



# SPEC® MPIM2007 Result

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## SGI

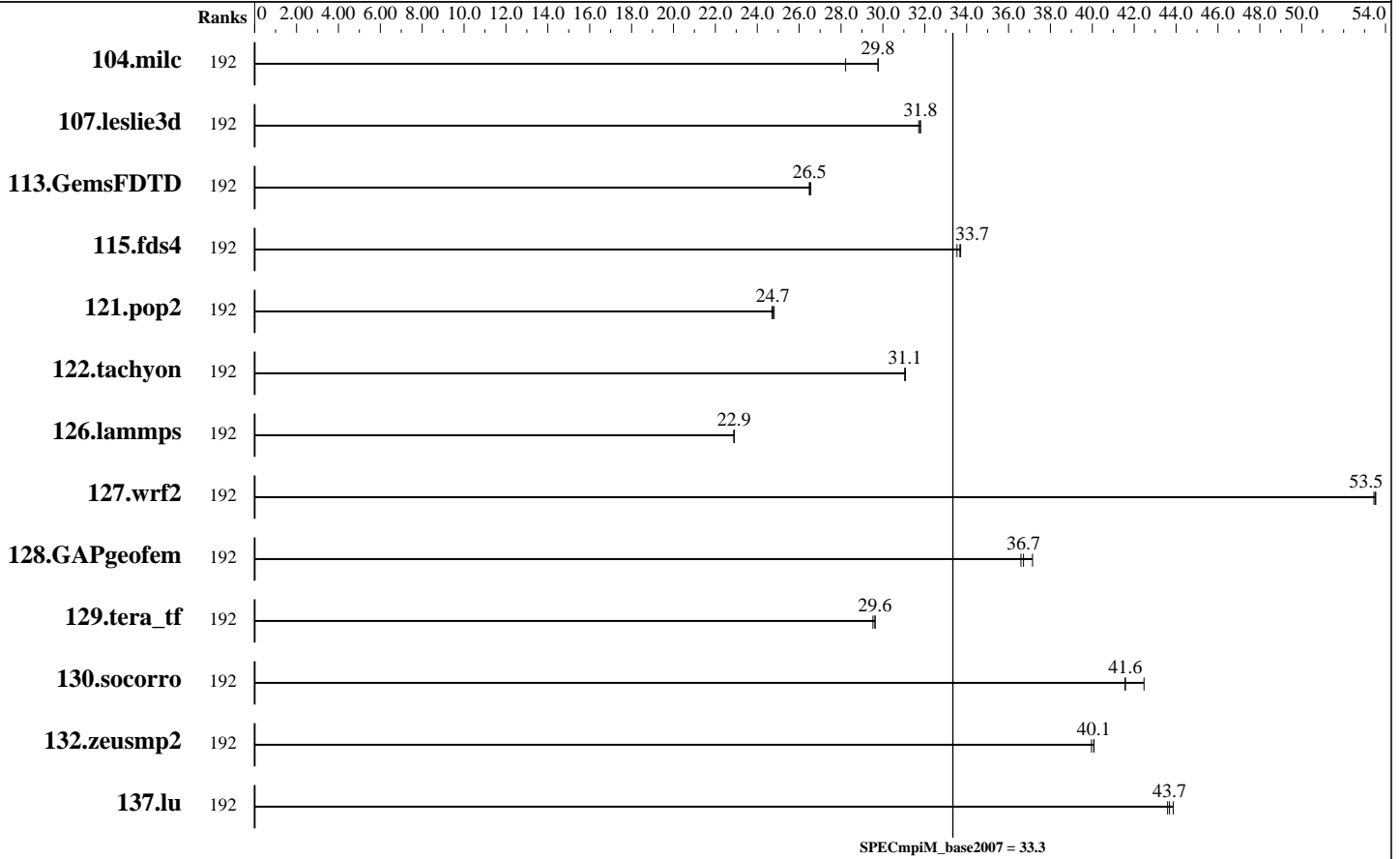
SGI Altix ICE 8400EX  
(Intel Xeon X5690, 3.46 GHz)

SPECmpiM\_peak2007 = Not Run

SPECmpiM\_base2007 = 33.3

MPI2007 license: 4  
Test sponsor: SGI  
Tested by: SGI

Test date: Jun-2011  
Hardware Availability: Feb-2011  
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      | 192   | 55.5               | 28.2               | <b><u>52.6</u></b> | <b><u>29.8</u></b> | 52.6               | 29.8               |       |         |       |         |       |         |       |
| 107.leslie3d  | 192   | 164                | 31.8               | <b><u>164</u></b>  | <b><u>31.8</u></b> | 165                | 31.7               |       |         |       |         |       |         |       |
| 113.GemsFDTD  | 192   | <b><u>238</u></b>  | <b><u>26.5</u></b> | 238                | 26.6               | 238                | 26.5               |       |         |       |         |       |         |       |
| 115.fds4      | 192   | 58.2               | 33.5               | <b><u>57.9</u></b> | <b><u>33.7</u></b> | 57.9               | 33.7               |       |         |       |         |       |         |       |
| 121.pop2      | 192   | 167                | 24.7               | 166                | 24.8               | <b><u>167</u></b>  | <b><u>24.7</u></b> |       |         |       |         |       |         |       |
| 122.tachyon   | 192   | 90.0               | 31.1               | <b><u>90.1</u></b> | <b><u>31.1</u></b> | 90.1               | 31.1               |       |         |       |         |       |         |       |
| 126.lammps    | 192   | 127                | 22.9               | <b><u>127</u></b>  | <b><u>22.9</u></b> | 127                | 22.9               |       |         |       |         |       |         |       |
| 127.wrf2      | 192   | 146                | 53.5               | <b><u>146</u></b>  | <b><u>53.5</u></b> | 146                | 53.4               |       |         |       |         |       |         |       |
| 128.GAPgeofem | 192   | 56.4               | 36.6               | 55.6               | 37.1               | <b><u>56.2</u></b> | <b><u>36.7</u></b> |       |         |       |         |       |         |       |
| 129.tera_tf   | 192   | <b><u>93.4</u></b> | <b><u>29.6</u></b> | 93.4               | 29.6               | 93.8               | 29.5               |       |         |       |         |       |         |       |

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   | 91.8    | 41.6  | <u>91.8</u> | <u>41.6</u> | 89.9        | 42.5        |       |         |       |         |       |         |       |
| 132.zeusmp2 | 192   | 77.4    | 40.1  | <u>77.4</u> | <u>40.1</u> | 77.6        | 40.0        |       |         |       |         |       |         |       |
| 137.lu      | 192   | 84.3    | 43.6  | 83.8        | 43.9        | <u>84.1</u> | <u>43.7</u> |       |         |       |         |       |         |       |

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: SGI Altix ICE 8400EX Compute Node  
 Interconnect: InfiniBand (MPI and I/O)  
 File Server Node: SGI InfiniteStorage Nexis 2000 NAS  
 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++ Composer XE 2011 for Linux, Version 12.0.3.174 Build 20110309  
 C++ Compiler: Intel C++ Composer XE 2011 for Linux, Version 12.0.3.174 Build 20110309  
 Fortran Compiler: Intel Fortran Composer XE 2011 for Linux, Version 12.0.3.174 Build 20110309  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 MPI Library: SGI MPT 2.04 Patch 10789  
 Other MPI Info: OFED 1.4.2  
 Pre-processors: None  
 Other Software: None

### Node Description: SGI Altix ICE 8400EX Compute Node

#### Hardware

Number of nodes: 16  
 Uses of the node: compute  
 Vendor: SGI  
 Model: SGI Altix ICE 8400EX (Intel Xeon X5690, 3.46 GHz)  
 CPU Name: Intel Xeon X5690  
 CPU(s) orderable: 1-2 chips  
 Chips enabled: 2  
 Cores enabled: 12  
 Cores per chip: 6  
 Threads per core: 2  
 CPU Characteristics: Six Core, 3.46 GHz, 6.4 GT/s QPI  
 Intel Turbo Boost Technology up to 3.73 GHz  
 Hyper-Threading Technology enabled  
 CPU MHz: 3467  
 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  
 Other Cache: None  
 Memory: 24 GB (6 x 4 GB 2Rx4 PC3-10600R-9, ECC)  
 Disk Subsystem: None  
 Other Hardware: None  
 Adapter: Mellanox MT26428 ConnectX IB QDR (PCIe x8 Gen2 5 GT/s)  
 Number of Adapters: 2  
 Slot Type: PCIe x8 Gen2

#### Software

Adapter: Mellanox MT26428 ConnectX IB QDR (PCIe x8 Gen2 5 GT/s)  
 Adapter Driver: OFED-1.4.2  
 Adapter Firmware: 2.7.8200  
 Operating System: SUSE Linux Enterprise Server 11 SP1, Kernel 2.6.32.13-0.4-default  
 Local File System: NFSv3  
 Shared File System: NFSv3 IPoIB  
 System State: Multi-user, run level 3  
 Other Software: SGI ProPack 7SP1 for Linux, Build 701r3.sles11-1005252113  
 SGI Tempo Compute Node 2.1, Build 701r3.sles11-1005252113

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### Node Description: SGI Altix ICE 8400EX Compute Node

Data Rate: InfiniBand 4x QDR  
Ports Used: 1  
Interconnect Type: InfiniBand

### Node Description: SGI InfiniteStorage Nexis 2000 NAS

#### Hardware

Number of nodes: 1  
Uses of the node: fileserver  
Vendor: SGI  
Model: SGI Altix XE 270 (Intel Xeon X5670, 2.93 GHz)  
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 up to 3.33 GHz  
Hyper-Threading Technology enabled  
CPU MHz: 2933  
Primary Cache: 32 KB I + 32 KB D on chip per core  
Secondary Cache: 256 KB I+D on chip per chip  
L3 Cache: 12 MB I+D on chip per chip  
Other Cache: None  
Memory: 96 GB (12\*8 GB DDR3-1333 CL9 DIMMs)  
Disk Subsystem: 8.8 TB RAID 5  
60 x 146 GB SAS (Seagate Cheetah 15K.5)  
Other Hardware: None  
Adapter: Mellanox MT26428 ConnectX IB QDR  
(PCIe x8 Gen2 5 GT/s)  
Number of Adapters: 2  
Slot Type: PCIe x8 Gen2  
Data Rate: InfiniBand 4x QDR  
Ports Used: 2  
Interconnect Type: InfiniBand

#### Software

Adapter: Mellanox MT26428 ConnectX IB QDR  
(PCIe x8 Gen2 5 GT/s)  
Adapter Driver: OFED-1.4.0  
Adapter Firmware: 2.7.0  
Operating System: SUSE Linux Enterprise Server 11 (x86\_64)  
Kernel 2.6.27.19-5-default  
Local File System: xfs  
Shared File System: --  
System State: Multi-user, run level 3  
Other Software: SGI Foundation Software 2, Build  
700r3.sles11-1004061553

### Interconnect Description: InfiniBand (MPI and I/O)

#### Hardware

Vendor: Mellanox Technologies and SGI  
Model: None  
Switch Model: SGI QDR\_1.5\_HYPR\_2454 with Mellanox Device 48438  
(Infiniscale IV)  
Number of Switches: 4  
Number of Ports: 36  
Data Rate: InfiniBand 4x QDR

#### Software

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## Interconnect Description: InfiniBand (MPI and I/O)

Firmware: 5040005  
Topology: Enhanced Hypercube  
Primary Use: MPI and I/O traffic

## Submit Notes

The config file option 'submit' was used.

## General Notes

### Software environment:

```
export MPI_REQUEST_MAX=65536
export MPI_TYPE_MAX=32768
export MPI_BUFS_THRESHOLD=1
export MPI_IB_RAILS=2
ulimit -s unlimited
```

### BIOS settings:

```
AMI BIOS version 080016
Hyper-Threading Technology enabled (default)
Intel Turbo Boost Technology enabled (default)
Intel Turbo Boost Technology activated in the OS via
/etc/init.d/acpid start
/etc/init.d/powersaved start
powersave -f
```

### Job Placement:

Each MPI job was assigned to a topologically compact set of nodes, i.e. the minimal needed number of switches was used for each job: 2 switches for up to 96 ranks, 4 switches for 192 ranks, 8 switches for 384 ranks, 16 switches for 768 ranks.

### Additional notes regarding interconnect:

The Infiniband network consists of two independent planes, with half the switches in the system allocated to each plane. I/O traffic is restricted to one plane, while MPI traffic can use both planes.

## Base Compiler Invocation

C benchmarks:  
icc

C++ benchmarks:

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## Base Compiler Invocation (Continued)

126.lammps: icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

icc ifort

## Base Portability Flags

121.pop2: -DSPEC\_MPI\_CASE\_FLAG

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 -ansi-alias

Fortran benchmarks:

-O3 -xSSE4.2 -no-prec-div

Benchmarks using both Fortran and C:

-O3 -xSSE4.2 -no-prec-div

## Base Other Flags

C benchmarks:

-lmpi

C++ benchmarks:

126.lammps: -lmpi

Fortran benchmarks:

-lmpi

Benchmarks using both Fortran and C:

-lmpi



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

[http://www.spec.org/mpi2007/flags/SGI\\_x86\\_64\\_Intel12\\_flags.html](http://www.spec.org/mpi2007/flags/SGI_x86_64_Intel12_flags.html)

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

[http://www.spec.org/mpi2007/flags/SGI\\_x86\\_64\\_Intel12\\_flags.xml](http://www.spec.org/mpi2007/flags/SGI_x86_64_Intel12_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).

Tested with SPEC MPI2007 v2.0.1.  
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