



# SPEC® MPIM2007 Result

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## Intel Corporation

Discovery (Intel Xeon X7560, 2.27 GHz, DDR3-1066 MHz, SMT off, Turbo on)

SPECmpiM\_peak2007 = Not Run

SPECmpiM\_base2007 = 16.6

MPI2007 license: 13

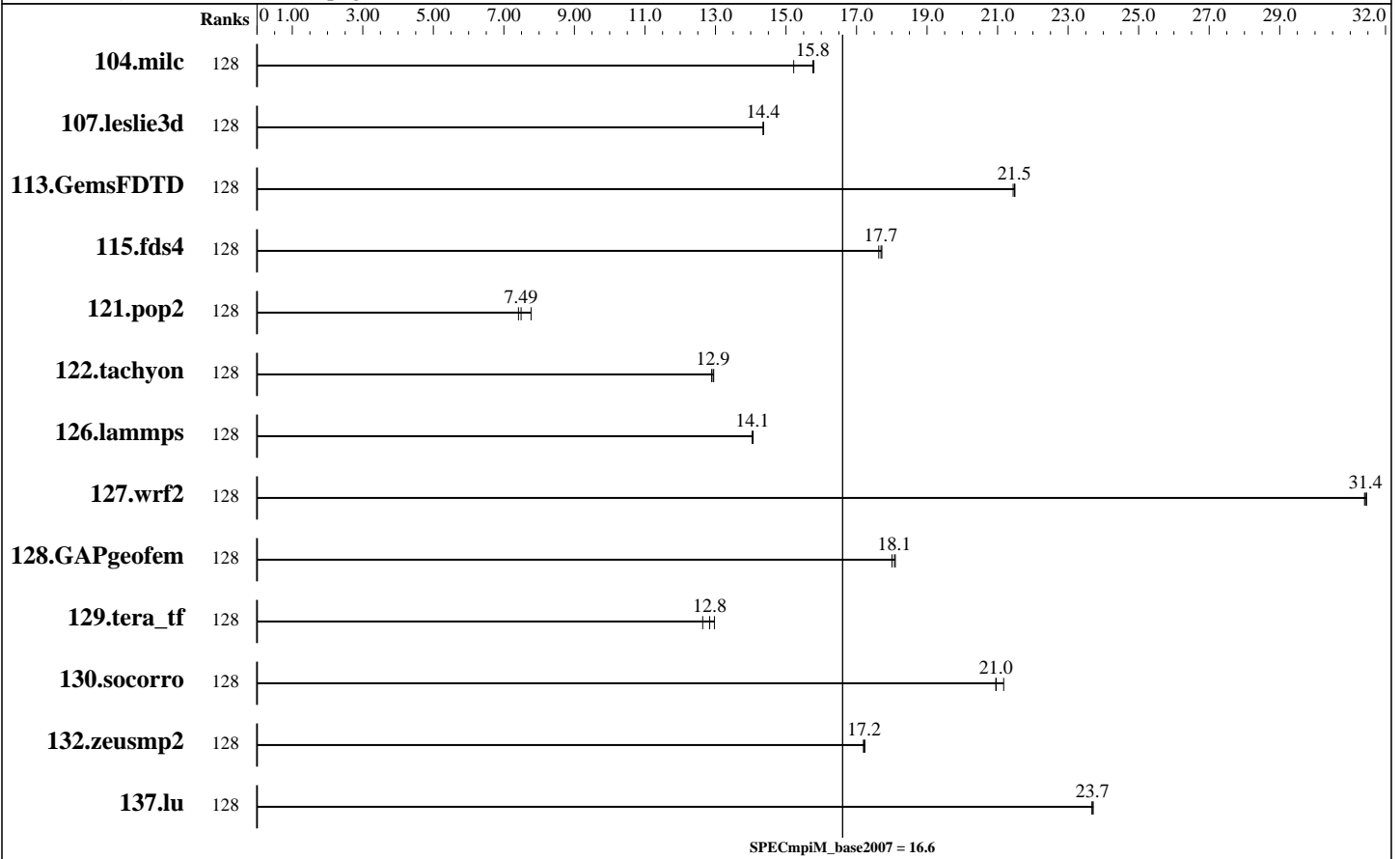
Test sponsor: Intel Corporation

Tested by: Pavel Shelepugin

Test date: Mar-2010

Hardware Availability: Mar-2010

Software Availability: Feb-2010



## Results Table

Benchmark	Base								Peak					
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	128	103	15.2	<b><u>99.3</u></b>	<b><u>15.8</u></b>	99.1	15.8							
107.leslie3d	128	364	14.4	<b><u>364</u></b>	<b><u>14.4</u></b>	364	14.4							
113.GemsFDTD	128	294	21.4	<b><u>294</u></b>	<b><u>21.5</u></b>	294	21.5							
115.fds4	128	110	17.7	<b><u>110</u></b>	<b><u>17.7</u></b>	111	17.6							
121.pop2	128	531	7.77	557	7.41	<b><u>551</u></b>	<b><u>7.49</u></b>							
122.tachyon	128	217	12.9	216	13.0	<b><u>216</u></b>	<b><u>12.9</u></b>							
126.lammps	128	<b><u>207</u></b>	<b><u>14.1</u></b>	207	14.1	208	14.0							
127.wrf2	128	248	31.5	248	31.4	<b><u>248</u></b>	<b><u>31.4</u></b>							
128.GAPgeofem	128	<b><u>114</u></b>	<b><u>18.1</u></b>	115	18.0	114	18.1							
129.tera_tf	128	<b><u>216</u></b>	<b><u>12.8</u></b>	219	12.6	213	13.0							

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	128	182	21.0	<b><u>182</u></b>	<b><u>21.0</u></b>	180	21.2									
132.zeusmp2	128	180	17.2	<b><u>180</u></b>	<b><u>17.2</u></b>	180	17.2									
137.lu	128	155	23.7	155	23.7	<b><u>155</u></b>	<b><u>23.7</u></b>									

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: Discovery Node  
 Interconnects: IB Switch  
 Gigabit Ethernet  
 File Server Node: HOME  
 Total Compute Nodes: 4  
 Total Chips: 16  
 Total Cores: 128  
 Total Threads: 128  
 Total Memory: 512 GB  
 Base Ranks Run: 128  
 Minimum Peak Ranks: --  
 Maximum Peak Ranks: --

### Software Summary

C Compiler: Intel C++ Compiler 11.1.064 for Linux  
 C++ Compiler: Intel C++ Compiler 11.1.064 for Linux  
 Fortran Compiler: Intel Fortran Compiler 11.1.064 for Linux  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 MPI Library: Intel MPI Library 3.2.2.006 for Linux  
 Other MPI Info: None  
 Pre-processors: No  
 Other Software: None

## Node Description: Discovery Node

### Hardware

Number of nodes: 4  
 Uses of the node: compute  
 Vendor: Quanta  
 Model: QSSC-S4R  
 CPU Name: Intel Xeon X7560  
 CPU(s) orderable: 1-4 chips  
 Chips enabled: 4  
 Cores enabled: 32  
 Cores per chip: 8  
 Threads per core: 1  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.66 GHz, 6.4 GT/s QPI, Hyper-Threading disabled  
 CPU MHz: 2261  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core  
 L3 Cache: 24 MB I+D on chip per chip, 24 MB shared / 8 cores  
 Other Cache: None  
 Memory: 128 GB (dual-rank RDIMM 32x4-GB DDR3-1066 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

### 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: Discovery Node

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

### Node Description: HOME

Hardware	
Number of nodes:	1
Uses of the node:	fileserver
Vendor:	Intel
Model:	SSR212CC
CPU Name:	Intel Xeon CPU
CPU(s) orderable:	2 chips
Chips enabled:	2
Cores enabled:	2
Cores per chip:	1
Threads per core:	1
CPU Characteristics:	--
CPU MHz:	2800
Primary Cache:	12 KB I + 16 KB D on chip per chip
Secondary Cache:	1 MB I+D on chip per chip
L3 Cache:	None
Other Cache:	None
Memory:	6 GB
Disk Subsystem:	10 disks, 320GB/disk, 2.6TB total
Other Hardware:	None
Adapter:	Intel 82546GB 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 82546GB Dual-Port Gigabit Ethernet Controller
Adapter Driver:	e1000
Adapter Firmware:	N/A
Operating System:	RedHat EL 4 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

### Software

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### Interconnect Description: IB Switch

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

### 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, 10Gbps 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:

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.

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 2x4-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:

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## General Notes (Continued)

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 32/64/96/128 ranks.

PBS Pro was used for job submission. It has no impact on performance.  
Can be found at: <http://www.altair.com>

## Base Compiler Invocation

C benchmarks:  
mpiicc

C++ benchmarks:

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



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

[http://www.spec.org/mpi2007/flags/EM64T\\_Intel111\\_flags.20100202.html](http://www.spec.org/mpi2007/flags/EM64T_Intel111_flags.20100202.html)

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

[http://www.spec.org/mpi2007/flags/EM64T\\_Intel111\\_flags.20100202.xml](http://www.spec.org/mpi2007/flags/EM64T_Intel111_flags.20100202.xml)

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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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