## SPECmpiL2007 Result

### SGI

**SGI Rackable C2112-4GP3**

**(Intel Xeon E5-2699 v4, 2.20 GHz)**

**SPECmpiL_peak2007 = Not Run**

**SPECmpiL_base2007 = 3.65**

- **MPI2007 license:** 14
- **Test sponsor:** SGI
- **Tested by:** SGI
- **Test date:** Mar-2016
- **Hardware Availability:** Mar-2016
- **Software Availability:** May-2016

### Test Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Ranks</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Ratio</th>
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<td>121.pop2</td>
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<td>1051</td>
<td>3.70</td>
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<td>125.RAxML</td>
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<td>2313</td>
<td>3.55</td>
<td>2284</td>
<td>3.59</td>
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</tr>
</tbody>
</table>

**Results 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)

SGE mpiL_peak2007 = Not Run
SGE mpiL_base2007 = 3.65

Test sponsor: SGI
Tested by: SGI

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: 2
Total Chips: 4
Total Cores: 88
Total Threads: 176
Total Memory: 256 GB
Base Ranks Run: 176
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: 2
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: 2
CPU Characteristics: 22 Core, 2.20 GHz, 9.6 GT/s QPI
Intel Turbo Boost Technology up to 3.60 GHz
Hyper-Threading Technology enabled
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
(PCE x16 Gen3 8 GT/s)
Adapter Driver: OFED-3.1.1-0.3
Adapter Firmware: 12.12.1240
Adapter: Mellanox MT27500 with ConnectX-3
(PCE 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

Software

Adapter: Mellanox MT27620 with ConnectX-4
(PCE x16 Gen3 8 GT/s)
Adapter Driver: OFED-3.1.1-0.3
Adapter Firmware: 12.12.1240
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Continued on next page
# SPEC MPiL2007 Result

**SGI**

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

**SPECmpiL_peak2007 = Not Run**

**SPECmpiL_base2007 = 3.65**

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<thead>
<tr>
<th>MPI2007 license: 14</th>
<th>Test date: Mar-2016</th>
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<tbody>
<tr>
<td>Test sponsor: SGI</td>
<td>Hardware Availability: Mar-2016</td>
</tr>
<tr>
<td>Tested by: SGI</td>
<td>Software Availability: May-2016</td>
</tr>
</tbody>
</table>

Node Description: SGI Rackable C2112-4GP3 Compute Node

- 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 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**

- 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

**Software**

- Adapter: Mellanox MT27500 with ConnectX-3 ASIC
- Adapter Driver: MLNX_OFED_LINUX-3.1-1.0.3 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
SGI Rackable C2112-4GP3
(Intel Xeon E5-2699 v4, 2.20 GHz)

**SPECmpilL_peak2007 = Not Run**

**SPECmpilL_base2007 = 3.65**

**MPI2007 license:** 14
**Test date:** Mar-2016
**Test sponsor:** SGI
**Hardware Availability:** Mar-2016
**Tested by:** SGI
**Software Availability:** May-2016

### Interconnect Description: InfiniBand I/O

**Hardware**
- **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

**Software**
- **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`
- `export MPI_IB HYPER _LAZY=false`
- `ulimit -s unlimited`

**BIOS settings:**
- AMI BIOS version T20151001184140
- Hyper-Threading Technology enabled
- 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

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

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SPECmpilL_base2007 = 3.65

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

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