



# SPEC® MPIM2007 Result

Copyright 2006-2010 Standard Performance Evaluation Corporation

## SGI

SGI Rackable C2112-4GP3  
(Intel Xeon E5-2699 v4, 2.20 GHz)

SPECmpiM\_peak2007 = Not Run

SPECmpiM\_base2007 = 86.8

MPI2007 license: 14

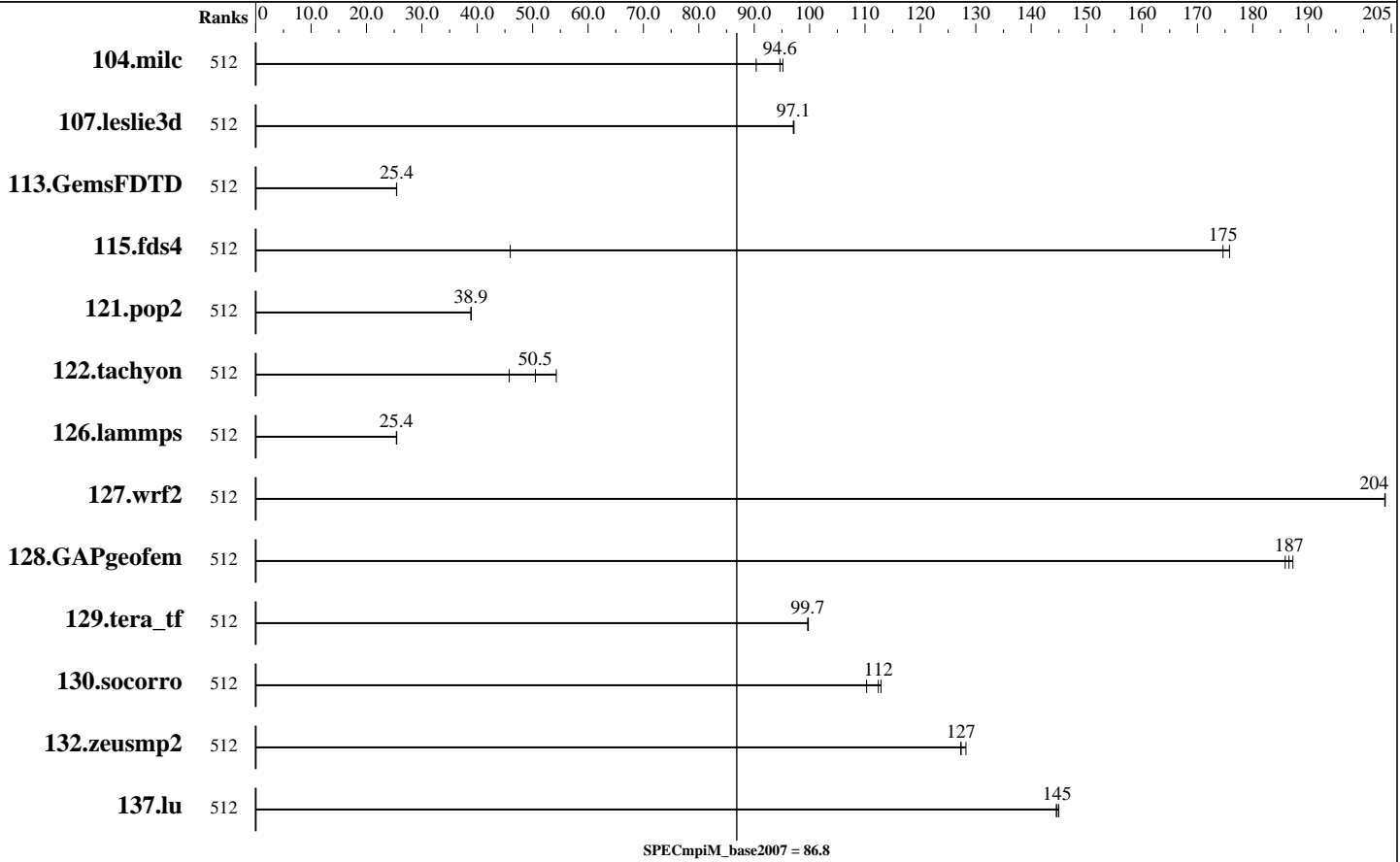
Test sponsor: SGI

Tested by: SGI

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: May-2016



## Results Table

Benchmark	Base								Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
104.milc	512	17.3	90.4	<b><u>16.5</u></b>	<b><u>94.6</u></b>	16.4	95.2									
107.leslie3d	512	<b><u>53.8</u></b>	<b><u>97.1</u></b>	53.8	97.1	53.7	97.2									
113.GemsFDTD	512	<b><u>248</u></b>	<b><u>25.4</u></b>	248	25.5	248	25.4									
115.fds4	512	11.1	176	42.5	46.0	<b><u>11.2</u></b>	<b><u>175</u></b>									
121.pop2	512	106	38.9	106	38.9	<b><u>106</u></b>	<b><u>38.9</u></b>									
122.tachyon	512	<b><u>55.4</u></b>	<b><u>50.5</u></b>	51.5	54.3	61.1	45.8									
126.lammps	512	114	25.5	115	25.4	<b><u>115</u></b>	<b><u>25.4</u></b>									
127.wrf2	512	38.2	204	38.2	204	<b><u>38.2</u></b>	<b><u>204</u></b>									
128.GAPgeofem	512	<b><u>11.1</u></b>	<b><u>187</u></b>	11.0	187	11.1	186									
129.tera_tf	512	27.8	99.7	<b><u>27.8</u></b>	<b><u>99.7</u></b>	27.7	99.8									

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



# SPEC MPIM2007 Result

Copyright 2006-2010 Standard Performance Evaluation Corporation

## SGI

SGI Rackable C2112-4GP3  
(Intel Xeon E5-2699 v4, 2.20 GHz)

SPECmpiM\_peak2007 = Not Run

SPECmpiM\_base2007 = 86.8

MPI2007 license: 14  
Test sponsor: SGI  
Tested by: SGI

Test date: Mar-2016  
Hardware Availability: Mar-2016  
Software Availability: May-2016

### Results Table (Continued)

Benchmark	Base								Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
130.socorro	512	34.6	110	33.8	113	<b>34.0</b>	<b>112</b>									
132.zeusmp2	512	24.4	127	24.2	128	<b>24.4</b>	<b>127</b>									
137.lu	512	25.4	145	<b>25.4</b>	<b>145</b>	25.4	145									

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 Rackable C2112-4GP3 Compute Node  
 Interconnects: InfiniBand MPI  
 InfiniBand I/O  
 File Server Node: SGI MIS Server  
 Total Compute Nodes: 16  
 Total Chips: 32  
 Total Cores: 704  
 Total Threads: 704  
 Total Memory: 2 TB  
 Base Ranks Run: 512  
 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 2.14  
 Other MPI Info: MLNX\_OFED\_LINUX-3.1-1.0.3  
 Pre-processors: None  
 Other Software: None

### Node Description: SGI Rackable C2112-4GP3 Compute Node

#### Hardware

Number of nodes: 16  
 Uses of the node: compute  
 Vendor: SGI  
 Model: SGI Rackable C2112-4GP3 (Intel Xeon E5-2699 v4,  
 2.20 GHz)  
 CPU Name: Intel Xeon E5-2699 v4  
 CPU(s) orderable: 1-2 chips  
 Chips enabled: 2  
 Cores enabled: 44  
 Cores per chip: 22  
 Threads per core: 1  
 CPU Characteristics: 22 Core, 2.20 GHz, 9.6 GT/s QPI  
 Intel Turbo Boost Technology up to 3.60 GHz  
 Hyper-Threading Technology disabled  
 CPU MHz: 2220  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core  
 L3 Cache: 55 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 128 GB (8 x 16 GB 2Rx4 PC4-2400T-R)  
 Disk Subsystem: None  
 Other Hardware: None  
 Adapter: Mellanox MT27620 with ConnectX-4  
 (PCIe x16 Gen3 8 GT/s)

#### Software

Adapter: Mellanox MT27620 with ConnectX-4  
 (PCIe x16 Gen3 8 GT/s)  
 Adapter Driver: OFED-3.1.1-0.3  
 Adapter Firmware: 12.12.1240  
 Adapter: Mellanox MT27500 with ConnectX-3  
 (PCIe x8 Gen3 8 GT/s)  
 Adapter Driver: OFED-3.1.1-0.0  
 Adapter Firmware: 2.35.5100  
 Operating System: SUSE Linux Enterprise Server 12 (x86\_64),  
 Kernel 3.12.44-52.10-default  
 Local File System: ext3  
 Shared File System: NFSv3 IPoIB  
 System State: Multi-user, run level 3  
 Other Software: SGI Tempo Service Node 3.2.0,  
 Build 713r26.sles12-1510192000

Continued on next page



# SPEC MPIM2007 Result

Copyright 2006-2010 Standard Performance Evaluation Corporation

## SGI

SPECmpiM\_peak2007 = Not Run

SGI Rackable C2112-4GP3  
(Intel Xeon E5-2699 v4, 2.20 GHz)

SPECmpiM\_base2007 = 86.8

MPI2007 license: 14

Test date: Mar-2016

Test sponsor: SGI

Hardware Availability: Mar-2016

Tested by: SGI

Software Availability: May-2016

### Node Description: SGI Rackable C2112-4GP3 Compute Node

Number of Adapters:	1
Slot Type:	PCIe x16 Gen3
Data Rate:	InfiniBand 4x EDR
Ports Used:	1
Interconnect Type:	InfiniBand
Adapter:	Mellanox MT27500 with ConnectX-3 (PCIe x8 Gen3 8 GT/s)
Number of Adapters:	1
Slot Type:	PCIe x8 Gen3
Data Rate:	InfiniBand 4x FDR
Ports Used:	1
Interconnect Type:	InfiniBand

### Node Description: SGI MIS Server

Hardware	
Number of nodes:	1
Uses of the node:	fileserver
Vendor:	SGI
Model:	SGI MIS Server (Intel Xeon X2670, 2.60 GHz)
CPU Name:	Intel Xeon E5-2670
CPU(s) orderable:	1-2 chips
Chips enabled:	2
Cores enabled:	16
Cores per chip:	8
Threads per core:	2
CPU Characteristics:	Intel Turbo Boost Technology up to 3.30 GHz Hyper-Threading Technology enabled
CPU MHz:	2601
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core
L3 Cache:	20 MB I+D on chip per chip
Other Cache:	None
Memory:	128 GB (8 * 16 GB 2Rx4 PC3-10600R-9, ECC)
Disk Subsystem:	45 TB RAID 6 12 x 1 TB SATA (Seagate Constellation, 7200RPM)
Other Hardware:	None
Adapter:	Mellanox MT27500 with ConnectX-3 ASIC
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
Adapter Driver:	MLNX_OFED_LINUX-3.1-1.0.3
Adapter Firmware:	2.35.5100
Operating System:	SUSE Linux Enterprise Server 11 SP3 (x86_64), Kernel 3.0.101-0.46-default
Local File System:	xfs
Shared File System:	--
System State:	Multi-user, run level 5
Other Software:	SGI Foundation Software 2.10 Build 710r16.sles11sp3-1404092103



# SPEC MPIM2007 Result

Copyright 2006-2010 Standard Performance Evaluation Corporation

## SGI

SGI Rackable C2112-4GP3  
(Intel Xeon E5-2699 v4, 2.20 GHz)

SPECmpiM\_peak2007 = Not Run

SPECmpiM\_base2007 = 86.8

MPI2007 license: 14

Test sponsor: SGI

Tested by: SGI

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: May-2016

### Interconnect Description: InfiniBand MPI

Hardware		Software
Vendor:	Mellanox Technologies	
Model:	None	
Switch Model:	Mellanox SB7790	
Number of Switches:	6	
Number of Ports:	36	
Data Rate:	InfiniBand 4x EDR	
Firmware:	11.1.102	
Topology:	Fat Tree	
Primary Use:	MPI traffic	

### Interconnect Description: InfiniBand I/O

Hardware		Software
Vendor:	Mellanox Technologies	
Model:	None	
Switch Model:	Mellanox MSX6036F-1SFS	
Number of Switches:	2	
Number of Ports:	36	
Data Rate:	InfiniBand 4x FDR	
Firmware:	9.3.5080	
Switch Model:	Mellanox MSX6025	
Number of Switches:	4	
Number of Ports:	36	
Data Rate:	InfiniBand 4x FDR	
Firmware:	9.3.6000	
Topology:	Fat Tree	
Primary Use:	I/O traffic	

### Submit Notes

The config file option 'submit' was used.

### General Notes

130.socorro (base): "nullify\_ptrs" src.alt was used.

129.tera\_tf (base): "add\_rank\_support" src.alt was used.

Software environment:

```
export MPI_REQUEST_MAX=65536
export MPI_TYPE_MAX=32768
export MPI_IB_DEVS=1
export MPI_CONNECTIONS_THRESHOLD=0
export MPI_IB_UPGRADE_SENDS=50
export MPI_IB_IMM_UPGRADE=false
```

Continued on next page



# SPEC MPIM2007 Result

Copyright 2006-2010 Standard Performance Evaluation Corporation

## SGI

SGI Rackable C2112-4GP3  
(Intel Xeon E5-2699 v4, 2.20 GHz)

SPECmpiM\_peak2007 = Not Run

SPECmpiM\_base2007 = 86.8

MPI2007 license: 14

Test sponsor: SGI

Tested by: SGI

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: May-2016

## General Notes (Continued)

```
export MPI_IB_HYPER_LAZY=false
ulimit -s unlimited
```

### BIOS settings:

```
AMI BIOS version T20151001184140
Hyper-Threading Technology disabled
Transparent HugePages enabled
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:

Sixteen ranks were assigned to each CPU chip, leaving 6 cores per chip idle. Each MPI job was assigned to a topologically compact set of nodes, i.e. the minimal number of leaf switches was used for each job: 1 switch for up to 32 sockets, and 2 switches for up to 64 sockets.

### 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 is restricted to the other plane.

## Base Compiler Invocation

### C benchmarks:

```
icc
```

### C++ benchmarks:

```
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
130.socorro: -assume nostd_intent_in
```



# SPEC MPIM2007 Result

Copyright 2006-2010 Standard Performance Evaluation Corporation

## SGI

SGI Rackable C2112-4GP3  
(Intel Xeon E5-2699 v4, 2.20 GHz)

SPECmpiM\_peak2007 = Not Run

SPECmpiM\_base2007 = 86.8

MPI2007 license: 14

Test sponsor: SGI

Tested by: SGI

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: May-2016

## 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

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)

SPEC and SPEC MPI are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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.

Report generated on Thu Mar 31 11:05:53 2016 by SPEC MPI2007 PS/PDF formatter v1463.

Originally published on 31 March 2016.