



SPEC[®] MPIM2007 Result

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SGI

SGI Altix ICE 8400EX
(Intel Xeon X5690, 3.46 GHz)

SPECmpiM_peak2007 = 76.1

SPECmpiM_base2007 = 73.1

MPI2007 license: 4

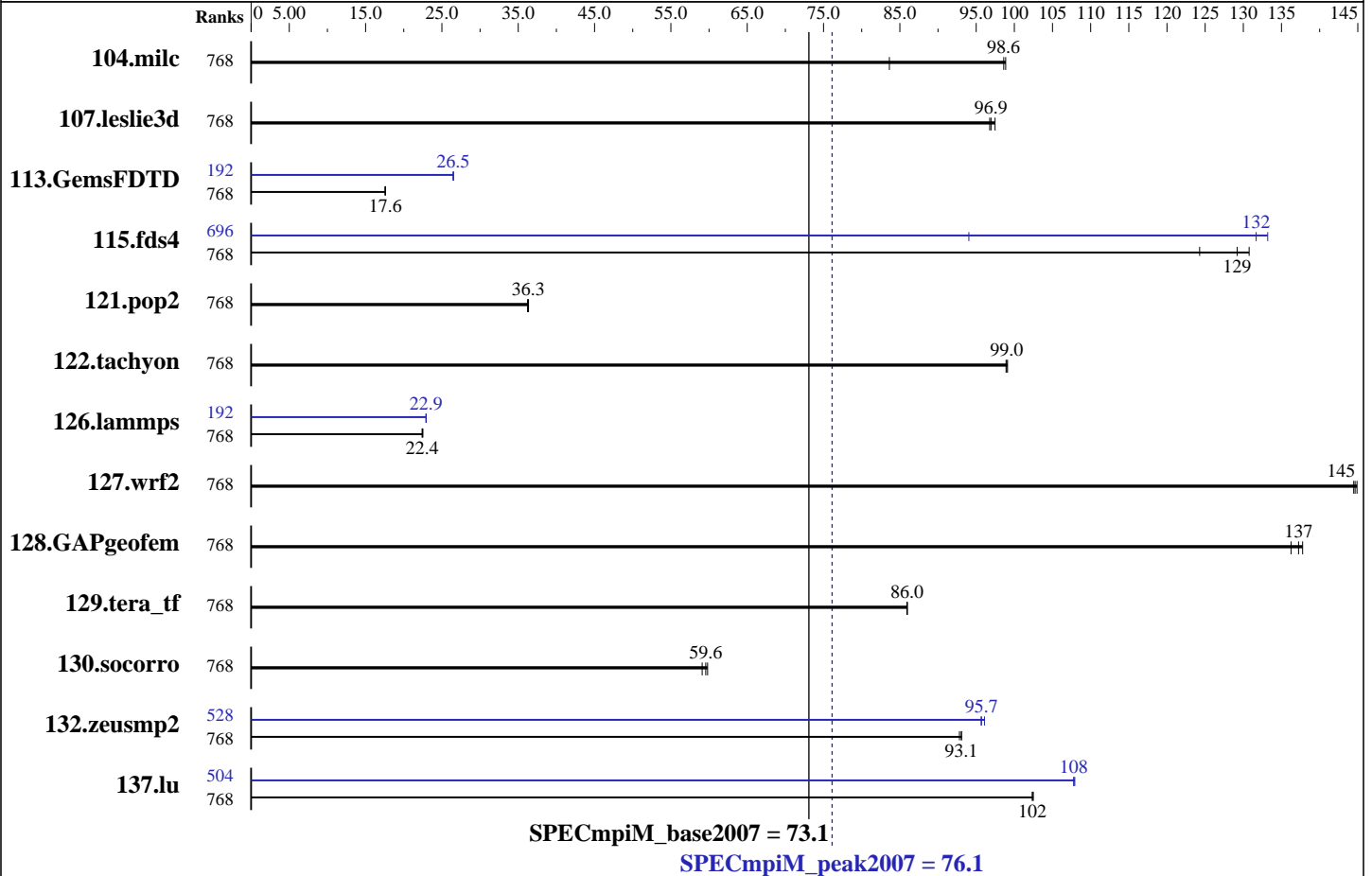
Test sponsor: SGI

Tested by: SGI

Test date: Jun-2011

Hardware Availability: Feb-2011

Software Availability: Aug-2011



Results Table

Benchmark	Base								Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
104.milc	768	18.7	83.6	15.8	98.9	<u>15.9</u>	<u>98.6</u>	768	18.7	83.6	15.8	98.9	<u>15.9</u>	<u>98.6</u>		
107.leslie3d	768	<u>53.8</u>	<u>96.9</u>	53.9	96.8	53.6	97.5	768	<u>53.8</u>	<u>96.9</u>	53.9	96.8	53.6	97.5		
113.GemsFDTD	768	360	17.5	358	17.6	<u>359</u>	<u>17.6</u>	192	<u>238</u>	<u>26.5</u>	238	26.5	238	26.5		
115.fds4	768	14.9	131	15.7	124	<u>15.1</u>	<u>129</u>	696	14.6	133	20.7	94.0	<u>14.8</u>	<u>132</u>		
121.pop2	768	114	36.3	<u>114</u>	<u>36.3</u>	114	36.2	768	114	36.3	<u>114</u>	<u>36.3</u>	114	36.2		
122.tachyon	768	28.2	99.1	<u>28.3</u>	<u>99.0</u>	28.3	98.9	768	28.2	99.1	<u>28.3</u>	<u>99.0</u>	28.3	98.9		
126.lammps	768	130	22.4	<u>130</u>	<u>22.4</u>	129	22.5	192	127	22.9	127	22.9	<u>127</u>	<u>22.9</u>		
127.wrf2	768	<u>53.9</u>	<u>145</u>	53.8	145	54.0	144	768	<u>53.9</u>	<u>145</u>	53.8	145	54.0	144		
128.GAPgeofem	768	15.2	136	<u>15.0</u>	<u>137</u>	15.0	138	768	15.2	136	<u>15.0</u>	<u>137</u>	15.0	138		
129.tera_tf	768	32.2	86.0	<u>32.2</u>	<u>86.0</u>	32.2	85.9	768	32.2	86.0	<u>32.2</u>	<u>86.0</u>	32.2	85.9		

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	768	63.8	59.8	64.1	59.6	64.6	59.1	768	63.8	59.8	64.1	59.6	64.6	59.1		
132.zeusmp2	768	33.3	93.1	33.3	93.1	33.4	92.8	528	32.4	95.6	32.4	95.7	32.3	96.1		
137.lu	768	35.9	102	35.9	102	35.9	102	504	34.1	108	34.1	108	34.1	108		

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 Altix ICE 8400EX Compute Node
 Interconnect: InfiniBand (MPI and I/O)
 File Server Node: SGI InfiniteStorage Nexis 2000 NAS
 Total Compute Nodes: 64
 Total Chips: 128
 Total Cores: 768
 Total Threads: 1536
 Total Memory: 1536 GB
 Base Ranks Run: 768
 Minimum Peak Ranks: 192
 Maximum Peak Ranks: 768

Software Summary

C Compiler: Intel C++ Composer XE 2011 for Linux, Version 12.0.3.174 Build 20110309
 C++ Compiler: Intel C++ Composer XE 2011 for Linux, Version 12.0.3.174 Build 20110309
 Fortran Compiler: Intel Fortran Composer XE 2011 for Linux, Version 12.0.3.174 Build 20110309
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 MPI Library: SGI MPT 2.04 Patch 10789
 Other MPI Info: OFED 1.4.2
 Pre-processors: None
 Other Software: None

Node Description: SGI Altix ICE 8400EX Compute Node

Hardware

Number of nodes: 64
 Uses of the node: compute
 Vendor: SGI
 Model: SGI Altix ICE 8400EX (Intel Xeon X5690, 3.46 GHz)
 CPU Name: Intel Xeon X5690
 CPU(s) orderable: 1-2 chips
 Chips enabled: 2
 Cores enabled: 12
 Cores per chip: 6
 Threads per core: 2
 CPU Characteristics: Six Core, 3.46 GHz, 6.4 GT/s QPI
 Intel Turbo Boost Technology up to 3.73 GHz
 Hyper-Threading Technology enabled
 CPU MHz: 3467
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 256 KB I+D on chip per core
 L3 Cache: 12 MB I+D on chip per chip
 Other Cache: None
 Memory: 24 GB (6 x 4 GB 2Rx4 PC3-10600R-9, ECC)
 Disk Subsystem: None
 Other Hardware: None
 Adapter: Mellanox MT26428 ConnectX IB QDR (PCIe x8 Gen2 5 GT/s)
 Number of Adapters: 2
 Slot Type: PCIe x8 Gen2

Software

Adapter: Mellanox MT26428 ConnectX IB QDR (PCIe x8 Gen2 5 GT/s)
 Adapter Driver: OFED-1.4.2
 Adapter Firmware: 2.7.8200
 Operating System: SUSE Linux Enterprise Server 11 SP1, Kernel 2.6.32.13-0.4-default
 Local File System: NFSv3
 Shared File System: NFSv3 IPoIB
 System State: Multi-user, run level 3
 Other Software: SGI ProPack 7SP1 for Linux, Build 701r3.sles11-1005252113
 SGI Tempo Compute Node 2.1, Build 701r3.sles11-1005252113

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Software Availability: Aug-2011

Node Description: SGI Altix ICE 8400EX Compute Node

Data Rate: InfiniBand 4x QDR
Ports Used: 1
Interconnect Type: InfiniBand

Node Description: SGI InfiniteStorage Nexis 2000 NAS

Hardware

Number of nodes: 1
Uses of the node: fileserver
Vendor: SGI
Model: SGI Altix XE 270 (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 DDR3-1333 CL9 DIMMs)
Disk Subsystem: 8.8 TB RAID 5
60 x 146 GB SAS (Seagate Cheetah 15K.5)
Other Hardware: None
Adapter: Mellanox MT26428 ConnectX IB QDR
(PCIe x8 Gen2 5 GT/s)
Number of Adapters: 2
Slot Type: PCIe x8 Gen2
Data Rate: InfiniBand 4x QDR
Ports Used: 2
Interconnect Type: InfiniBand

Software

Adapter: Mellanox MT26428 ConnectX IB QDR
(PCIe x8 Gen2 5 GT/s)
Adapter Driver: OFED-1.4.0
Adapter Firmware: 2.7.0
Operating System: SUSE Linux Enterprise Server 11 (x86_64)
Kernel 2.6.27.19-5-default
Local File System: xfs
Shared File System: --
System State: Multi-user, run level 3
Other Software: SGI Foundation Software 2, Build
700r3.sles11-1004061553

Interconnect Description: InfiniBand (MPI and I/O)

Hardware

Vendor: Mellanox Technologies and SGI
Model: None
Switch Model: SGI QDR_1.5_HYPR_2454 with Mellanox Device 48438
(Infiniscale IV)
Number of Switches: 16
Number of Ports: 36
Data Rate: InfiniBand 4x QDR

Software

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Interconnect Description: InfiniBand (MPI and I/O)

Firmware: 5040005
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_BUFS_THRESHOLD=1
export MPI_IB_RAILS=2
ulimit -s unlimited
```

BIOS settings:

```
AMI BIOS version 080016
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 96 ranks, 4 switches for 192 ranks, 8 switches for 384 ranks, 16 switches for 768 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

Base Optimization Flags

C benchmarks:
-O3 -xSSE4.2 -no-prec-div

C++ benchmarks:
126.lammps: -O3 -xSSE4.2 -no-prec-div -ansi-alias

Fortran benchmarks:
-O3 -xSSE4.2 -no-prec-div

Benchmarks using both Fortran and C:
-O3 -xSSE4.2 -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 -xSSE4.2 -no-prec-div -ansi-alias

Fortran benchmarks:

107.leslie3d: basepeak = yes

113.GemsFDTD: -O3 -xSSE4.2 -no-prec-div

129.tera_tf: basepeak = yes

137.lu: Same as 113.GemsFDTD

Benchmarks using both Fortran and C:

115.fds4: -O3 -xSSE4.2 -no-prec-div

121.pop2: basepeak = yes

127.wrf2: basepeak = yes

128.GAPgeofem: basepeak = yes

130.socorro: basepeak = yes

132.zeusmp2: Same as 115.fds4

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_Intel12_flags.html

You can also download the XML flags source by saving the following link:

http://www.spec.org/mpi2007/flags/SGI_x86_64_Intel12_flags.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 Tue Jul 22 13:42:53 2014 by SPEC MPI2007 PS/PDF formatter v1463.
Originally published on 14 July 2011.