# SPEC® MPIM2007 Result

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## SGI

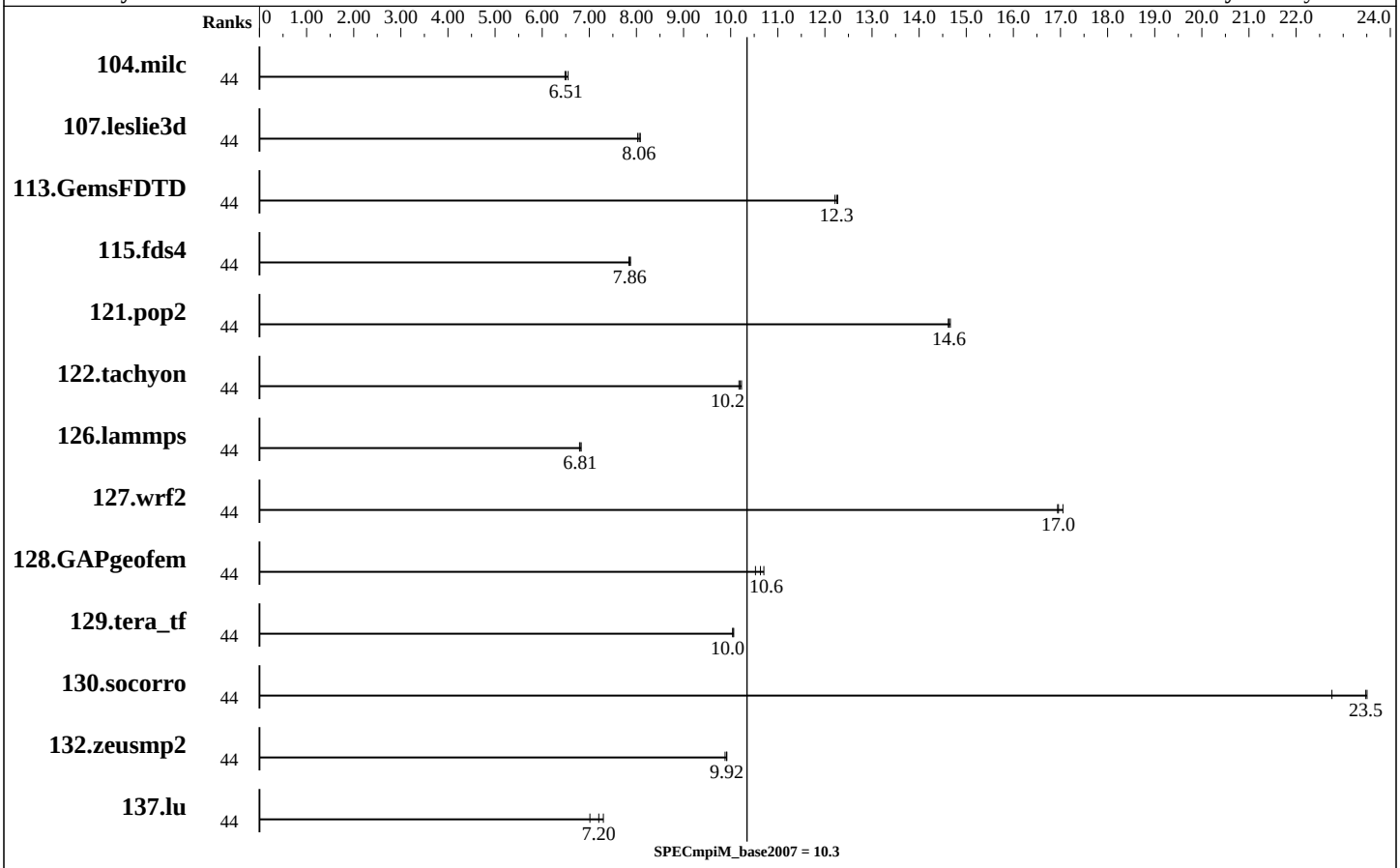
SGI Rackable C2112-4GP3
(Intel Xeon E5-2699 v4, 2.20 GHz)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 10.3

**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 | 44 | 241 | 6.48 | **241** | **6.51** | 239 | 6.55 | | | | | | | |
| 107.leslie3d | 44 | 650 | 8.03 | 646 | 8.08 | **648** | **8.06** | | | | | | | |
| 113.GemsFDTD | 44 | **515** | **12.3** | 514 | 12.3 | 516 | 12.2 | | | | | | | |
| 115.fds4 | 44 | **248** | **7.86** | 248 | 7.87 | 249 | 7.84 | | | | | | | |
| 121.pop2 | 44 | **282** | **14.6** | 282 | 14.6 | 282 | 14.7 | | | | | | | |
| 122.tachyon | 44 | 275 | 10.2 | 273 | 10.2 | **274** | **10.2** | | | | | | | |
| 126.lammps | 44 | 427 | 6.83 | **428** | **6.81** | 429 | 6.79 | | | | | | | |
| 127.wrf2 | 44 | 457 | 17.1 | 460 | 16.9 | **460** | **17.0** | | | | | | | |
| 128.GAPgeofem | 44 | **194** | **10.6** | 193 | 10.7 | 196 | 10.5 | | | | | | | |
| 129.tera_tf | 44 | 275 | 10.1 | 276 | 10.0 | **276** | **10.0** | | | | | | | |

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 | 44 | **163** | **23.5** | 162 | 23.5 | 168 | 22.8 | | | | | | | |
| 132.zeusmp2 | 44 | **313** | **9.92** | 314 | 9.88 | 313 | 9.92 | | | | | | | |
| 137.lu | 44 | **510** | **7.20** | 504 | 7.30 | 524 | 7.01 | | | | | | | |

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<br>InfiniBand I/O |
| File Server Node: | SGI MIS Server |
| Total Compute Nodes: | 1 |
| Total Chips: | 2 |
| Total Cores: | 44 |
| Total Threads: | 44 |
| Total Memory: | 128 GB |
| Base Ranks Run: | 44 |
| 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: | 1 |
| 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<br>Intel Turbo Boost Technology up to 3.60 GHz<br>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) |

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### 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
**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<br>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<br>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<br>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
```

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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`

## 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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