SPEC® MPIM2007 Result

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SGI

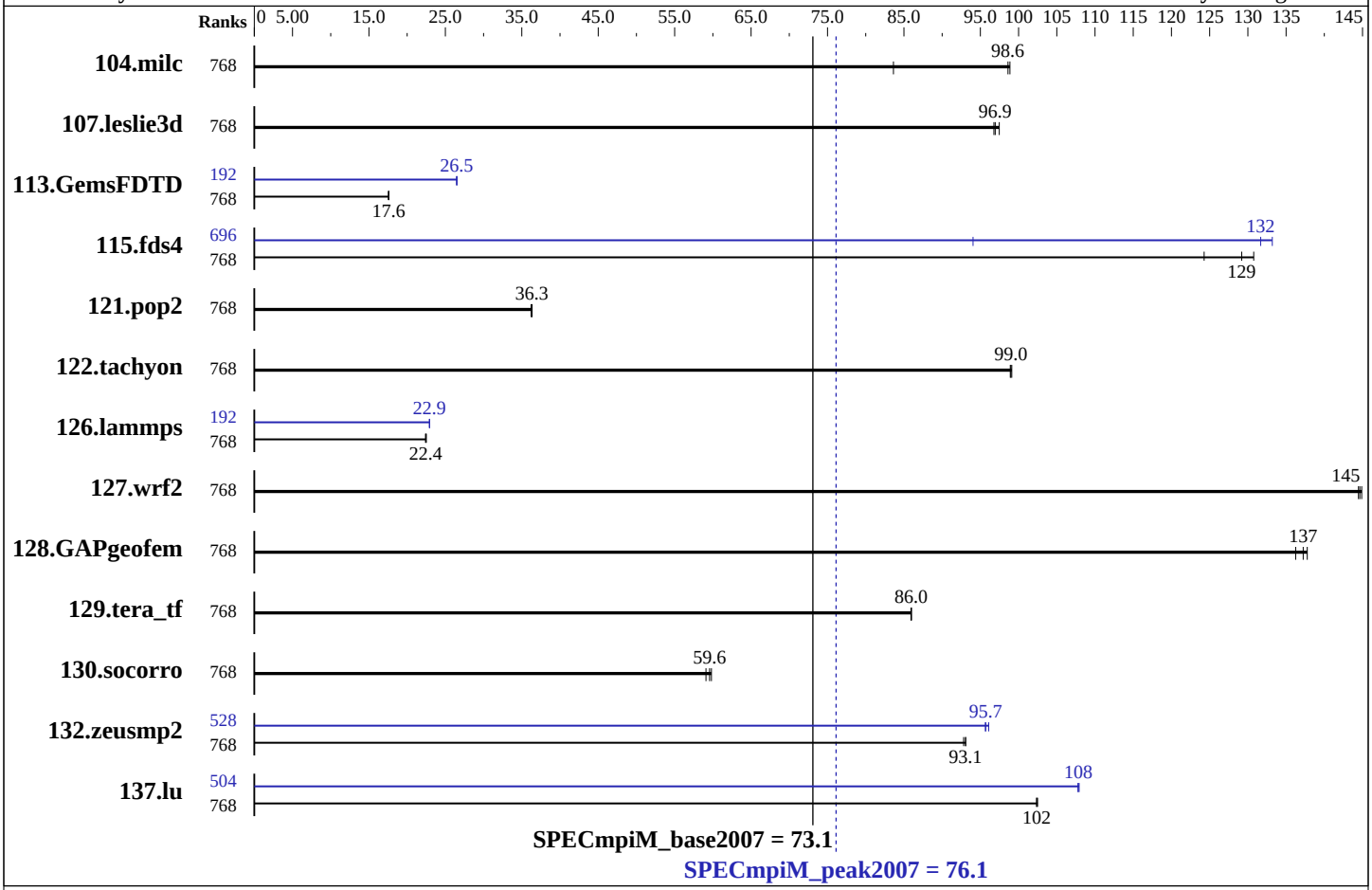
SGI Altix ICE 8400EX
(Intel Xeon X5690, 3.46 GHz)

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

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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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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

Continued on next page

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.
```

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:

Continued on next page

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.

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