



SPEC® MPIM2007 Result

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SGI

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

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 55.9

MPI2007 license: 14

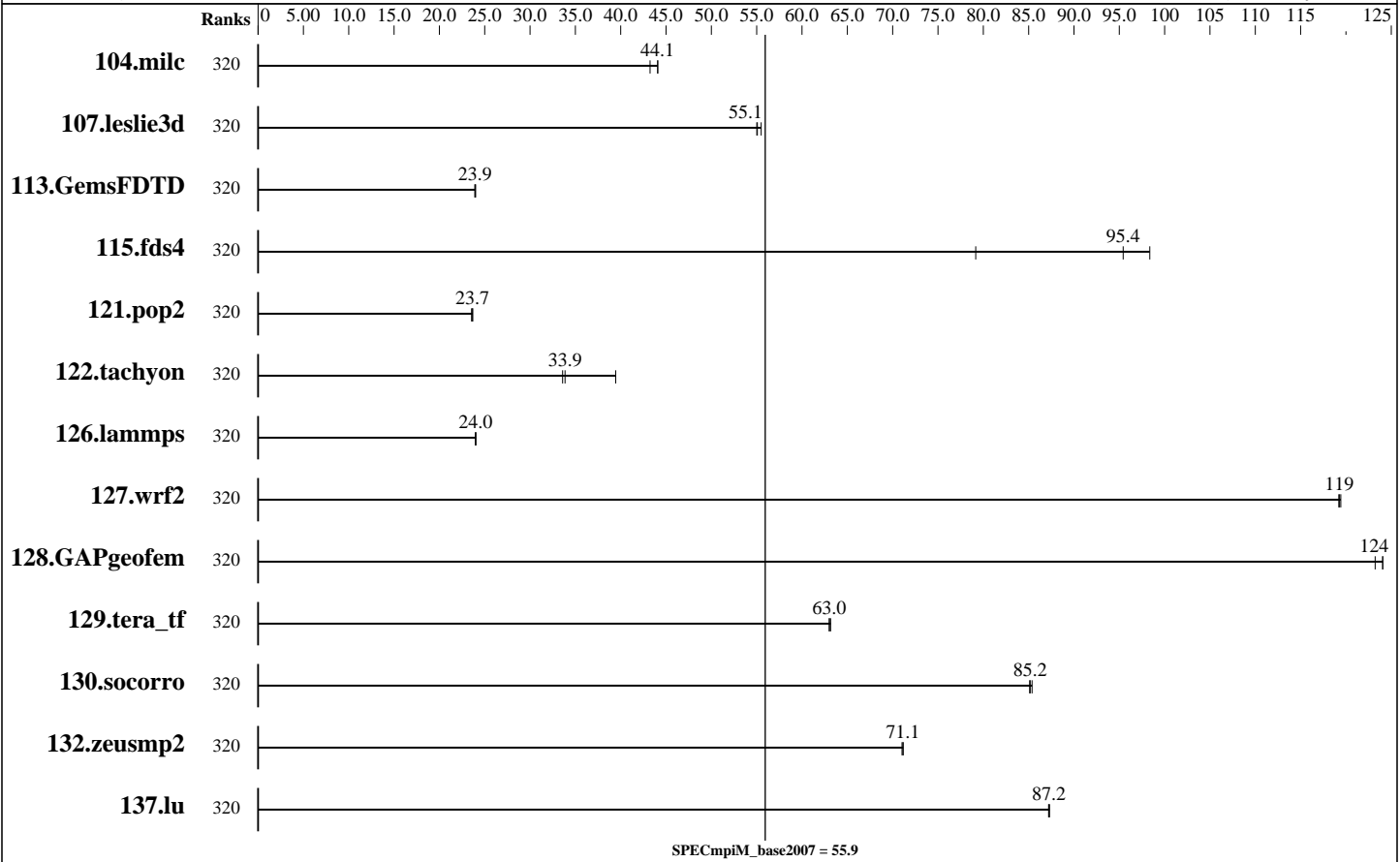
Test sponsor: SGI

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	320	36.2	43.2	35.5	44.1	<u>35.5</u>	<u>44.1</u>							
107.leslie3d	320	<u>94.8</u>	<u>55.1</u>	94.9	55.0	94.1	55.5							
113.GemsFDTD	320	263	24.0	264	23.9	<u>263</u>	<u>23.9</u>							
115.fds4	320	19.8	98.4	24.6	79.2	<u>20.4</u>	<u>95.4</u>							
121.pop2	320	174	23.7	175	23.5	<u>175</u>	<u>23.7</u>							
122.tachyon	320	<u>82.6</u>	<u>33.9</u>	70.9	39.5	83.3	33.6							
126.lammps	320	<u>122</u>	<u>24.0</u>	122	24.0	121	24.0							
127.wrf2	320	65.4	119	<u>65.4</u>	<u>119</u>	65.3	119							
128.GAPgeofem	320	16.6	124	16.8	123	<u>16.6</u>	<u>124</u>							
129.tera_tf	320	43.9	63.0	<u>43.9</u>	<u>63.0</u>	43.8	63.2							

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	320	44.7	85.4	44.8	85.1	44.8	85.2							
132.zeusmp2	320	43.6	71.2	43.6	71.1	43.7	71.0							
137.lu	320	42.1	87.3	42.1	87.2	42.2	87.2							

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: 8
 Total Chips: 16
 Total Cores: 352
 Total Threads: 352
 Total Memory: 1 TB
 Base Ranks Run: 320
 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: 8
 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

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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



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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

```

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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:

Twenty ranks were assigned to each CPU chip, leaving 2 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
```



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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

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

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

Tested with SPEC MPI2007 v2.0.1.

Report generated on Thu Mar 31 11:05:45 2016 by SPEC MPI2007 PS/PDF formatter v1463.

Originally published on 31 March 2016.