# SPEC MPI2007 Result

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

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

**SPECmpiL базе2007 = 27.5**

**Test date:** Mar-2016  
**Hardware Availability:** Mar-2016  
**Tested by:** SGI  
**Software Availability:** May-2016

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Ranks</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>121.pop2</td>
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<td>30.9</td>
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</tbody>
</table>

**Results appear in the order in which they were run. Bold underlined text indicates a median measurement.**
SPEC MPIL2007 Result

SGI

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

SPECmpiL_peak2007 = Not Run
SPECmpiL_base2007 = 27.5

Test Date: Mar-2016
Hardware Availability: Mar-2016
Software Availability: May-2016

Hardware Summary
Type of System: Homogeneous
Compute Node: SGI Rackable C2112-4GP3 Compute Node
Interconnects: InfiniBand MPI
File Server Node: SGI MIS Server
Total Compute Nodes: 16
Total Chips: 32
Total Cores: 704
Total Memory: 2 TB
Base Ranks Run: 704
Minimum Peak Ranks: --
Maximum Peak Ranks: --

Software Summary
C Compiler: Intel C++ Composer XE 2016 for Linux, Version 16.0.1.150 Build 20151021
C++ Compiler: Intel C++ Composer XE 2016 for Linux, Version 16.0.1.150 Build 20151021
Fortran Compiler: Intel Fortran Composer XE 2016 for Linux, Version 16.0.1.150 Build 20151021
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)
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

Software
Adapter: Mellanox MT27620 with ConnectX-4 (PCIe x16 Gen3 8 GT/s)
Adapter Driver: OFED-3.1.1-0.0
Adapter Firmware: 2.35.5100
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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## SPEC MPIL2007 Result

**SGI**

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

### SPECmpilL_peak2007 = Not Run

**SPECmpilL_base2007 = 27.5**

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

<table>
<thead>
<tr>
<th>Port Used:</th>
<th>1</th>
<th><strong>Interconnect Type:</strong></th>
<th>InfiniBand</th>
</tr>
</thead>
</table>

### Node Description: SGI Rackable C2112-4GP3 Compute Node

### Node Description: SGI MIS Server

#### Hardware

<table>
<thead>
<tr>
<th>Number of nodes:</th>
<th>1</th>
<th>Uses of the node:</th>
<th>fileserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor:</td>
<td>SGI</td>
<td>Model:</td>
<td>SGI MIS Server (Intel Xeon X2670, 2.60 GHz)</td>
</tr>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon E5-2670</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1-2 chips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chips enabled:</td>
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<tr>
<td>Cores enabled:</td>
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</tr>
<tr>
<td>Cores per chip:</td>
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<tr>
<td>Threads per core:</td>
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<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.30 GHz Hyper-Threading Technology enabled</td>
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<tr>
<td>CPU MHz:</td>
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<tr>
<td>Primary Cache:</td>
<td>32 KB I + 32 KB D on chip per core</td>
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<tr>
<td>Secondary Cache:</td>
<td>256 KB I+D on chip per core</td>
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<tr>
<td>L3 Cache:</td>
<td>20 MB I+D on chip per chip</td>
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<tr>
<td>Other Cache:</td>
<td>None</td>
<td></td>
<td></td>
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<tr>
<td>Memory:</td>
<td>128 GB (8 * 16 GB 2Rx4 PC3-10600R-9, ECC)</td>
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<tr>
<td>Disk Subsystem:</td>
<td>45 TB RAID 6</td>
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<td>Other Hardware:</td>
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<tr>
<td>Adapter:</td>
<td>Mellanox MT27500 with ConnectX-3 ASIC</td>
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<tr>
<td>Number of Adapters:</td>
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<tr>
<td>Slot Type:</td>
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<td>Data Rate:</td>
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<td>Ports Used:</td>
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<tr>
<td>Interconnect Type:</td>
<td>InfiniBand</td>
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</tbody>
</table>

#### 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 |
| System State:     | Multi-user, run level 5 |
| Other Software:   | SGI Foundation Software 2.10 Build 710r16.sles11sp3-1404092103 |

### Interconnect Description: InfiniBand MPI

#### Hardware

<table>
<thead>
<tr>
<th>Vendor:</th>
<th>Mellanox Technologies</th>
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<tbody>
<tr>
<td>Model:</td>
<td>None</td>
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<tr>
<td>Switch Model:</td>
<td>Mellanox SB7790</td>
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<td>Number of Switches:</td>
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<td>Number of Ports:</td>
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<td>Data Rate:</td>
<td>InfiniBand 4x EDR</td>
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<tr>
<td>Firmware:</td>
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</tr>
<tr>
<td>Topology:</td>
<td>Fat Tree</td>
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<tr>
<td>Primary Use:</td>
<td>MPI traffic</td>
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</tbody>
</table>

#### Software
SGI

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

SPECmpiL_peak2007 = Not Run
SPECmpiL_base2007 = 27.5

Interconnect Description: InfiniBand I/O

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
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<tbody>
<tr>
<td>Vendor: Mellanox Technologies</td>
<td>Topology: Fat Tree</td>
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<tr>
<td>Model: None</td>
<td>Primary Use: I/O traffic</td>
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<tr>
<td>Switch Model: Mellanox MSX6036F-1SFS</td>
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</tr>
<tr>
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<tr>
<td>Number of Ports: 36</td>
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<tr>
<td>Firmware: 9.3.5080</td>
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<td>Data Rate: InfiniBand 4x FDR</td>
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<td>Firmware: 9.3.6000</td>
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<td>Switch Model: Mellanox MSX6025</td>
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<td>Number of Ports: 36</td>
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<tr>
<td>Firmware: 9.3.6000</td>
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</tbody>
</table>

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
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
cpuspower 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
Continued on next page
## General Notes (Continued)

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`

## 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`
**SPEC MPIL2007 Result**

**SGI**

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

<table>
<thead>
<tr>
<th>SPECmpiL_peak2007 = Not Run</th>
<th>SPECmpiL_base2007 = 27.5</th>
</tr>
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</table>

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

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

**For questions about this result, please contact the tester.**

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Tested with SPEC MPI2007 v2.0.1.
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