



SPEC® MPIM2007 Result

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SGI

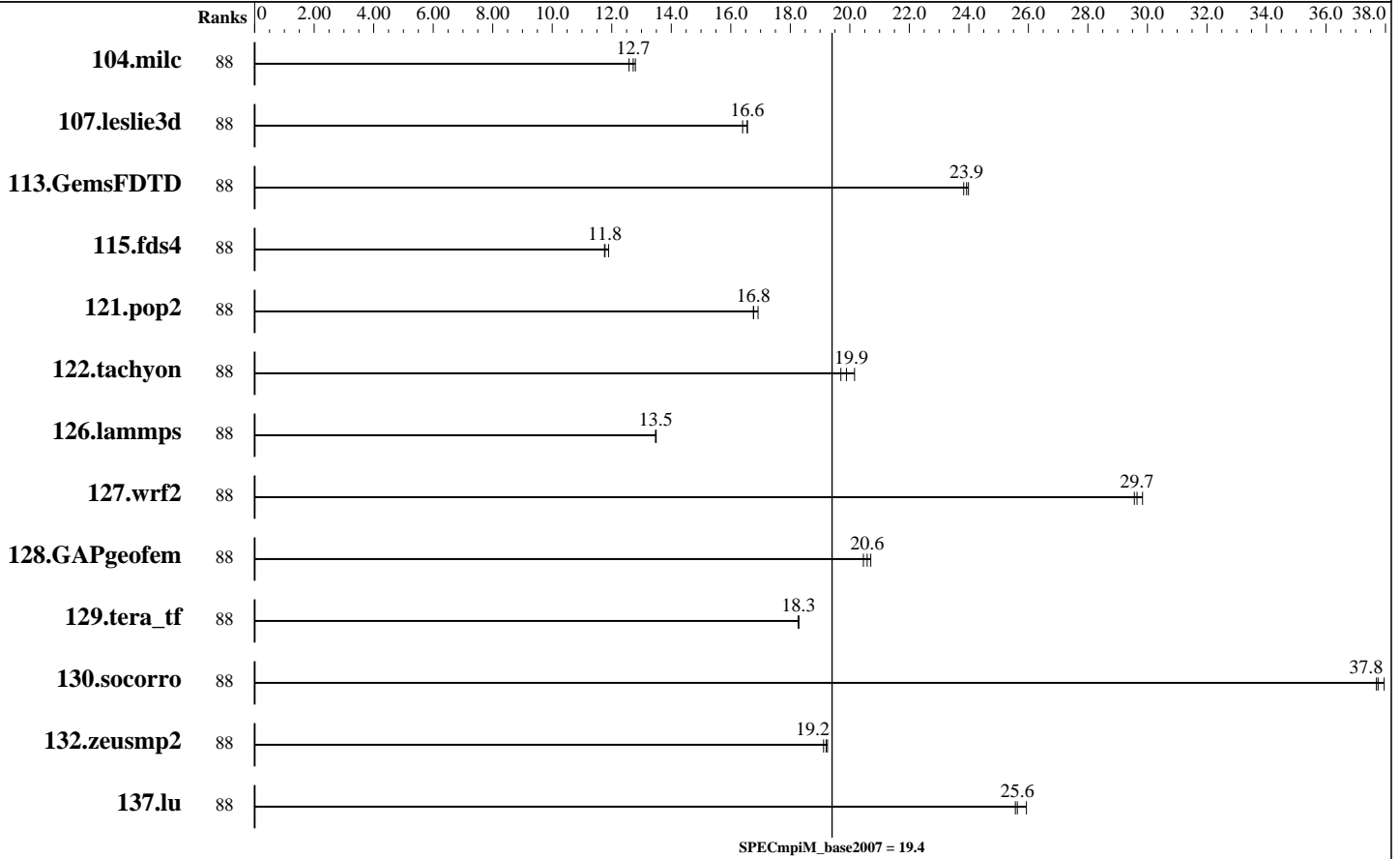
SGI Rackable C2112-4GP3
(Intel Xeon E5-2699 v4, 2.20 GHz)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 19.4

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	88	124	12.6	<u>123</u>	<u>12.7</u>	122	12.8									
107.leslie3d	88	318	16.4	315	16.6	<u>315</u>	<u>16.6</u>									
113.GemsFDTD	88	263	24.0	<u>264</u>	<u>23.9</u>	265	23.8									
115.fds4	88	166	11.8	164	11.9	<u>166</u>	<u>11.8</u>									
121.pop2	88	<u>246</u>	<u>16.8</u>	246	16.8	244	16.9									
122.tachyon	88	142	19.7	139	20.2	<u>141</u>	<u>19.9</u>									
126.lammmps	88	216	13.5	216	13.5	<u>216</u>	<u>13.5</u>									
127.wrf2	88	264	29.6	261	29.8	<u>263</u>	<u>29.7</u>									
128.GAPgeofem	88	101	20.5	99.7	20.7	<u>100</u>	<u>20.6</u>									
129.tera_tf	88	152	18.3	151	18.3	<u>151</u>	<u>18.3</u>									

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	88	<u>101</u>	<u>37.8</u>	101	37.7	101	38.0							
132.zeusmp2	88	<u>162</u>	<u>19.2</u>	161	19.2	162	19.1							
137.lu	88	142	25.9	144	25.6	<u>143</u>	<u>25.6</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 Rackable C2112-4GP3 Compute Node
 Interconnects: InfiniBand MPI
 InfiniBand I/O
 File Server Node: SGI MIS Server
 Total Compute Nodes: 2
 Total Chips: 4
 Total Cores: 88
 Total Threads: 88
 Total Memory: 256 GB
 Base Ranks Run: 88
 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: 2
 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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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:

Each MPI job was assigned to a topologically compact set of nodes, i.e. the minimal needed 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.

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