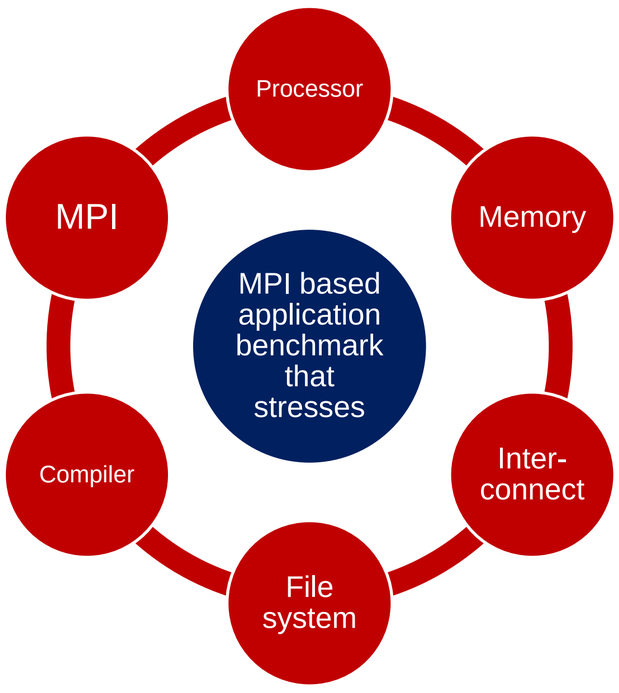
MPI & OpenMP Application Benchmarks for High-Performance Computing

Developed by the SPEC High-Performance Group
Webpages: http://www.spec.org/omp2001 and http://www.spec.org/mpi2007

SPEC MPI2007™

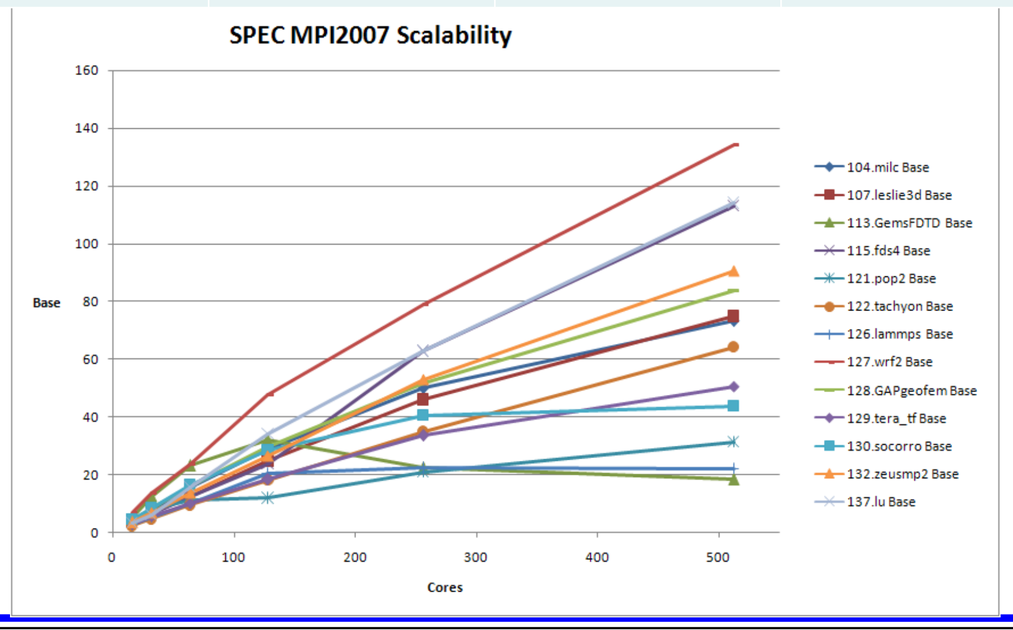
Benchmark suite for performance testing of distributed memory processor systems



[1]One MPI rank can run on a core, a chip, a node

MPI2007 medium	• Target: 4 to 128 MPI rank[1] systems (tested to 512 ranks) • 158 published results at www.spec.org/mpi2007
MPI2007 large	• Target: 64 to 2048 MPI rank systems (tested to 4096 ranks) • Will be released on February 2, 2010

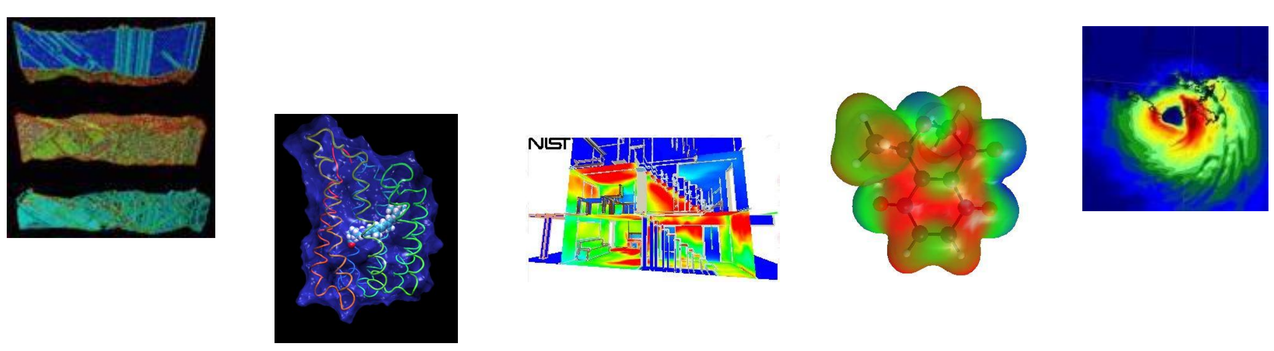
Code	Application Field	Language	Lines of Code
Milc	Lattice QCD	C	17987
Leslie3d	Large Eddy Simulation	Fortran 77, Fortran 90	10503
GemsFDTD	CEM	Fortran 90	21858
Fds4	CFD	Fortran 90, C	44524
Pop2	Ocean modeling	Fortran 90	69203
Tachyon	Ray tracing	C	15512
Lammps	Molecular Dynamics	C++	6796
Wrf2	Weather forecast	Fortran 90, C	163462
GAPgeofem	Geophysical FEM	Fortran 77, C	30935
Tera_tf	Eulerian hydrodnamics	Fortran 90	6468
Zeusmp2	Magneto hydrodynamics	C, Fortran 90	44441
Socorro	Density-functional theory	Fortran 90	91585
Lu	SSOR	Fortran 90	5671



SPEC OMP2001™

Benchmark suite for performance testing of shared memory processor systems

OMP2001 medium	• Target: 4 to 16-way systems • 236 published results at www.spec.org/omp2001
OMP2001 large	• Target : 32-way and larger systems • 77 published results at www.spec.org/omp2001



Code	Type of Application	Language	Lines of Code
Ammp	Molecular Dynamics	C	13500
Applu	CFD, partial LU	Fortran	4000
Apsi	Air pollution	Fortran	7500
Art	Image recognition/neural networks	C	1300
Fma3d	Crash simulation	Fortran	60000
Gafort	Genetic algorithm	Fortran	1500
Galgel	CFD, Galerkin FE	Fortran	15300
Equake	Earthquake modeling	C	1500
Mgrid	Multigrid solver	Fortran	500
Swim	Shallow water modeling	Fortran	400
Wupwise	Quantum Chromodynamics	Fortran	2200

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The price of the benchmarks for non-members is:

	Retail Price	Price for non-profit organisations
SPEC MPI2007	$ 800	$ 250
SPEC OMP2001	$ 550	$ 250

Selected SPEC HPG Publications

SPEC MPI2007 – an application benchmark suite for parallel systems using MPI
M.S. Müller et al; Concurrency and Computation: Practice and Experience, Vol. 22, pp. 191-205 (2010).

SPEC HPG Benchmarks for High-Performance Systems
M.S. Müller et al.; Lecture Notes in Computer Science, Vol. 2858, pp. 189-201 (2003).

Large Systems Performance of SPEC OMP2001 Benchmarks
H. Saito et al.; International Journal of Parallel Programming, Vol. 31, No 3, pp. 197-209 (2003).

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