



SPEC[®] MPIL2007 Result

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Intel Corporation

Endeavor (Intel Xeon X5670, 2.93 GHz,
DDR3-1333 MHz, SMT on, Turbo off)

SPECmpiL_peak2007 = 52.6

SPECmpiL_base2007 = 38.2

MPI2007 license: 13

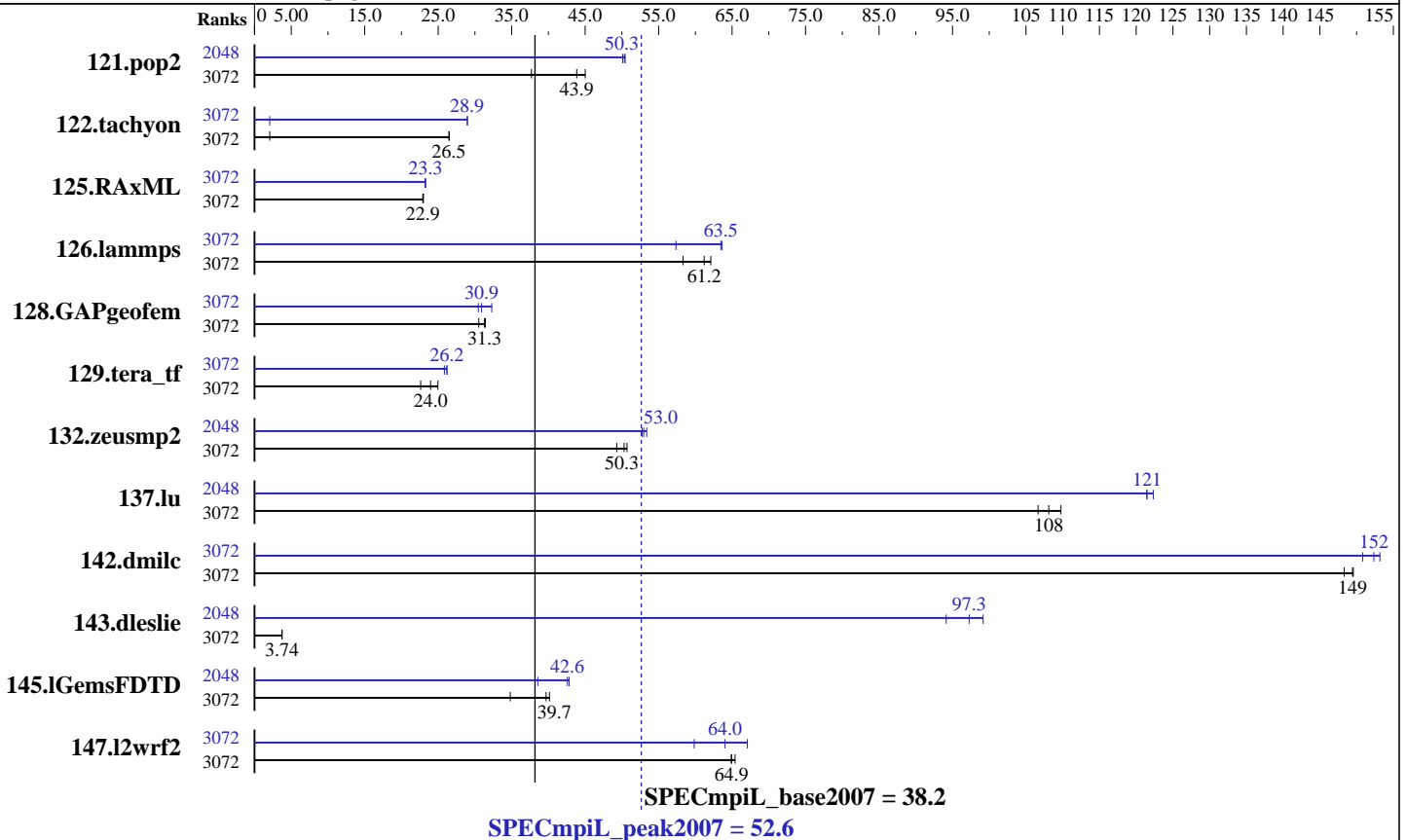
Test sponsor: Intel Corporation

Tested by: Pavel Shelepugin

Test date: Nov-2010

Hardware Availability: Mar-2010

Software Availability: Nov-2010



Results Table

Benchmark	Base								Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
121.pop2	3072	103	37.7	86.4	45.0	88.7	43.9	2048	77.1	50.4	77.7	50.1	77.3	50.3		
122.tachyon	3072	937	2.08	73.5	26.5	73.3	26.5	3072	938	2.07	67.2	28.9	67.1	29.0		
125.RAxML	3072	127	23.0	127	22.9	127	22.9	3072	126	23.2	125	23.3	125	23.3		
126.lammps	3072	42.2	58.3	39.6	62.1	40.2	61.2	3072	42.9	57.4	38.6	63.6	38.7	63.5		
128.GAPgeofem	3072	189	31.4	190	31.3	194	30.5	3072	195	30.5	192	30.9	184	32.3		
129.tera_tf	3072	48.6	22.6	44.0	25.0	45.9	24.0	3072	42.5	25.8	41.9	26.2	42.0	26.2		
132.zeusmp2	3072	41.8	50.7	43.0	49.3	42.1	50.3	2048	39.7	53.4	40.0	53.0	40.2	52.8		
137.lu	3072	38.3	110	38.9	108	39.4	107	2048	34.4	122	34.6	121	34.6	121		
142.dmilc	3072	24.6	150	24.8	148	24.7	149	3072	24.2	152	24.1	153	24.4	151		
143.dleslie	3072	831	3.73	826	3.75	828	3.74	2048	32.9	94.1	31.9	97.3	31.3	99.2		
145.lGemsFDTD	3072	111	39.7	110	40.1	127	34.8	2048	104	42.6	114	38.6	103	42.8		
147.l2wrf2	3072	125	65.4	126	64.9	126	64.9	3072	128	64.0	137	59.8	122	67.1		

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Standard Performance Evaluation Corporation

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http://www.spec.org/



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Hardware Summary

Type of System: Homogeneous
 Compute Node: Endeavor Node
 Interconnects: IB Switch
 Gigabit Ethernet
 File Server Node: NFS
 Total Compute Nodes: 256
 Total Chips: 512
 Total Cores: 3072
 Total Threads: 6144
 Total Memory: 6 TB
 Base Ranks Run: 3072
 Minimum Peak Ranks: 2048
 Maximum Peak Ranks: 3072

Software Summary

C Compiler: Intel C++ Compiler 12.0.0.072 for Linux
 C++ Compiler: Intel C++ Compiler 12.0.0.072 for Linux
 Fortran Compiler: Intel Fortran Compiler 12.0.0.072 for Linux
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 MPI Library: Intel MPI Library 4.0.1.005 for Linux
 Other MPI Info: None
 Pre-processors: No
 Other Software: None

Node Description: Endeavor Node

Hardware

Number of nodes: 256
 Uses of the node: compute
 Vendor: Intel
 Model: SR1600UR
 CPU Name: Intel Xeon X5670
 CPU(s) orderable: 1-2 chips
 Chips enabled: 2
 Cores enabled: 12
 Cores per chip: 6
 Threads per core: 2
 CPU Characteristics: Intel Turbo Boost Technology disabled, 6.4 GT/s QPI, Hyper-Threading enabled
 CPU MHz: 2934
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 256 KB I+D on chip per core
 L3 Cache: 12 MB I+D on chip per chip, 12 MB shared / 6 cores
 Other Cache: None
 Memory: 24 GB (Dual-rank RDIMM 6x4-GB DDR3-1333 MHz)
 Disk Subsystem: Seagate 400 GB ST3400755SS
 Other Hardware: None
 Adapter: Intel (ESB2) 82575EB Dual-Port Gigabit Ethernet Controller
 Number of Adapters: 1
 Slot Type: PCI-Express x8
 Data Rate: 1Gbps Ethernet
 Ports Used: 2
 Interconnect Type: Ethernet
 Adapter: Mellanox MHQH29-XTC
 Number of Adapters: 1
 Slot Type: PCIe x8 Gen2
 Data Rate: InfiniBand 4x QDR
 Ports Used: 1
 Interconnect Type: InfiniBand

Software

Adapter: Intel (ESB2) 82575EB Dual-Port Gigabit Ethernet Controller
 Adapter Driver: e1000
 Adapter Firmware: None
 Adapter: Mellanox MHQH29-XTC
 Adapter Driver: OFED 1.4.2
 Adapter Firmware: 2.7.000
 Operating System: Red Hat EL 5.4, kernel 2.6.18-164
 Local File System: Linux/ext2
 Shared File System: NFS
 System State: Multi-User
 Other Software: PBS Pro 10.1



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Node Description: NFS

Hardware		Software	
Number of nodes:	1	Adapter:	Intel 82563GB Dual-Port Gigabit Ethernet Controller
Uses of the node:	fileserver	Adapter Driver:	e1000e
Vendor:	Intel	Adapter Firmware:	N/A
Model:	S7000FC4UR	Operating System:	RedHat EL 5 Update 4
CPU Name:	Intel Xeon CPU	Local File System:	None
CPU(s) orderable:	1-4 chips	Shared File System:	NFS
Chips enabled:	4	System State:	Multi-User
Cores enabled:	16	Other Software:	None
Cores per chip:	4		
Threads per core:	2		
CPU Characteristics:	--		
CPU MHz:	2926		
Primary Cache:	32 KB I + 32 KB D on chip per core		
Secondary Cache:	8 MB I+D on chip per chip, 4 MB shared / 2 cores		
L3 Cache:	None		
Other Cache:	None		
Memory:	64 GB		
Disk Subsystem:	8 disks, 500GB/disk, 2.7TB total		
Other Hardware:	None		
Adapter:	Intel 82563GB Dual-Port Gigabit Ethernet Controller		
Number of Adapters:	1		
Slot Type:	PCI-Express x8		
Data Rate:	1Gbps Ethernet		
Ports Used:	1		
Interconnect Type:	Ethernet		

Interconnect Description: IB Switch

Hardware		Software	
Vendor:	Mellanox		
Model:	Mellanox MTS3600Q-1UNC		
Switch Model:	Mellanox MTS3600Q-1UNC		
Number of Switches:	46		
Number of Ports:	36		
Data Rate:	InfiniBand 4x QDR		
Firmware:	7.1.000		
Topology:	Fat tree		
Primary Use:	MPI traffic		



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Interconnect Description: Gigabit Ethernet

	Hardware	Software
Vendor:	Force10 Networks	
Model:	Force10 S50, Force10 C300	
Switch Model:	Force10 S50, Force10 C300	
Number of Switches:	15	
Number of Ports:	48	
Data Rate:	1Gbps Ethernet	
Firmware:	8.2.1.0	
Topology:	Fat tree	
Primary Use:	Cluster File System	

Submit Notes

The config file option 'submit' was used.

General Notes

MPI startup command:

mpiexec.hydra command was used to start MPI jobs. To start a job by this command, the daemons are not required to be run beforehand.

BIOS settings:

Intel Hyper-Threading Technology (SMT): Enabled (default is Enabled)

Intel Turbo Boost Technology (Turbo) : Disabled (default is Enabled)

RAM configuration:

Compute nodes have 1x4-GB RDIMM on each memory channel.

Network:

Forty six 36-port switches: 18 core switches and 28 leaf switches.

Each leaf has one link to each core. Remaining 18 ports on 25 of 28 leafs are used for compute nodes. On the remaining 3 leafs the ports are used for FS nodes and other peripherals.

Job placement:

Each MPI job was assigned to a topologically compact set of nodes, i.e. the minimal needed number of leaf switches was used for each job: 1 switch for 96/192 ranks, 2 switches for 384 ranks, 4 switches for 768 ranks, 8 switches for 1536 ranks, 15 switches for 3072 ranks.

PBS Pro was used for job submission. It has no impact on performance.

Can be found at: <http://www.altair.com>



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Compiler Invocation

C benchmarks:
mpiicc

C++ benchmarks:

126.lammps: mpiicpc

Fortran benchmarks:
mpiifort

Benchmarks using both Fortran and C:
mpiicc mpiifort

Portability Flags

121.pop2: -DSPEC_MPI_CASE_FLAG
126.lammps: -DMPICH_IGNORE_CXX_SEEK

Base Optimization Flags

C benchmarks:
-O3 -xSSE4.2 -no-prec-div

C++ benchmarks:

126.lammps: -O3 -xSSE4.2 -no-prec-div

Fortran benchmarks:
-O3 -xSSE4.2 -no-prec-div

Benchmarks using both Fortran and C:
-O3 -xSSE4.2 -no-prec-div

Peak Optimization Flags

C benchmarks:
-O3 -xSSE4.2 -no-prec-div -ipo

C++ benchmarks:

126.lammps: -O3 -xSSE4.2 -no-prec-div -ipo

Fortran benchmarks:
-O3 -xSSE4.2 -no-prec-div -ipo

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Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

121.pop2: -O3 -xSSE4.2 -no-prec-div -ipo

128.GAPgeofem: -O3 -xSSE4.2 -no-prec-div

132.zeusmp2: Same as 121.pop2

147.l2wrf2: Same as 121.pop2

The flags file that was used to format this result can be browsed at

http://www.spec.org/mpi2007/flags/EM64T_Intel111_flags.20120720.html

You can also download the XML flags source by saving the following link:

http://www.spec.org/mpi2007/flags/EM64T_Intel111_flags.20120720.xml

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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