



# SPEC® MPIL2007 Result

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## Intel Corporation

Endeavor (Intel Xeon E5-2670, 2.60 GHz, DDR3-1333 MHz, SMT on, Turbo on)

SPECmpiL\_peak2007 = Not Run

SPECmpiL\_base2007 = 20.4

MPI2007 license: 13

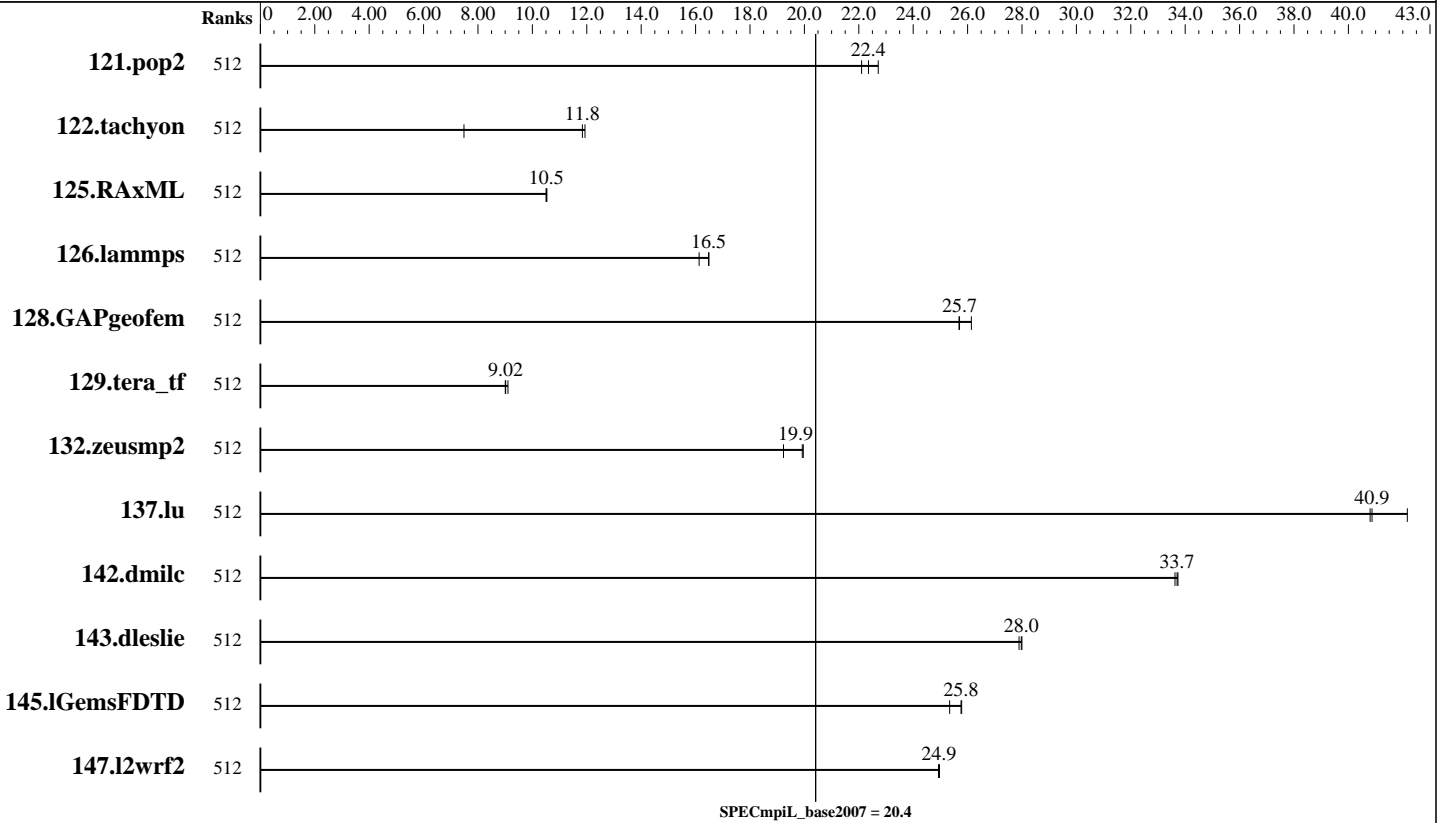
Test sponsor: Intel Corporation

Tested by: Pavel Shelepugin

Test date: Feb-2012

Hardware Availability: Mar-2012

Software Availability: Sep-2011



## Results Table

| Benchmark     | Base  |            |             |            |             |         |       |       | Peak    |       |         |       |         |       |  |  |
|---------------|-------|------------|-------------|------------|-------------|---------|-------|-------|---------|-------|---------|-------|---------|-------|--|--|
|               | Ranks | Seconds    | Ratio       | Seconds    | Ratio       | Seconds | Ratio | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |  |  |
| 121.pop2      | 512   | 176        | 22.1        | <b>174</b> | <b>22.4</b> | 171     | 22.7  |       |         |       |         |       |         |       |  |  |
| 122.tachyon   | 512   | 260        | 7.49        | <b>164</b> | <b>11.8</b> | 163     | 11.9  |       |         |       |         |       |         |       |  |  |
| 125.RAxML     | 512   | 277        | 10.5        | <b>278</b> | <b>10.5</b> | 278     | 10.5  |       |         |       |         |       |         |       |  |  |
| 126.lammps    | 512   | 152        | 16.1        | <b>149</b> | <b>16.5</b> | 149     | 16.5  |       |         |       |         |       |         |       |  |  |
| 128.GAPgeofem | 512   | <b>231</b> | <b>25.7</b> | 227        | 26.1        | 231     | 25.7  |       |         |       |         |       |         |       |  |  |
| 129.tera_tf   | 512   | <b>122</b> | <b>9.02</b> | 121        | 9.10        | 122     | 9.00  |       |         |       |         |       |         |       |  |  |
| 132.zeusmp2   | 512   | 106        | 20.0        | <b>106</b> | <b>19.9</b> | 110     | 19.2  |       |         |       |         |       |         |       |  |  |
| 137.lu        | 512   | 99.7       | 42.2        | <b>103</b> | <b>40.9</b> | 103     | 40.8  |       |         |       |         |       |         |       |  |  |
| 142.dmilc     | 512   | 110        | 33.6        | <b>109</b> | <b>33.7</b> | 109     | 33.7  |       |         |       |         |       |         |       |  |  |
| 143.dleslie   | 512   | 111        | 28.0        | <b>111</b> | <b>28.0</b> | 111     | 27.9  |       |         |       |         |       |         |       |  |  |
| 145.lGemsFDTD | 512   | 171        | 25.8        | <b>171</b> | <b>25.8</b> | 174     | 25.3  |       |         |       |         |       |         |       |  |  |
| 147.l2wrf2    | 512   | <b>329</b> | <b>24.9</b> | 329        | 24.9        | 329     | 25.0  |       |         |       |         |       |         |       |  |  |

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: 32  
 Total Chips: 64  
 Total Cores: 512  
 Total Threads: 1024  
 Total Memory: 2 TB  
 Base Ranks Run: 512  
 Minimum Peak Ranks: --  
 Maximum Peak Ranks: --

### Software Summary

C Compiler: Intel C++ Composer XE 2011 for Linux, Version 12.0.5.220 Build 20110719  
 C++ Compiler: Intel C++ Composer XE 2011 for Linux, Version 12.0.5.220 Build 20110719  
 Fortran Compiler: Intel Fortran Composer XE 2011 for Linux, Version 12.0.5.220 Build 20110719  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 MPI Library: Intel MPI Library 4.0.3.008 for Linux  
 Other MPI Info: None  
 Pre-processors: No  
 Other Software: None

## Node Description: Endeavor Node

### Hardware

Number of nodes: 32  
 Uses of the node: compute  
 Vendor: Intel  
 Model: R1208GLBPP  
 CPU Name: Intel Xeon E5-2670  
 CPU(s) orderable: 1-2 chips  
 Chips enabled: 2  
 Cores enabled: 16  
 Cores per chip: 8  
 Threads per core: 2  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.3 GHz, 8.0 GT/s QPI, Hyper-Threading enabled  
 CPU MHz: 2600  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core  
 L3 Cache: 20 MB I+D on chip per chip, 20 MB shared / 8 cores  
 Other Cache: None  
 Memory: 64 GB (8 x 8 GB 2Rx4 PC3-12800R, ECC, running at 1333MHz and CL9)  
 Disk Subsystem: Seagate 600 GB SSD ST9600205SS  
 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 1.5.3.1  
 Adapter Firmware: 2.10.0  
 Operating System: Red Hat EL 6.1, kernel 2.6.32-131  
 Local File System: Linux/ext2  
 Shared File System: NFS  
 System State: Multi-User  
 Other Software: Platform LSF 8.0



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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:           | 7.2.0                  |          |  |
| 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, 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:

mpiexec.hydra command was used to start MPI jobs.

BIOS settings:

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

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

RAM configuration:

Compute nodes have 2x8-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 16/32/64/128/256 ranks, 2 switches for 512 ranks, 4 switches for 1024 ranks, 8 switches for 2048 ranks.

Platform LSF was used for job submission. It has no impact on performance.

Information can be found at: <http://www.platform.com>

## Base Compiler Invocation

C benchmarks:  
mpiicc

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## Base Compiler Invocation (Continued)

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

## Base Optimization Flags

C benchmarks:

-O3 -xAVX -no-prec-div -ipo

C++ benchmarks:

126.lammps: -O3 -xAVX -no-prec-div -ipo

Fortran benchmarks:

-O3 -xAVX -no-prec-div -ipo

Benchmarks using both Fortran and C:

-O3 -xAVX -no-prec-div -ipo

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

[http://www.spec.org/mpi2007/flags/EM64T\\_Intel121\\_flags.html](http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.html)

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

[http://www.spec.org/mpi2007/flags/EM64T\\_Intel121\\_flags.xml](http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.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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