



# SPEC® MPIM2007 Result

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## Intel Corporation

Endeavor (Intel Xeon E5-2697 v2, 2.70 GHz,  
DDR3-1600 MHz, SMT on, Turbo off)

SPECmpiM\_peak2007 = Not Run

SPECmpiM\_base2007 = 34.8

MPI2007 license: 13

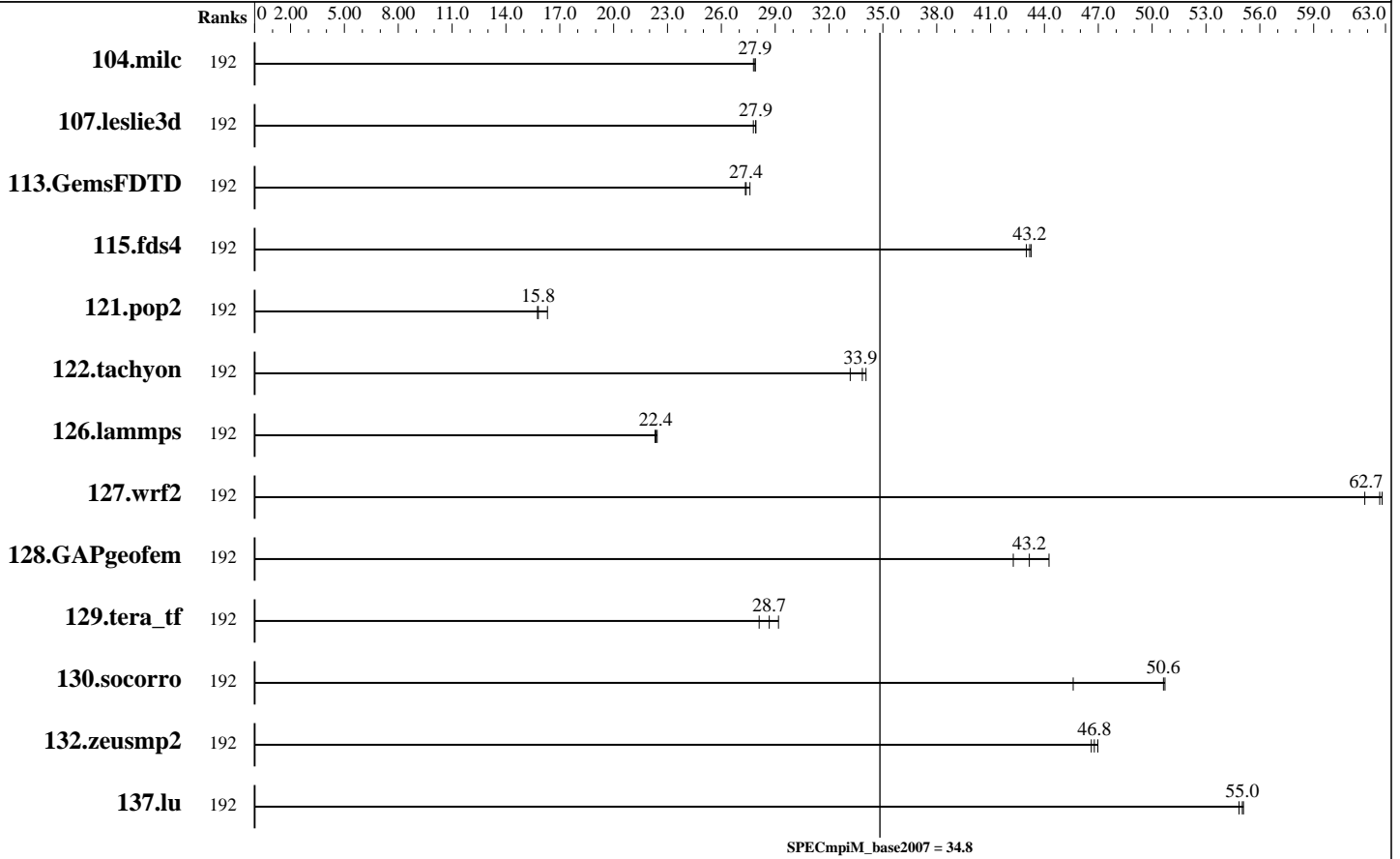
Test sponsor: Intel Corporation

Tested by: Pavel Shelepugin

Test date: Aug-2013

Hardware Availability: Sep-2013

Software Availability: Sep-2013



## Results Table

| Benchmark     | Base  |                    |                    |                    |                    |                    |                    |       | Peak    |       |         |       |         |       |  |  |
|---------------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------|---------|-------|---------|-------|---------|-------|--|--|
|               | Ranks | Seconds            | Ratio              | Seconds            | Ratio              | Seconds            | Ratio              | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |  |  |
| 104.milc      | 192   | 56.3               | 27.8               | <b><u>56.1</u></b> | <b><u>27.9</u></b> | 56.1               | 27.9               |       |         |       |         |       |         |       |  |  |
| 107.leslie3d  | 192   | 187                | 27.9               | <b><u>187</u></b>  | <b><u>27.9</u></b> | 188                | 27.8               |       |         |       |         |       |         |       |  |  |
| 113.GemsFDTD  | 192   | 231                | 27.3               | 229                | 27.6               | <b><u>230</u></b>  | <b><u>27.4</u></b> |       |         |       |         |       |         |       |  |  |
| 115.fds4      | 192   | 45.1               | 43.3               | <b><u>45.2</u></b> | <b><u>43.2</u></b> | 45.4               | 43.0               |       |         |       |         |       |         |       |  |  |
| 121.pop2      | 192   | 253                | 16.3               | <b><u>261</u></b>  | <b><u>15.8</u></b> | 262                | 15.8               |       |         |       |         |       |         |       |  |  |
| 122.tachyon   | 192   | 84.3               | 33.2               | 82.1               | 34.1               | <b><u>82.6</u></b> | <b><u>33.9</u></b> |       |         |       |         |       |         |       |  |  |
| 126.lammps    | 192   | <b><u>130</u></b>  | <b><u>22.4</u></b> | 131                | 22.3               | 130                | 22.4               |       |         |       |         |       |         |       |  |  |
| 127.wrf2      | 192   | <b><u>124</u></b>  | <b><u>62.7</u></b> | 124                | 62.8               | 126                | 61.8               |       |         |       |         |       |         |       |  |  |
| 128.GAPgeofem | 192   | <b><u>47.8</u></b> | <b><u>43.2</u></b> | 46.7               | 44.3               | 48.9               | 42.3               |       |         |       |         |       |         |       |  |  |
| 129.tera_tf   | 192   | 94.8               | 29.2               | <b><u>96.6</u></b> | <b><u>28.7</u></b> | 98.5               | 28.1               |       |         |       |         |       |         |       |  |  |

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 | 192   | 75.3        | 50.7        | 83.7        | 45.6        | <b>75.4</b> | <b>50.6</b> |       |         |       |         |       |         |       |
| 132.zeusmp2 | 192   | <b>66.3</b> | <b>46.8</b> | 66.6        | 46.6        | 66.1        | 47.0        |       |         |       |         |       |         |       |
| 137.lu      | 192   | 66.7        | 55.1        | <b>66.8</b> | <b>55.0</b> | 67.0        | 54.8        |       |         |       |         |       |         |       |

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  
 Interconnects: IB Switch  
 Gigabit Ethernet  
 File Server Node: NFS  
 Total Compute Nodes: 8  
 Total Chips: 16  
 Total Cores: 192  
 Total Threads: 384  
 Total Memory: 512 GB  
 Base Ranks Run: 192  
 Minimum Peak Ranks: --  
 Maximum Peak Ranks: --

### Software Summary

C Compiler: Intel C++ Composer XE 2013 for Linux, Version 14.0.0.080 Build 20130728  
 C++ Compiler: Intel C++ Composer XE 2013 for Linux, Version 14.0.0.080 Build 20130728  
 Fortran Compiler: Intel Fortran Composer XE 2013 for Linux, Version 14.0.0.080 Build 20130728  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 MPI Library: Intel MPI Library 4.1.1.036 for Linux  
 Other MPI Info: None  
 Pre-processors: No  
 Other Software: None

## Node Description: Endeavor Node

### Hardware

Number of nodes: 8  
 Uses of the node: compute  
 Vendor: Intel  
 Model: R2208GZ4GC  
 CPU Name: Intel Xeon E5-2697 v2  
 CPU(s) orderable: 1-2 chips  
 Chips enabled: 2  
 Cores enabled: 24  
 Cores per chip: 12  
 Threads per core: 2  
 CPU Characteristics: Intel Turbo Boost Technology disabled, 8.0 GT/s QPI, Hyper-Threading enabled  
 CPU MHz: 2700  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core  
 L3 Cache: 30 MB I+D on chip per chip, 30 MB shared / 12 cores  
 Other Cache: None  
 Memory: 64 GB (8 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
 Disk Subsystem: Seagate 600 GB SSD ST9600205SS  
 Other Hardware: None  
 Adapter: Intel (ESB2) 82575EB Dual-Port Gigabit Ethernet Controller  
 Number of Adapters: 1

### Software

Adapter: Intel (ESB2) 82575EB Dual-Port Gigabit Ethernet Controller  
 Adapter Driver: e1000  
 Adapter Firmware: None  
 Adapter: Mellanox MCX353A-FCAT ConnectX-3  
 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: Endeavor Node

|                     |                                  |
|---------------------|----------------------------------|
| Slot Type:          | PCI-Express x8                   |
| Data Rate:          | 1Gbps Ethernet                   |
| Ports Used:         | 2                                |
| Interconnect Type:  | Ethernet                         |
| Adapter:            | Mellanox MCX353A-FCAT ConnectX-3 |
| Number of Adapters: | 1                                |
| Slot Type:          | PCIe x8 Gen3                     |
| Data Rate:          | InfiniBand 4x FDR                |
| Ports Used:         | 1                                |
| Interconnect Type:  | InfiniBand                       |

### 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  |



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### Interconnect Description: IB Switch

| Hardware  | Software |
|---|----------|
| Vendor: Mellanox<br>Model: Mellanox MSX6025F-1BFR<br>Switch Model: Mellanox MSX6025F-1BFR<br>Number of Switches: 46<br>Number of Ports: 36<br>Data Rate: InfiniBand 4x FDR<br>Firmware: 7.2.0<br>Topology: Fat tree<br>Primary Use: MPI traffic |          |

### Interconnect Description: Gigabit Ethernet

| Hardware  | Software |
|---|----------|
| Vendor: Force10 Networks<br>Model: Force10 S50, Force10 C300<br>Switch Model: Force10 S50, Force10 C300<br>Number of Switches: 15<br>Number of Ports: 48<br>Data Rate: 1Gbps Ethernet, 10Gbps Ethernet<br>Firmware: 8.2.1.0<br>Topology: Fat tree<br>Primary Use: Cluster File System |          |

### Submit Notes

The config file option 'submit' was used.

### General Notes

130.socorro (base): "nullify\_ptrs" src.alt was used.

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) : Disabled (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

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## General Notes (Continued)

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 24/48/96/192/384 ranks, 2 switches for 768 ranks, 4 switches for 1536 ranks, 8 switches for 3072 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

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  
130.socorro: -assume nostd\_intent\_in

## Base Optimization Flags

C benchmarks:  
-O3 -xCORE-AVX-I -no-prec-div

C++ benchmarks:

126.lammps: -O3 -xCORE-AVX-I -no-prec-div

Fortran benchmarks:

-O3 -xCORE-AVX-I -no-prec-div

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## Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:

-O3 -xCORE-AVX-I -no-prec-div

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

[http://www.spec.org/mpi2007/flags/EM64T\\_Intel140\\_flags.html](http://www.spec.org/mpi2007/flags/EM64T_Intel140_flags.html)

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

[http://www.spec.org/mpi2007/flags/EM64T\\_Intel140\\_flags.xml](http://www.spec.org/mpi2007/flags/EM64T_Intel140_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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