



SPEC® MPIM2007 Result

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SGI

SPECmpiM_peak2007 = 103

SGI ICE X (Intel Xeon E5-2690 v2, 3.0 GHz)

SPECmpiM_base2007 = 100

MPI2007 license: 4

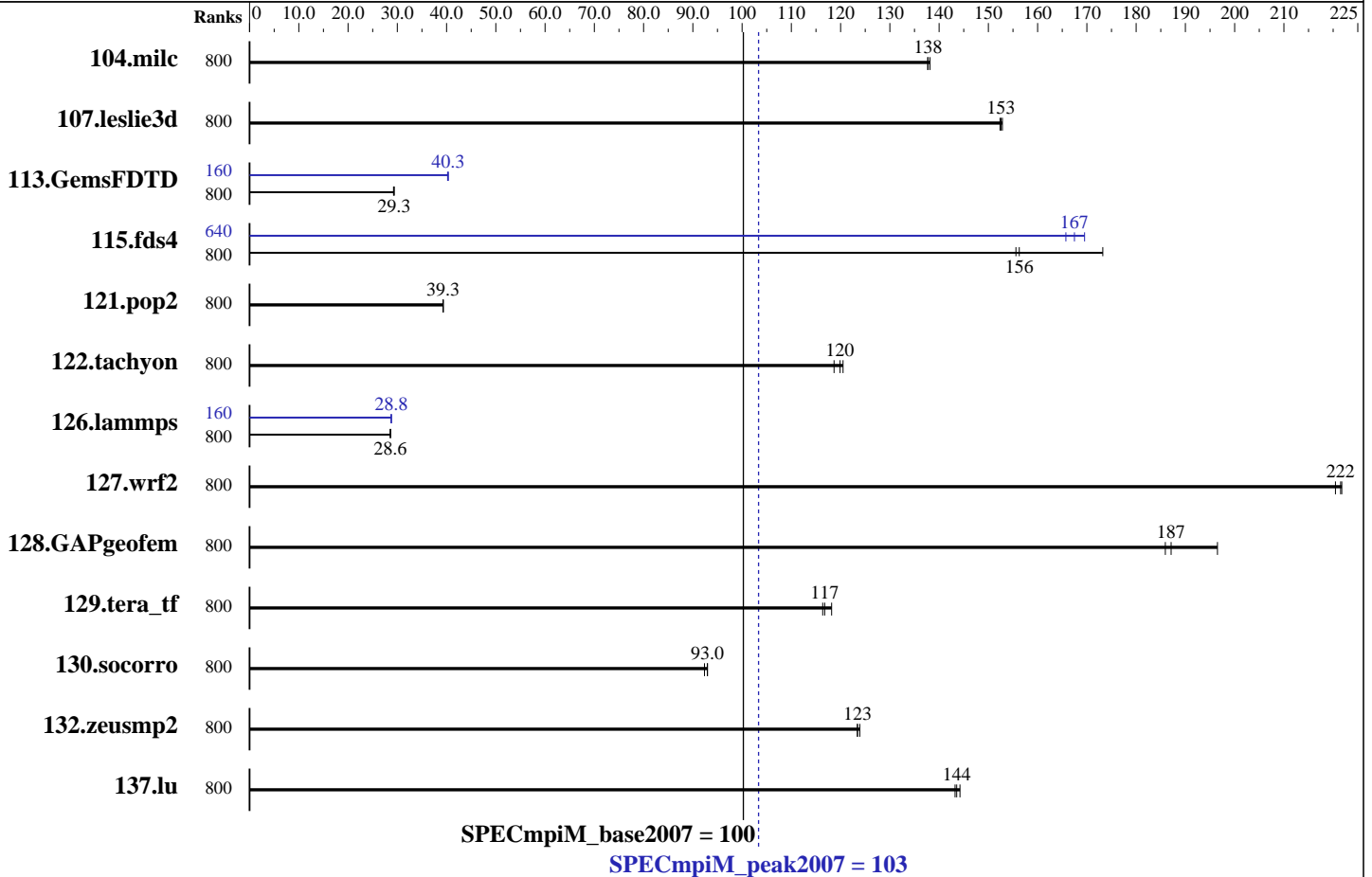
Test sponsor: SGI

Tested by: SGI

Test date: Dec-2013

Hardware Availability: Sep-2013

Software Availability: Nov-2013



Results Table

Benchmark	Base								Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
104.milc	800	<u>11.4</u>	<u>138</u>	11.4	138	11.3	138	800	<u>11.4</u>	<u>138</u>	11.4	138	11.3	138		
107.leslie3d	800	<u>34.2</u>	<u>153</u>	34.2	153	34.3	152	800	<u>34.2</u>	<u>153</u>	34.2	153	34.3	152		
113.GemsFDTD	800	215	29.4	216	29.2	<u>215</u>	<u>29.3</u>	160	156	40.3	<u>156</u>	<u>40.3</u>	157	40.2		
115.fds4	800	12.5	156	11.3	173	<u>12.5</u>	<u>156</u>	640	<u>11.6</u>	<u>167</u>	11.5	170	11.8	166		
121.pop2	800	105	39.3	105	39.4	<u>105</u>	<u>39.3</u>	800	105	39.3	105	39.4	<u>105</u>	<u>39.3</u>		
122.tachyon	800	23.2	120	23.6	119	<u>23.3</u>	<u>120</u>	800	23.2	120	23.6	119	<u>23.3</u>	<u>120</u>		
126.lammps	800	102	28.6	<u>102</u>	<u>28.6</u>	102	28.6	160	102	28.7	101	28.8	<u>101</u>	<u>28.8</u>		
127.wrf2	800	<u>35.2</u>	<u>222</u>	35.4	220	35.2	222	800	<u>35.2</u>	<u>222</u>	35.4	220	35.2	222		
128.GAPgeofem	800	10.5	197	<u>11.0</u>	<u>187</u>	11.1	186	800	10.5	197	<u>11.0</u>	<u>187</u>	11.1	186		
129.tera_tf	800	23.8	116	23.4	118	<u>23.7</u>	<u>117</u>	800	23.8	116	23.4	118	<u>23.7</u>	<u>117</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	800	<u>41.1</u>	<u>93.0</u>	41.1	93.0	41.3	92.4	800	<u>41.1</u>	<u>93.0</u>	41.1	93.0	41.3	92.4
132.zeusmp2	800	<u>25.1</u>	<u>123</u>	25.0	124	25.1	123	800	<u>25.1</u>	<u>123</u>	25.0	124	25.1	123
137.lu	800	<u>25.6</u>	<u>144</u>	25.5	144	25.7	143	800	<u>25.6</u>	<u>144</u>	25.5	144	25.7	143

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-113 Compute Node
 Interconnect: InfiniBand (MPI and I/O)
 File Server Node: SGI Modular InfiniteStorage Server
 Total Compute Nodes: 40
 Total Chips: 80
 Total Cores: 800
 Total Threads: 1600
 Total Memory: 2560 GB
 Base Ranks Run: 800
 Minimum Peak Ranks: 160
 Maximum Peak Ranks: 800

Software Summary

C Compiler: Intel C++ Composer XE 2011 for Linux, Version 14.0.0.080 Build 20130728
 C++ Compiler: Intel C++ Composer XE 2011 for Linux, Version 14.0.0.080 Build 20130728
 Fortran Compiler: Intel Fortran Composer XE 2011 for Linux, Version 14.0.0.080 Build 20130728
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 MPI Library: SGI MPT 2.09
 Other MPI Info: OFED 1.5.2
 Pre-processors: None
 Other Software: None

Node Description: SGI ICE X IP-113 Compute Node

Hardware

Number of nodes: 40
 Uses of the node: compute
 Vendor: SGI
 Model: SGI ICE X IP-113 (Intel Xeon E5-2690 v2, 3.0 GHz)
 CPU Name: Intel Xeon E5-2690 v2
 CPU(s) orderable: 1-2 chips
 Chips enabled: 2
 Cores enabled: 20
 Cores per chip: 10
 Threads per core: 2
 CPU Characteristics: Ten Core, 3.0 GHz, 8.0 GT/s QPI
 Intel Turbo Boost Technology up to 3.60 GHz
 Hyper-Threading Technology enabled
 CPU MHz: 3000
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 256 KB I+D on chip per core
 L3 Cache: 25 MB I+D on chip per chip
 Other Cache: None
 Memory: 64 GB (8 x 8 GB 2Rx4 PC3-14900R-13, 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-1.5.2
 Adapter Firmware: 2.11.312
 Operating System: SUSE Linux Enterprise Server 11 SP2, Kernel 3.0.80-0.7-default
 Local File System: NFSv3
 Shared File System: NFSv3 IPoIB
 System State: Multi-user, run level 3
 Other Software: SGI Tempo Compute Node 2.7.3, Build 708rp14.sles11sp2-1305311204

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Tested by: SGI

Test date: Dec-2013

Hardware Availability: Sep-2013

Software Availability: Nov-2013

Node Description: SGI ICE X IP-113 Compute Node

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

Node Description: SGI Modular InfiniteStorage Server

Hardware

Number of nodes: 1
Uses of the node: fileserver
Vendor: SGI
Model: SGI Modular InfiniteStorage Server
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 3.33 GHz
Hyper-Threading Technology enabled
CPU MHz: 2600
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per chip
L3 Cache: 20 MB I+D on chip per chip
Other Cache: None
Memory: 128 GB (8 * 16 GB 2Rx4 PC3-12800R-11, ECC)
Disk Subsystem: 64.8 TB RAID 6
72 x 900 GB SAS (Western Digital, 10K RPM)
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-1.5.0
Adapter Firmware: 2.11.312
Operating System: SUSE Linux Enterprise Server 11 SP3
Kernel
Local File System: xfs
Shared File System: --
System State: Multi-user, run level 3
Other Software: SGI Foundation Software 2.9,
Build 700r3.sles11-1004061553

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: 12
Number of Ports: 36
Data Rate: InfiniBand 4x FDR

Software

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Interconnect Description: InfiniBand (MPI and I/O)

Firmware: 07130007_LL2 and 08130007_LL2
Topology: Enhanced Hypercube
Primary Use: MPI and I/O traffic

Submit Notes

The config file option 'submit' was used.

General Notes

130.socorro (base): "nullify_ptrs" src.alt was used.

Software environment:

```
export MPI_REQUEST_MAX=65536
export MPI_TYPE_MAX=32768
export MPI_BUFS_THRESHOLD=1
export MPI_IB_RAILS=2
export MPI_CONNECTIONS_THRESHOLD=0
ulimit -s unlimited
```

BIOS settings:

```
AMI BIOS version 3.0
Hyper-Threading Technology enabled (default)
Intel Turbo Boost Technology enabled (default)
Intel Turbo Boost Technology activated in the OS via
/etc/init.d/acpid start
/etc/init.d/powersaved start
powersave -f
```

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 180 ranks, 4 switches for up to 320 ranks, 8 switches for 640 ranks, 10 switches for 800 ranks, 16 switches for 1280 ranks, 22 switches for 1920 ranks, and 30 switches for 2560 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.

Peak run:

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



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Compiler Invocation

C benchmarks:

icc

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 -xAVX -no-prec-div

C++ benchmarks:

126.lammps: -O3 -xAVX -no-prec-div -ansi-alias

Fortran benchmarks:

-O3 -xAVX -no-prec-div

Benchmarks using both Fortran and C:

-O3 -xAVX -no-prec-div

Peak Optimization Flags

C benchmarks:

104.milc: basepeak = yes

122.tachyon: basepeak = yes

C++ benchmarks:

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Peak Optimization Flags (Continued)

126.lammps: -O3 -xAVX -no-prec-div -ansi-alias

Fortran benchmarks:

107.leslie3d: basepeak = yes

113.GemsFDTD: -O3 -xAVX -no-prec-div

129.tera_tf: basepeak = yes

137.lu: basepeak = yes

Benchmarks using both Fortran and C:

115.fds4: -O3 -xAVX -no-prec-div

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.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.xml



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For other inquiries, please contact webmaster@spec.org.

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