# SPEC® MPIM2007 Result

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## Intel Corporation

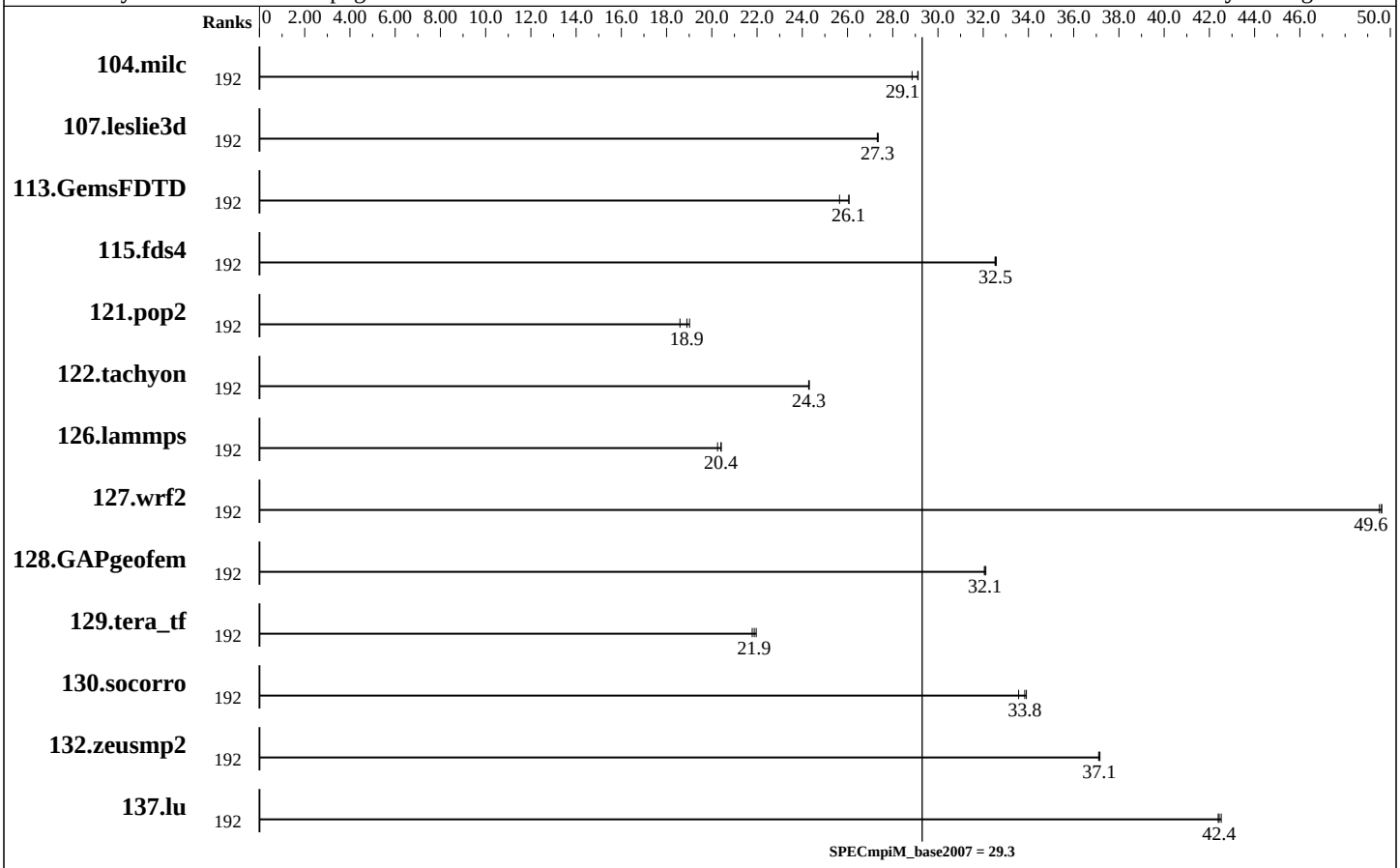
Endeavor (Intel Xeon X5670, 2.93 GHz,
DDR3-1333 MHz, SMT on, Turbo off)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 29.3

**MPI2007 license:** 13
**Test sponsor:** Intel Corporation
**Tested by:** Pavel Shelepugin

**Test date:** Jul-2010
**Hardware Availability:** Mar-2010
**Software Availability:** Aug-2010




## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 104.milc | 192 | 54.2 | 28.9 | **53.8** | **29.1** | 53.7 | 29.1 | | | | | | | |
| 107.leslie3d | 192 | 191 | 27.4 | 191 | 27.3 | **191** | **27.3** | | | | | | | |
| 113.GemsFDTD | 192 | **242** | **26.1** | 246 | 25.6 | 242 | 26.1 | | | | | | | |
| 115.fds4 | 192 | 60.0 | 32.5 | **60.0** | **32.5** | 59.9 | 32.6 | | | | | | | |
| 121.pop2 | 192 | **218** | **18.9** | 217 | 19.0 | 222 | 18.6 | | | | | | | |
| 122.tachyon | 192 | 115 | 24.3 | **115** | **24.3** | 115 | 24.3 | | | | | | | |
| 126.lammps | 192 | 144 | 20.3 | 143 | 20.4 | **143** | **20.4** | | | | | | | |
| 127.wrf2 | 192 | 157 | 49.5 | **157** | **49.6** | 157 | 49.6 | | | | | | | |
| 128.GAPgeofem | 192 | **64.4** | **32.1** | 64.4 | 32.0 | 64.3 | 32.1 | | | | | | | |
| 129.tera_tf | 192 | 127 | 21.8 | **127** | **21.9** | 126 | 22.0 | | | | | | | |

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 | 192 | **113** | **33.8** | 113 | 33.9 | 114 | 33.6 | | | | | | | |
| 132.zeusmp2 | 192 | 83.5 | 37.2 | 83.6 | 37.1 | **83.6** | **37.1** | | | | | | | |
| 137.lu | 192 | **86.6** | **42.4** | 86.7 | 42.4 | 86.4 | 42.5 | | | | | | | |

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<br>Gigabit Ethernet |
| File Server Node: | HOME |
| Total Compute Nodes: | 16 |
| Total Chips: | 32 |
| Total Cores: | 192 |
| Total Threads: | 384 |
| Total Memory: | 384 GB |
| Base Ranks Run: | 192 |
| 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 4.0.1 for Linux |
| Other MPI Info: | None |
| Pre-processors: | No |
| Other Software: | None |

## Node Description: Endeavor Node

### Hardware

| | |
|---|---|
| Number of nodes: | 16 |
| 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 (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 |

Continued on next page

### 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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**Hardware Availability:** Mar-2010
**Software Availability:** Aug-2010

## Node Description: Endeavor Node

| | |
|---|---|
| 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 |

## 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 | | 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: | 7.1.000 | |
| 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 | |
| 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)  : 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.
```

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## General Notes (Continued)

```
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 ranks, 2 switches for 384 ranks, 3 switches for 504 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`

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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