



# SPEC<sup>®</sup> MPIM2007 Result

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## SGI

SGI ICE X  
(Intel Xeon E5-2690 v3, 2.6 GHz)

SPECmpiM\_peak2007 = Not Run

SPECmpiM\_base2007 = 101

MPI2007 license: 14

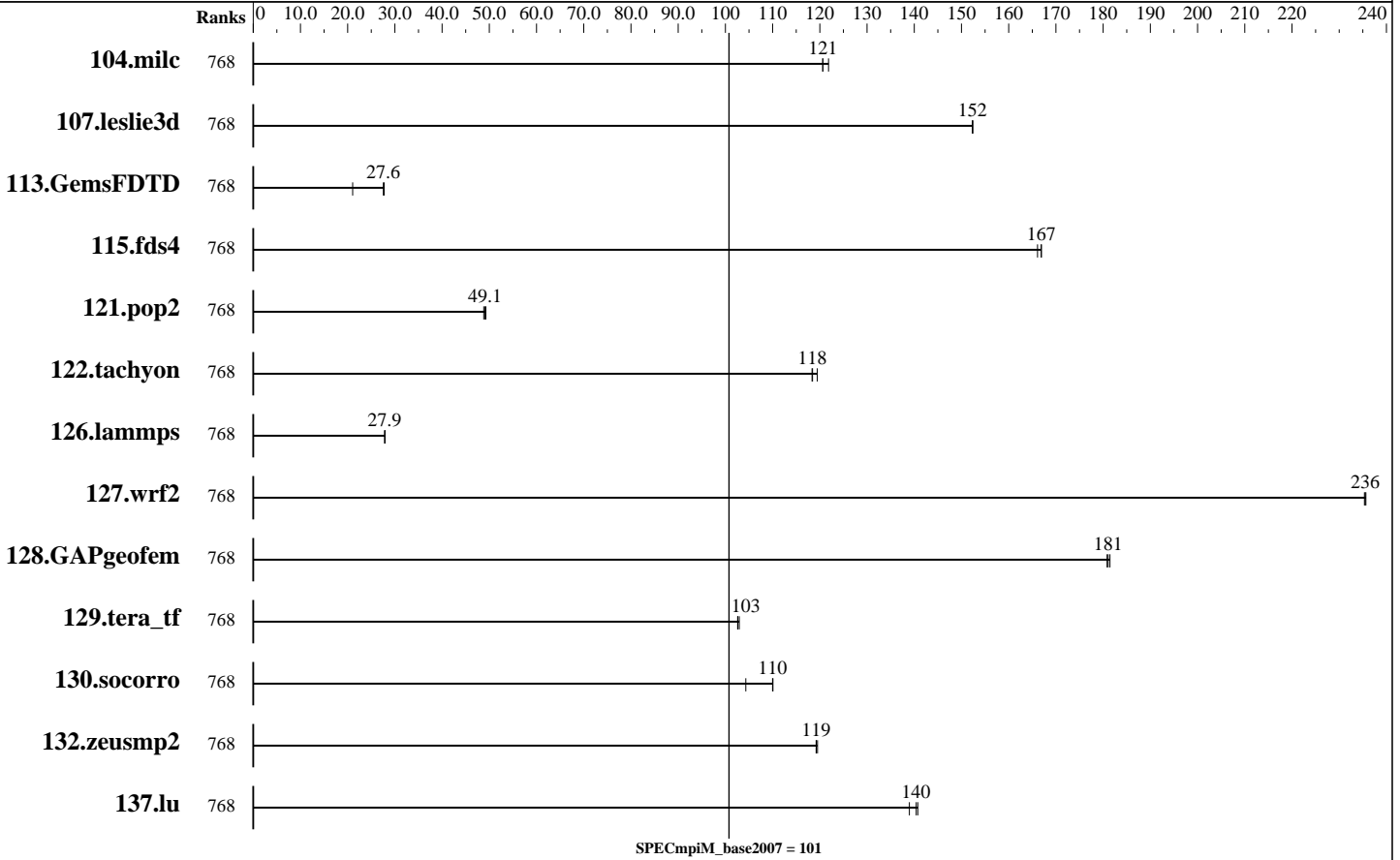
Test sponsor: SGI

Tested by: SGI

Test date: Jul-2014

Hardware Availability: Sep-2014

Software Availability: Apr-2014



## Results Table

Benchmark	Base								Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
104.milc	768	<b><u>13.0</u></b>	<b><u>121</u></b>	12.8	122	13.0	121									
107.leslie3d	768	34.3	152	<b><u>34.3</u></b>	<b><u>152</u></b>	34.3	152									
113.GemsFDTD	768	300	21.1	227	27.7	<b><u>229</u></b>	<b><u>27.6</u></b>									
115.fds4	768	<b><u>11.7</u></b>	<b><u>167</u></b>	11.7	167	11.7	166									
121.pop2	768	<b><u>84.1</u></b>	<b><u>49.1</u></b>	83.8	49.3	84.6	48.8									
122.tachyon	768	23.6	118	23.4	119	<b><u>23.6</u></b>	<b><u>118</u></b>									
126.lammps	768	<b><u>105</u></b>	<b><u>27.9</u></b>	104	27.9	105	27.9									
127.wrf2	768	33.1	235	33.1	236	<b><u>33.1</u></b>	<b><u>236</u></b>									
128.GAPgeofem	768	11.4	181	11.4	181	<b><u>11.4</u></b>	<b><u>181</u></b>									
129.tera_tf	768	27.0	103	26.9	103	<b><u>27.0</u></b>	<b><u>103</u></b>									

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	768	34.7	110	<b><u>34.7</u></b>	<b><u>110</u></b>	36.6	104							
132.zeusmp2	768	26.0	119	26.0	120	<b><u>26.0</u></b>	<b><u>119</u></b>							
137.lu	768	26.1	141	<b><u>26.2</u></b>	<b><u>140</u></b>	26.5	139							

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 ICE X IP-131 Compute Node  
 Interconnect: InfiniBand (MPI and I/O)  
 File Server Node: SGI Rackable C1103-TY12  
 Total Compute Nodes: 32  
 Total Chips: 64  
 Total Cores: 768  
 Total Threads: 768  
 Total Memory: 4 TB  
 Base Ranks Run: 768  
 Minimum Peak Ranks: --  
 Maximum Peak Ranks: --

#### Software Summary

C Compiler: Intel C++ Composer XE 2013 for Linux, Version 14.0.3.174 Build 20140422  
 C++ Compiler: Intel C++ Composer XE 2013 for Linux, Version 14.0.3.174 Build 20140422  
 Fortran Compiler: Intel Fortran Composer XE 2013 for Linux, Version 14.0.3.174 Build 20140422  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 MPI Library: SGI MPT 2.09 Patch 11049  
 Other MPI Info: OFED 1.5.4  
 Pre-processors: None  
 Other Software: None

### Node Description: SGI ICE X IP-131 Compute Node

#### Hardware

Number of nodes: 32  
 Uses of the node: compute  
 Vendor: SGI  
 Model: SGI ICE X (Intel Xeon E6-2690 v3, 2.6 GHz)  
 CPU Name: Intel Xeon E5-2690 v3  
 CPU(s) orderable: 1-2 chips  
 Chips enabled: 2  
 Cores enabled: 24  
 Cores per chip: 12  
 Threads per core: 1  
 CPU Characteristics: 12 Core, 2.60 GHz, 9.6 GT/s QPI  
 Intel Turbo Boost Technology up to 3.50 GHz  
 Hyper-Threading Technology disabled  
 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: 30 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 128 GB (8 x 16 GB 2Rx4 PC4-17000R-15, ECC)  
 Disk Subsystem: None  
 Other Hardware: None  
 Adapter: Mellanox MT27500 with ConnectX-3 ASIC (PCIe x8 Gen3 8 GT/s)  
 Number of Adapters: 2  
 Slot Type: PCIe x8 Gen3

#### Software

Adapter: Mellanox MT27500 with ConnectX-3 ASIC (PCIe x8 Gen3 8 GT/s)  
 Adapter Driver: OFED 1.5.4  
 Adapter Firmware: 2.30.3000  
 Operating System: SUSE Linux Enterprise Server 11 SP3 (x86\_64), Kernel 3.0.93-0.8-default  
 Local File System: NFSv3  
 Shared File System: NFSv3 IPoIB  
 System State: Multi-user, run level 3  
 Other Software: SGI Tempo Service Node 2.8.1, Build 709rp49.sles11sp3-1402182002

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Tested by: SGI

Test date: Jul-2014  
Hardware Availability: Sep-2014  
Software Availability: Apr-2014

### Node Description: SGI ICE X IP-131 Compute Node

Data Rate: InfiniBand 4x FDR  
Ports Used: 2  
Interconnect Type: InfiniBand

### Node Description: SGI Rackable C1103-TY12

#### Hardware

Number of nodes: 1  
Uses of the node: fileserver  
Vendor: SGI  
Model: SGI Rackable C1103-TY12 (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 2Rx4 PC3-10600R-9, ECC)  
Disk Subsystem: 12 TB RAID 6  
12 x 1 TB SATA (Seagate Constellation, 7200RPM)  
Other Hardware: None  
Adapter: Mellanox MT27500 with ConnectX-3 ASIC (PCIe x8 Gen3 8 GT/s)  
Number of Adapters: 2  
Slot Type: PCIe x8 Gen3  
Data Rate: InfiniBand 4x FDR  
Ports Used: 2  
Interconnect Type: InfiniBand

#### Software

Adapter: Mellanox MT27500 with ConnectX-3 ASIC (PCIe x8 Gen3 8 GT/s)  
Adapter Driver: OFED-1.5.2  
Adapter Firmware: 2.30.3000  
Operating System: SUSE Linux Enterprise Server 11 SP1 (x86\_64), Kernel 2.6.32.46-0.3-default  
Local File System: xfs  
Shared File System: --  
System State: Multi-user, run level 3  
Other Software: SGI Foundation Software 2.5, Build 705r10.sles11-1110192111

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

#### Hardware

Vendor: Mellanox Technologies and SGI  
Model: None  
Switch Model: SGI FDR Integrated IB Switch Blade 2SW9x27 with Mellanox SwitchX device 51000  
Number of Switches: 8  
Number of Ports: 36  
Data Rate: InfiniBand 4x FDR

#### Software

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Hardware Availability: Sep-2014

Software Availability: Apr-2014

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

Firmware: 09.02.3000  
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_IB_RAILS=2
ulimit -s unlimited
```

### BIOS settings:

```
AMI BIOS version DY2E6044
Hyper-Threading Technology disabled
Intel Turbo Boost Technology enabled (default)
Intel Turbo Boost Technology activated with
modprobe acpi_cpufreq
cpupower frequency-set -u 2601MHz -d 2601MHz -g performance
```

### 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 192 ranks, 4 switches for up to 384 ranks, 8 switches for 768 ranks, and 16 switches for 1536 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:

126.lammps: icpc

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## Base Compiler Invocation (Continued)

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

130.socorro: -assume nostd\_intent\_in

## Base Optimization Flags

C benchmarks:

-O3 -xCORE-AVX2 -no-prec-div

C++ benchmarks:

126.lammps: -O3 -xCORE-AVX2 -no-prec-div -ansi-alias

Fortran benchmarks:

-O3 -xCORE-AVX2 -no-prec-div

Benchmarks using both Fortran and C:

-O3 -xCORE-AVX2 -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\\_Intel14\\_flags.20140908.html](http://www.spec.org/mpi2007/flags/SGI_x86_64_Intel14_flags.20140908.html)

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

[http://www.spec.org/mpi2007/flags/SGI\\_x86\\_64\\_Intel14\\_flags.20140908.xml](http://www.spec.org/mpi2007/flags/SGI_x86_64_Intel14_flags.20140908.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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