). Nevertheless, we are considering alternate metrics such as the sum, mean, geometric mean, and median. Feedback from the community is welcome.

Rank	Site	System	DOF/s	Parallelization			DOF per	Top500 Rank
			h, 2h, 4h	MPI	OMP	ACC	Process	
1	DOE / SC / Argonne National Laboratory United States	Mira - BlueGene/Q, Power BQC 16C 1.60GHz, Custom IBM interconnect	5.00e11 3.13e11 1.07e11	49152	64	0	36M	5
			(baseline) 3.95e11 2.86e11 1.07e11	49152	64	0	36M	
2	HLRS - Höchstleistungsrechenzentrum Stuttgart Germany	Hazel Hen - Cray XC40, Xeon E5-2680v3 12C 2.5GHz, Aries interconnect Cray Inc.	4.95e11 4.11e11 2.21e11	15408	12	0	192M	8
3	DOE / SC / Oak Ridge National Laboratory United States	Titan - Cray XK7, Opteron 6274 16C 2.200GHz, Cray Gemini interconnect, NVIDIA K20x Cray Inc.	4.40e11 1.63e11 3.89e10	16384	4	1	32M	2
			(CPU-only) 1.61e11 8.25e10 2.37e10	36864	8	0	48M	
4	King Abdullah University of Science and Technology Saudi Arabia	Shaheen II - Cray XC40, Xeon E5-2698v3 16C 2.3GHz, Aries interconnect Cray Inc.	3.26e11 2.87e11 1.75e11	12288	16	0	144M	9
5	DOE / SC / LBNL / NERSC United States	Edison - Cray XC30, Intel Xeon E5-2695v2 12C 2.4GHz, Aries interconnect Cray Inc.	2.96e11 2.46e11 1.27e11	10648	12	0	128M	40
6	Swiss National Supercomputing Centre (CSCS) Switzerland	Piz Daint - Cray XC30, Xeon E5-2670 8C 2.600GHz, Aries interconnect, NVIDIA K20x Cray Inc.	1.53e11 6.88e10 1.85e10	4096	8	1	32M	7
			(CPU-only) 8.51e10 6.26e10 2.47e10	4096	8	0	16M	
8	Leibniz Rechenzentrum (LRZ) Germany	SuperMUC - iDataPlex DX360M4, Xeon E5-2680 8C 2.70GHz, Infiniband FDR IBM/Lenovo	7.25e10 5.25e10 2.80e10	4096	8	0	54M	23
9	HLRS - Höchstleistungsrechenzentrum Stuttgart Germany	NEC SX-ACE - Custom interconnect	3.24e09 1.77e09 7.51e08	256	1	0	32M	-
10	DOE / SC / LBNL / NERSC United States	Babbage - Xeon E5-2670 8C 2.600GHz, Intel Xeon Phi (KNC), Infiniband	7.62e08 3.16e08 9.93e07	256	45	0	8M	-