# SPEC® MPIM2007 Result



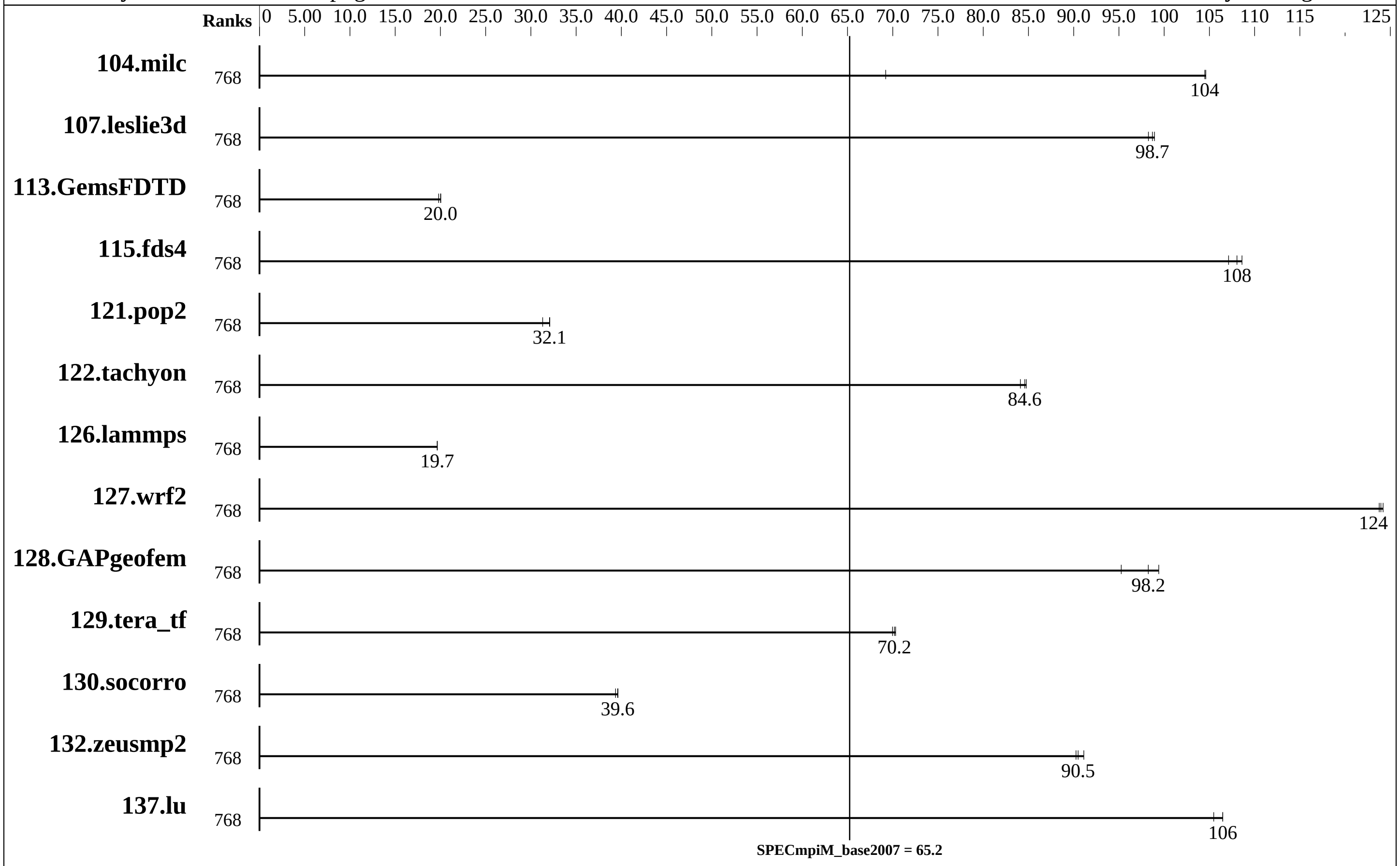
## Intel Corporation

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

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 65.2

| | | | |
|---|---|---|---|
| **MPI2007 license:** | 13 | **Test date:** | Jul-2011 |
| **Test sponsor:** | Intel Corporation | **Hardware Availability:** | Mar-2010 |
| **Tested by:** | Pavel Shelepugin | **Software Availability:** | Aug-2011 |




## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 104.milc | 768 | 22.6 | 69.2 | **15.0** | **104** | 15.0 | 105 | | | | | | | |
| 107.leslie3d | 768 | 53.1 | 98.3 | 52.8 | 98.9 | **52.9** | **98.7** | | | | | | | |
| 113.GemsFDTD | 768 | 319 | 19.8 | **315** | **20.0** | 315 | 20.0 | | | | | | | |
| 115.fds4 | 768 | 18.2 | 107 | 18.0 | 109 | **18.1** | **108** | | | | | | | |
| 121.pop2 | 768 | **129** | **32.1** | 132 | 31.3 | 129 | 32.1 | | | | | | | |
| 122.tachyon | 768 | 33.3 | 84.1 | **33.1** | **84.6** | 33.0 | 84.8 | | | | | | | |
| 126.lammps | 768 | **148** | **19.7** | 148 | 19.6 | 148 | 19.7 | | | | | | | |
| 127.wrf2 | 768 | 62.8 | 124 | 63.0 | 124 | **62.9** | **124** | | | | | | | |
| 128.GAPgeofem | 768 | 20.8 | 99.4 | **21.0** | **98.2** | 21.7 | 95.3 | | | | | | | |
| 129.tera_tf | 768 | 39.6 | 70.0 | **39.4** | **70.2** | 39.4 | 70.3 | | | | | | | |

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

# Results Table (Continued)

| | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Benchmark** | **Ranks** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Ranks** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** |
| 130.socorro | 768 | 96.3 | 39.6 | 97.0 | 39.4 | **96.4** | **39.6** | | | | | | | |
| 132.zeusmp2 | 768 | 34.1 | 91.1 | 34.4 | 90.3 | **34.3** | **90.5** | | | | | | | |
| 137.lu | 768 | **34.5** | **106** | 34.9 | 105 | 34.5 | 106 | | | | | | | |

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: | NFS |
| Total Compute Nodes: | 64 |
| Total Chips: | 128 |
| Total Cores: | 768 |
| Total Threads: | 1536 |
| Total Memory: | 1536 GB |
| Base Ranks Run: | 768 |
| Minimum Peak Ranks: | -- |
| Maximum Peak Ranks: | -- |

## Software Summary

| | |
|---|---|
| C Compiler: | Intel C++ Compiler 12.0.3.174 for Linux |
| C++ Compiler: | Intel C++ Compiler 12.0.3.174 for Linux |
| Fortran Compiler: | Intel Fortran Compiler 12.0.3.174 for Linux |
| Base Pointers: | 64-bit |
| Peak Pointers: | 64-bit |
| MPI Library: | Intel MPI Library 4.0.1.007 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 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 (Dual-rank 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 |

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## 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 6.1, kernel 2.6.32-131 |
| Local File System: | Linux/ext2 |
| Shared File System: | NFS |
| System State: | Multi-User |
| Other Software: | PBS Pro 11.1 |

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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 MHQH29-XTC |
| Number of Adapters: | 1 |
| Slot Type: | PCIe x8 Gen2 |
| Data Rate: | InfiniBand 4x QDR |
| 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

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

### Software

## Interconnect Description: Gigabit Ethernet

### Hardware

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

### Software

## Submit Notes

```
The config file option 'submit' was used.
```

## General Notes

```
MPI startup command:
  mpiexec.hydra command was used to start MPI jobs. To start a job by
  this command, the daemons are not required to be run beforehand.

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 96/192 ranks, 2 switches for 384 ranks, 4 switches for 768 ranks,
  8 switches for 1536 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_Intel120_flags.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/mpi2007/flags/EM64T_Intel120_flags.xml



For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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