



# SPEC® MPIM2007 Result

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## SGI

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

SPECmpim\_peak2007 = 115

SPECmpim\_base2007 = 112

MPI2007 license: 14

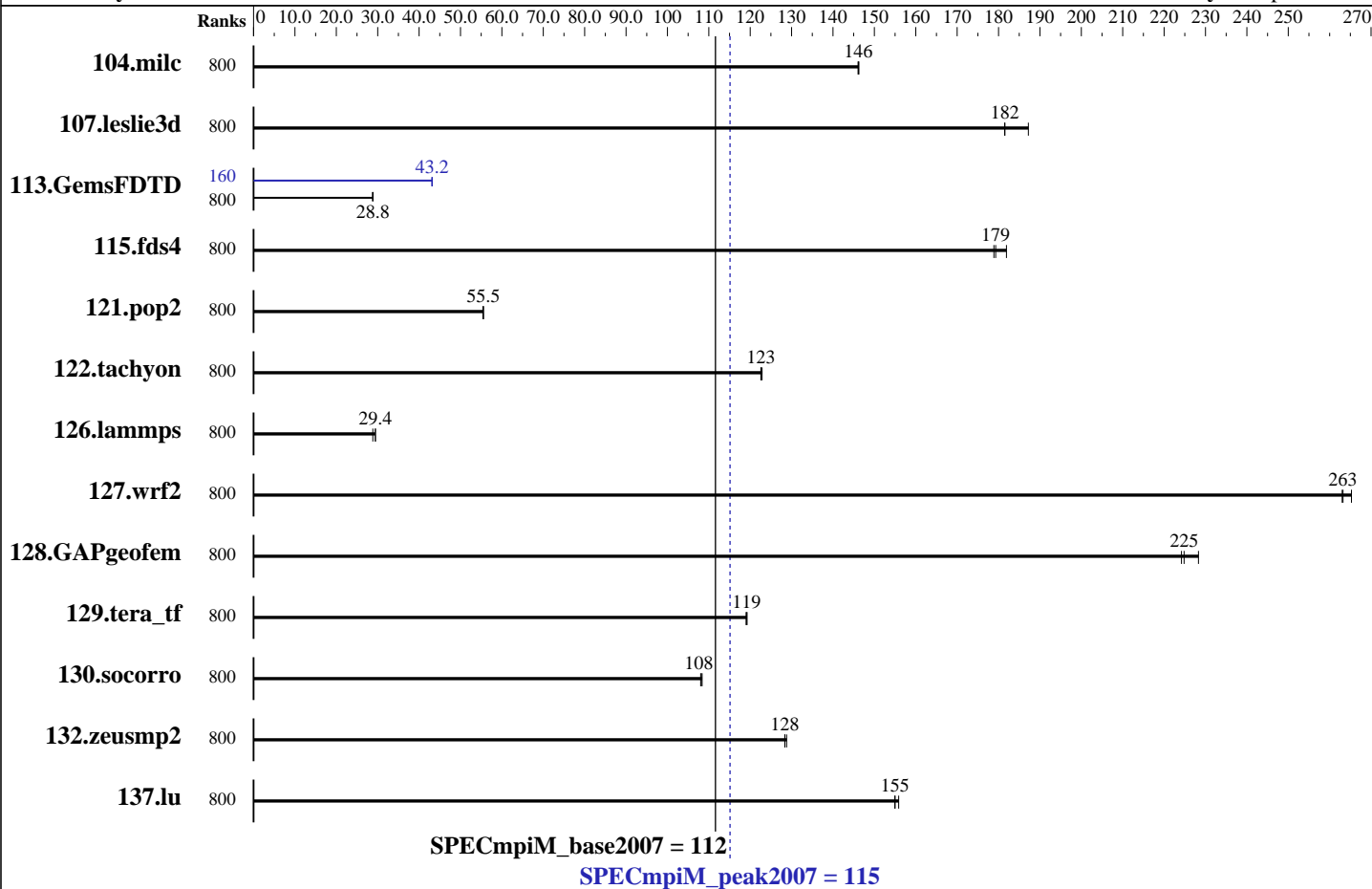
Test sponsor: SGI

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	800	10.7	146	<u>10.7</u>	<u>146</u>	10.7	146	800	10.7	146	<u>10.7</u>	<u>146</u>	10.7	146		
107.leslie3d	800	28.8	181	<u>28.8</u>	<u>182</u>	27.9	187	800	28.8	181	<u>28.8</u>	<u>182</u>	27.9	187		
113.GemsFDTD	800	<u>219</u>	<u>28.8</u>	219	28.8	219	28.8	160	<u>146</u>	<u>43.2</u>	146	43.2	146	43.1		
115.fds4	800	10.7	182	<u>10.9</u>	<u>179</u>	10.9	179	800	10.7	182	<u>10.9</u>	<u>179</u>	10.9	179		
121.pop2	800	<u>74.3</u>	<u>55.5</u>	74.3	55.5	74.5	55.4	800	<u>74.3</u>	<u>55.5</u>	74.3	55.5	74.5	55.4		
122.tachyon	800	22.8	123	22.8	123	<u>22.8</u>	<u>123</u>	800	22.8	123	22.8	123	<u>22.8</u>	<u>123</u>		
126.lammps	800	<u>99.1</u>	<u>29.4</u>	101	28.8	99.0	29.4	800	<u>99.1</u>	<u>29.4</u>	101	28.8	99.0	29.4		
127.wrf2	800	29.6	263	<u>29.6</u>	<u>263</u>	29.4	265	800	29.6	263	<u>29.6</u>	<u>263</u>	29.4	265		
128.GAPgeofem	800	9.04	228	<u>9.18</u>	<u>225</u>	9.21	224	800	9.04	228	<u>9.18</u>	<u>225</u>	9.21	224		
129.tera_tf	800	<u>23.2</u>	<u>119</u>	23.2	119	23.3	119	800	<u>23.2</u>	<u>119</u>	23.2	119	23.3	119		

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	800	<u>35.3</u>	<u>108</u>	35.3	108	35.2	108	800	<u>35.3</u>	<u>108</u>	35.3	108	35.2	108		
132.zeusmp2	800	<u>24.2</u>	<u>128</u>	24.1	129	24.2	128	800	<u>24.2</u>	<u>128</u>	24.1	129	24.2	128		
137.lu	800	<u>23.7</u>	<u>155</u>	23.7	155	23.6	156	800	<u>23.7</u>	<u>155</u>	23.7	155	23.6	156		

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: 40  
 Total Chips: 80  
 Total Cores: 960  
 Total Threads: 960  
 Total Memory: 5 TB  
 Base Ranks Run: 800  
 Minimum Peak Ranks: 160  
 Maximum Peak Ranks: 800

#### 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: 40  
 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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Test date: Jul-2014  
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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: 10  
Number of Ports: 36  
Data Rate: InfiniBand 4x FDR

#### Software

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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
export MPI_CONNECTIONS_THRESHOLD=0
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:

Ten ranks were assigned to each CPU chip, leaving 2 cores per chip idle. There were 10 switches used with a topologically compact configuration.

#### 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.

#### Peak run:

In the peak run, some benchmarks used different number of ranks from base. It is the only difference between base and peak.

### Compiler Invocation

C benchmarks:  
icc

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## Compiler Invocation (Continued)

C++ benchmarks:

126.lammps: icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

icc ifort

## 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

## Peak Optimization Flags

C benchmarks:

104.milc: basepeak = yes

122.tachyon: basepeak = yes

C++ benchmarks:

126.lammps: basepeak = yes

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## Peak Optimization Flags (Continued)

Fortran benchmarks:

107.leslie3d: basepeak = yes

113.GemsFDTD: -O3 -xCORE-AVX2 -no-prec-div

129.tera\_tf: basepeak = yes

137.lu: basepeak = yes

Benchmarks using both Fortran and C:

115.fds4: basepeak = yes

121.pop2: basepeak = yes

127.wrf2: basepeak = yes

128.GAPgeofem: basepeak = yes

130.socorro: basepeak = yes

132.zeusmp2: basepeak = yes

## Other Flags

C benchmarks:

-lmpi

C++ benchmarks:

126.lammps: -lmpi

Fortran benchmarks:

-lmpi

Benchmarks using both Fortran and C:

-lmpi

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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