SPEC® MPIM2007 Result

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SGI

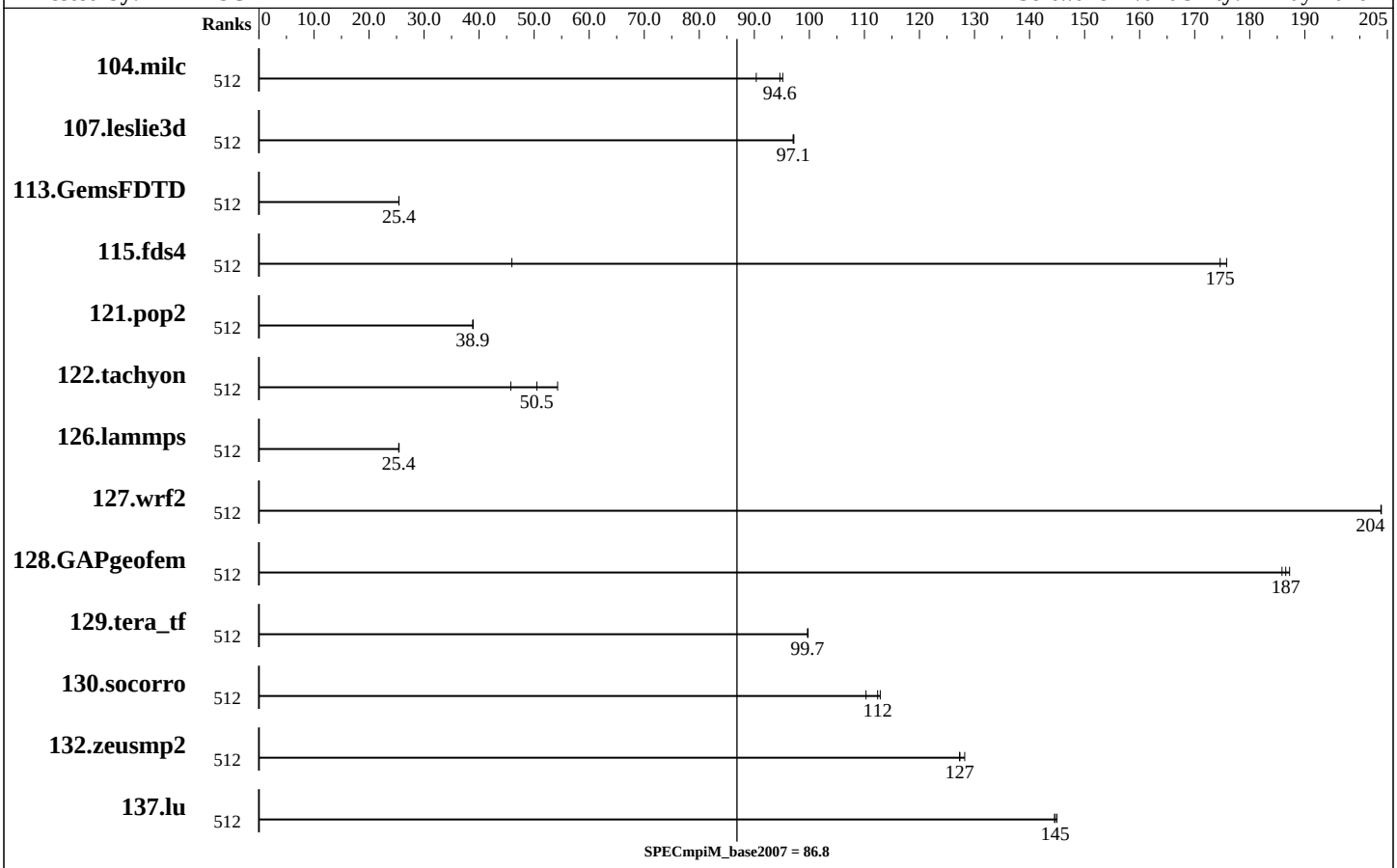
SGI Rackable C2112-4GP3
(Intel Xeon E5-2699 v4, 2.20 GHz)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 86.8

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	512	17.3	90.4	**16.5**	**94.6**	16.4	95.2							
107.leslie3d	512	**53.8**	**97.1**	53.8	97.1	53.7	97.2							
113.GemsFDTD	512	**248**	**25.4**	248	25.5	248	25.4							
115.fds4	512	11.1	176	42.5	46.0	**11.2**	**175**							
121.pop2	512	106	38.9	106	38.9	**106**	**38.9**							
122.tachyon	512	**55.4**	**50.5**	51.5	54.3	61.1	45.8							
126.lammps	512	114	25.5	115	25.4	**115**	**25.4**							
127.wrf2	512	38.2	204	38.2	204	**38.2**	**204**							
128.GAPgeofem	512	**11.1**	**187**	11.0	187	11.1	186							
129.tera_tf	512	27.8	99.7	**27.8**	**99.7**	27.7	99.8							

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	512	34.6	110	33.8	113	**34.0**	**112**							
132.zeusmp2	512	24.4	127	24.2	128	**24.4**	**127**							
137.lu	512	25.4	145	**25.4**	**145**	25.4	145							

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:	16
Total Chips:	32
Total Cores:	704
Total Threads:	704
Total Memory:	2 TB
Base Ranks Run:	512
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:	16
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)

Continued on next page

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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MPI2007 license: 14
Test sponsor: SGI
Tested by: SGI

Test date: Mar-2016
Hardware Availability: Mar-2016
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

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
```

Continued on next page

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:
    Sixteen ranks were assigned to each CPU chip, leaving 6
    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`

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.

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