



SPEC® MPIM2007 Result

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Intel Corporation

Endeavor (Intel Xeon X5560, 2.80 GHz,
DDR3-1333 MHz, SMT off, Turbo on)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 44.6

MPI2007 license: 13

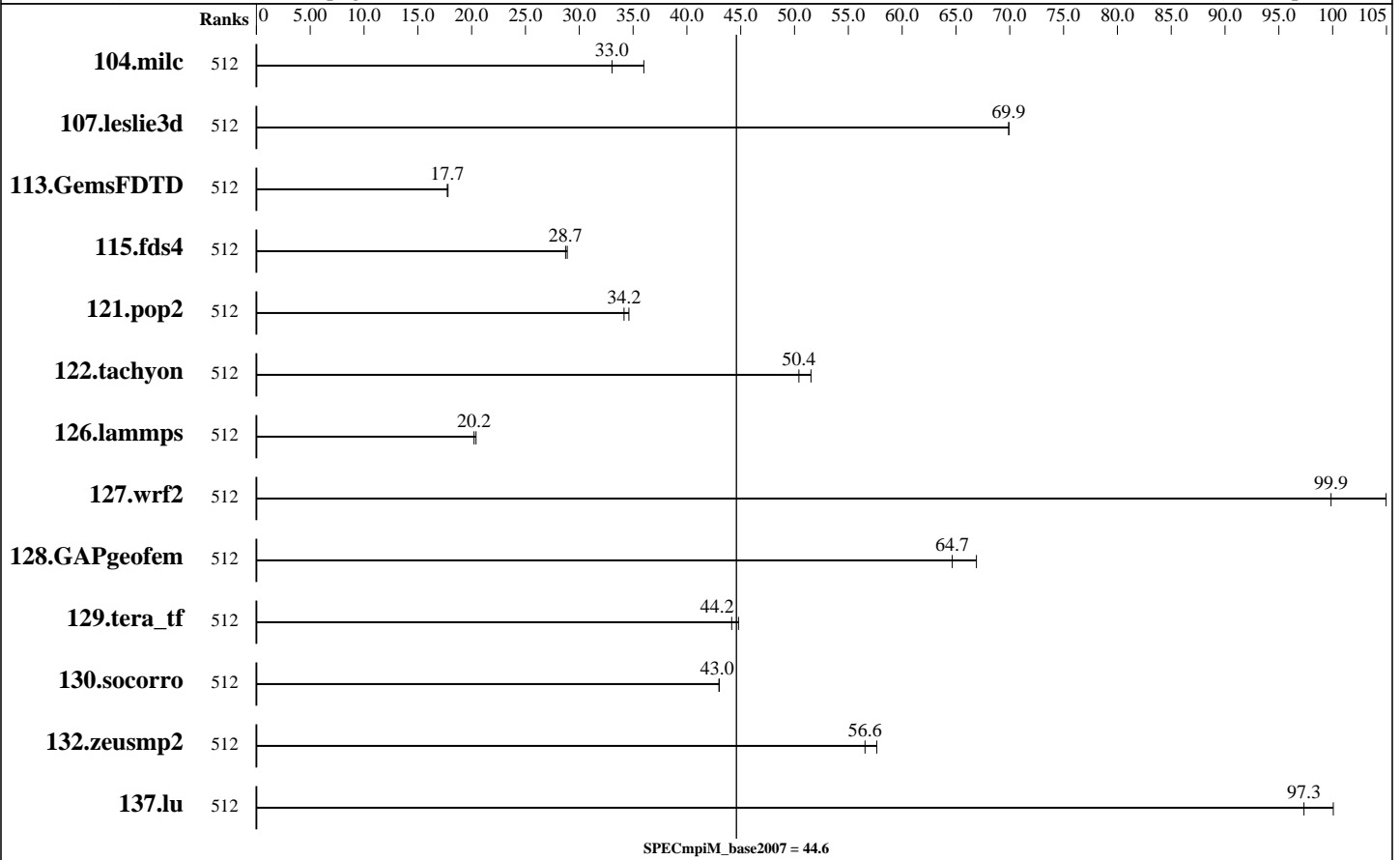
Test sponsor: Intel Corporation

Tested by: Pavel Shelepugin

Test date: Aug-2009

Hardware Availability: Jun-2009

Software Availability: Sep-2009



Results Table

Benchmark	Base								Peak					
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	512	<u>47.4</u>	<u>33.0</u>	43.5	36.0									
107.leslie3d	512	74.7	69.9	<u>74.7</u>	<u>69.9</u>									
113.GemsFDTD	512	<u>356</u>	<u>17.7</u>	354	17.8									
115.fds4	512	67.5	28.9	<u>67.9</u>	<u>28.7</u>									
121.pop2	512	<u>121</u>	<u>34.2</u>	119	34.6									
122.tachyon	512	<u>55.5</u>	<u>50.4</u>	54.3	51.5									
126.lammps	512	<u>144</u>	<u>20.2</u>	143	20.4									
127.wrf2	512	74.3	105	<u>78.1</u>	<u>99.9</u>									
128.GAPgeofem	512	30.9	66.9	<u>31.9</u>	<u>64.7</u>									
129.tera_tf	512	<u>62.7</u>	<u>44.2</u>	61.8	44.8									

Table continues on next page. Results appear in the order in which they were run. Bold underlined text indicates a median measurement.



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Results Table (Continued)

Benchmark	Base						Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
130.socorro	512	88.8	43.0	88.8	43.0									
132.zeusmp2	512	<u>54.9</u>	<u>56.6</u>	53.8	57.6									
137.lu	512	<u>37.8</u>	<u>97.3</u>	36.7	100									

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

Hardware Summary

Type of System: Homogeneous
 Compute Node: Endeavor Node
 Interconnect: IB Switch
 File Server Node: LFS
 Total Compute Nodes: 64
 Total Chips: 128
 Total Cores: 512
 Total Threads: 512
 Total Memory: 1536 GB
 Base Ranks Run: 512
 Minimum Peak Ranks: --
 Maximum Peak Ranks: --

Software Summary

C Compiler: Intel C++ Compiler 11.1 for Linux
 C++ Compiler: Intel C++ Compiler 11.1 for Linux
 Fortran Compiler: Intel Fortran Compiler 11.1 for Linux
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 MPI Library: Intel MPI Library 3.2.2 for Linux
 Other MPI Info: None
 Pre-processors: No
 Other Software: None

Node Description: Endeavor Node

Hardware

Number of nodes: 64
 Uses of the node: compute
 Vendor: Intel
 Model: SR1600UR
 CPU Name: Intel Xeon X5560
 CPU(s) orderable: 1-2 chips
 Chips enabled: 2
 Cores enabled: 8
 Cores per chip: 4
 Threads per core: 1
 CPU Characteristics: Intel Turbo Boost Technology up to 3.2 GHz, 6.4 GT/s QPI, Hyper-Threading disabled
 CPU MHz: 2800
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 256 KB I+D on chip per core
 L3 Cache: 8 MB I+D on chip per chip, 8 MB shared / 4 cores
 Other Cache: None
 Memory: 24 GB (RDIMM 6x4-GB DDR3-1333 MHz)
 Disk Subsystem: Seagate 400 GB ST3400755SS
 Other Hardware: None
 Adapter: Mellanox MHQH29-XTC
 Number of Adapters: 1
 Slot Type: PCIe x8 Gen2
 Data Rate: InfiniBand 4x QDR

Software

Adapter: Mellanox MHQH29-XTC
 Adapter Driver: OFED 1.3.1
 Adapter Firmware: 2.6.000
 Operating System: Red Hat EL 5.2, kernel 2.6.18-128
 Local File System: Linux/ext2
 Shared File System: Lustre FS
 System State: Multi-User
 Other Software: PBS Pro 8.0

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Node Description: Endeavor Node

Ports Used: 1
Interconnect Type: InfiniBand

Node Description: LFS

Hardware

Number of nodes: 8
Uses of the node: fileserver
Vendor: Intel
Model: SR1560SF
CPU Name: Intel Xeon E5462
CPU(s) orderable: 1-2 chips
Chips enabled: 2
Cores enabled: 8
Cores per chip: 4
Threads per core: 1
CPU Characteristics: 1600 MHz FSB
CPU MHz: 2800
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 12 MB I+D on chip per chip, 6 MB shared / 2 cores
L3 Cache: None
Other Cache: None
Memory: 16 GB DDR2 16x1-GB 667 MHz
Disk Subsystem: Seagate 250 GB
Other Hardware: connected to DDN storage (see General Notes)
Adapter: Mellanox MHGH28-XTC
Number of Adapters: 1
Slot Type: PCIe x8 Gen2
Data Rate: InfiniBand 4x DDR
Ports Used: 1
Interconnect Type: InfiniBand

Software

Adapter: Mellanox MHGH28-XTC
Adapter Driver: OFED 1.3.1
Adapter Firmware: 2.6.000
Operating System: Red Hat EL 5.2, kernel 2.6.18-53
Local File System: None
Shared File System: Lustre FS
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, FS traffic

Software



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Submit Notes

The config file option 'submit' was used.

General Notes

MPI startup command:

mpirun command was used to start MPI jobs. This command starts an independent ring of mpd daemons, launches an MPI job, and shuts down the mpd ring upon the job termination. The mpirun command automatically detects if an MPI job is submitted in a session allocated using a job scheduler (like PBS Pro). In this case, the mpirun command extracts the host list from the respective environment and uses these nodes automatically.

BIOS settings:

Intel Hyper-Threading Technology (SMT): Disabled (default is Enabled)
Intel Turbo Boost Technology (Turbo) : Enabled (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 16/32/64/128 ranks, 2 switches for 256 ranks, 4 switches for 512 ranks.

Fileserver:

Intel SR1560SF systems connected via IB to DataDirect Networks S2A9900 storage which is: 160 disks, 300GB/disk, 48TB total, 35TB available.

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

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

Lustre File System 1.6.6 was used. Download from:

<http://www.sun.com/software/products/lustre>

Base Compiler Invocation

C benchmarks:

mpiicc

C++ benchmarks:

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Base Compiler Invocation (Continued)

126.lammps: mpiicpc

Fortran benchmarks:

mpiifort

Benchmarks using both Fortran and C:

mpiicc mpiifort

Base Portability Flags

121.pop2: -DSPEC_MPI_CASE_FLAG

126.lammps: -DMPICH_IGNORE_CXX_SEEK

127.wrf2: -DSPEC_MPI_CASE_FLAG -DSPEC_MPI_LINUX

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

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

http://www.spec.org/mpi2007/flags/EM64T_Intel111_flags.20090910.html

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

http://www.spec.org/mpi2007/flags/EM64T_Intel111_flags.20090910.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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