SPEC® MPIL2007 Result

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Intel Corporation

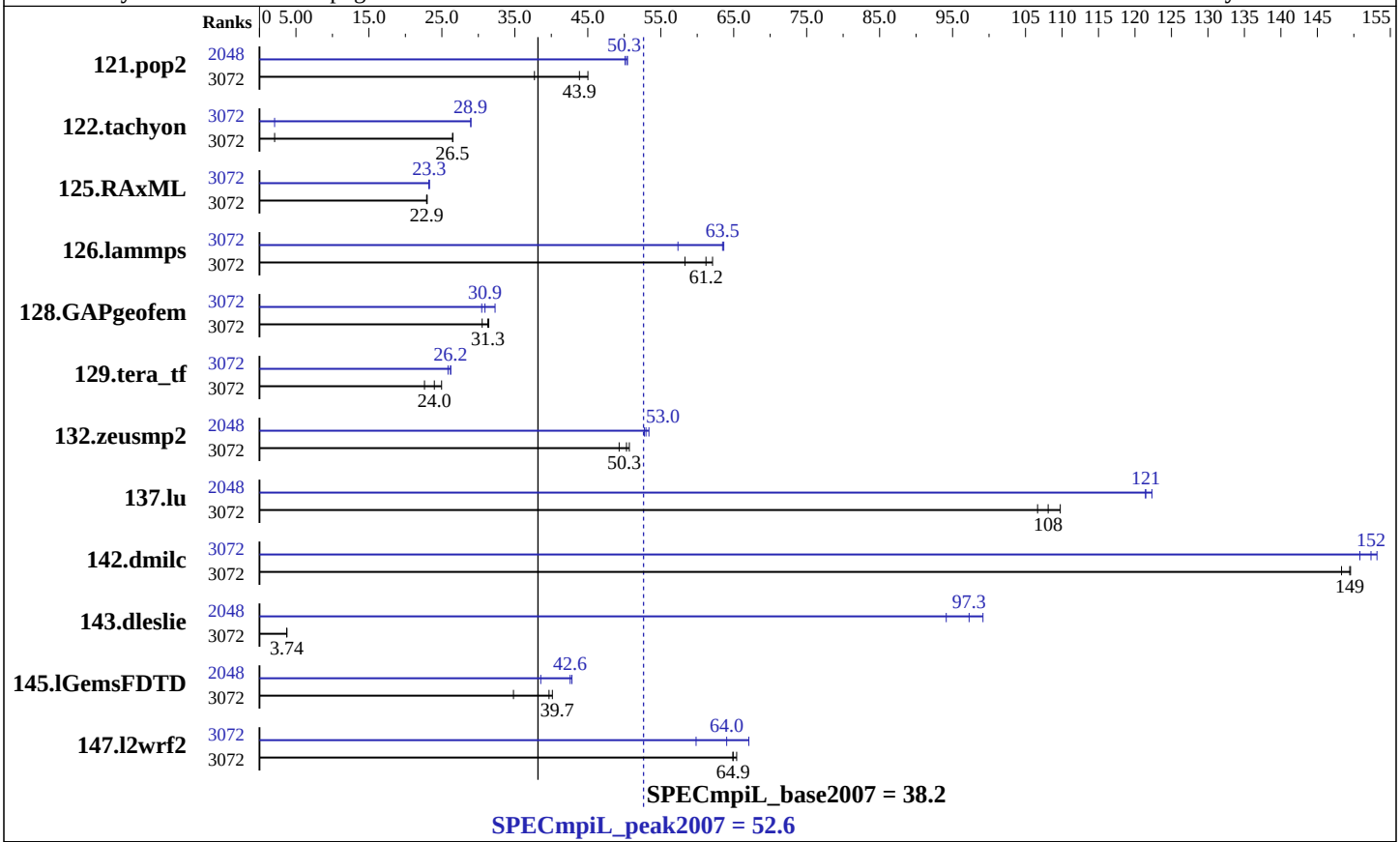
Endeavor (Intel Xeon X5670, 2.93 GHz,
DDR3-1333 MHz, SMT on, Turbo off)

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.

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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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Software Availability: Nov-2010

Node Description: NFS

Hardware

Number of nodes:	1
Uses of the node:	fileserver
Vendor:	Intel
Model:	S7000FC4UR
CPU Name:	Intel Xeon CPU
CPU(s) orderable:	1-4 chips
Chips enabled:	4
Cores enabled:	16
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

Software

Adapter:	Intel 82563GB Dual-Port Gigabit Ethernet Controller
Adapter Driver:	e1000e
Adapter Firmware:	N/A
Operating System:	RedHat EL 5 Update 4
Local File System:	None
Shared File System:	NFS
System State:	Multi-User
Other Software:	None

Interconnect Description: IB Switch

Hardware

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

Software

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
```

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`

Continued on next page

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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