SGI ICE X (Intel Xeon E5-2690 v2, 3.0 GHz)

SPECmpiM_peak2007 = 103
SPECmpiM_base2007 = 100

SGI

MPI2007 license: 4
Test sponsor: SGI
Tested by: SGI

Hardware Availability: Sep-2013
Software Availability: Nov-2013

Test date: Dec-2013

Ranks

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Results Table

Table continues on next page. Results appear in the order in which they were run. Bold underlined text indicates a median measurement.
SPECmpIMpeak2007 = 103
SPECmpIMbase2007 = 100

Results Table (Continued)

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</tbody>
</table>

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 ICE X IP-113 Compute Node
Interconnect: InfiniBand (MPI and I/O)
File Server Node: SGI Modular InfiniteStorage Server
Total Compute Nodes: 40
Total Chips: 800
Total Cores: 800
Total Threads: 1600
Total Memory: 2560 GB
Base Ranks Run: 800
Minimum Peak Ranks: 160
Maximum Peak Ranks: 800

Software Summary

C Compiler: Intel C++ Composer XE 2011 for Linux, Version 14.0.0.080 Build 20130728
C++ Compiler: Intel C++ Composer XE 2011 for Linux, Version 14.0.0.080 Build 20130728
Fortran Compiler: Intel Fortran Composer XE 2011 for Linux, Version 14.0.0.080 Build 20130728
Base Pointers: 64-bit
Peak Pointers: 64-bit
MPI Library: SGI MPT 2.09
Other MPI Info: OFED 1.5.2
Pre-processors: None
Other Software: None

Node Description: SGI ICE X IP-113 Compute Node

Number of nodes: 40
Uses of the node: compute
Vendor: SGI
Model: SGI ICE X IP-113 (Intel Xeon E5-2690 v2, 3.0 GHz)
CPU Name: Intel Xeon E5-2690 v2
CPU(s) orderable: 1-2 chips
Chips enabled: 2
Cores enabled: 20
Cores per chip: 10
Threads per core: 2
CPU Characteristics: Ten Core, 3.0 GHz, 8.0 GT/s QPI
Intel Turbo Boost Technology up to 3.60 GHz
Hyper-Threading Technology enabled
3000
CPU MHz: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core
L3 Cache: 25 MB I+D on chip per chip
Other Cache: None
Memory: 64 GB (8 x 8 GB 2Rx4 PC3-14900R-13, ECC)
Disk Subsystem: None
Other Hardware: None
Adapter: Mellanox MT27500 with ConnectX-3 ASIC (PCIe x8 Gen3 8 GT/s)
Number of Adapters: 2
Slot Type: PCIe x8 Gen3

Software

Adapter: Mellanox MT27500 with ConnectX-3 ASIC (PCIe x8 Gen3 8 GT/s)
Adapter Driver: OFED-1.5.2
Adapter Firmware: 2.11.312
Operating System: SUSE Linux Enterprise Server 11 SP2, Kernel 3.0.80-0.8-default
Local File System: NFSv3
Shared File System: NFSv3 IPoIB
System State: Multi-user, run level 3
Other Software: SGI Tempo Compute Node 2.7.3, Build 708rp14.sles11sp2-1305311204

Continued on next page
# SPEC MPIM2007 Result

## SGI ICE X (Intel Xeon E5-2690 v2, 3.0 GHz)

<table>
<thead>
<tr>
<th>SPECmpIM_peak2007</th>
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<td>Tested by:</td>
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<td>Test date:</td>
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<td>Hardware Availability:</td>
<td>Sep-2013</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Nov-2013</td>
</tr>
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</table>

### Node Description: SGI ICE X IP-113 Compute Node

- **Data Rate:** InfiniBand 4x FDR
- **Ports Used:** 2
- **Interconnect Type:** InfiniBand

### Node Description: SGI Modular InfiniteStorage Server

#### Hardware
- **Number of nodes:** 1
- **Uses of the node:** fileserver
- **Vendor:** SGI
- **Model:** SGI Modular InfiniteStorage Server
- **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 3.33 GHz
  - Hyper-Threading Technology enabled
- **CPU MHz:** 2600
- **Primary Cache:** 32 KB I + 32 KB D on chip per core
- **Secondary Cache:** 256 KB I+D on chip per chip
- **L3 Cache:** 20 MB I+D on chip per chip
- **Other Cache:** None
- **Memory:** 128 GB (8 * 16 GB 2Rx4 PC3-12800R-11, ECC)
- **Disk Subsystem:** 64.8 TB RAID 6
- **Other Hardware:** None
- **Adapter:** Mellanox MT27500 with ConnectX-3 ASIC (PCIe x8 Gen3 8 GT/s)
- **Number of Adapters:** 2
- **Slot Type:** PCIe x8 Gen3
- **Data Rate:** InfiniBand 4x FDR
- **Ports Used:** 2
- **Interconnect Type:** InfiniBand

#### Software
- **Adapter:** OFED-1.5.0
- **Adapter Driver:** 2.11.312
- **Operating System:** SUSE Linux Enterprise Server 11 SP3
- **Local File System:** xfs
- **Shared File System:** --
- **System State:** Multi-user, run level 3
- **Other Software:** SGI Foundation Software 2.9, Build 700r3.sles11-1004061553

### Interconnect Description: InfiniBand (MPI and I/O)

#### Hardware
- **Vendor:** Mellanox Technologies and SGI
- **Model:** None
- **Switch Model:** SGI FDR Integrated IB Switch Blade 2SW9x27 with Mellanox SwitchX device 51000
- **Number of Switches:** 12
- **Number of Ports:** 36
- **Data Rate:** InfiniBand 4x FDR

#### Software
- **Adapter:** Mellanox MT27500 with ConnectX-3 ASIC (PCIe x8 Gen3 8 GT/s)
- **Adapter Driver:** OFED-1.5.0
- **Adapter Firmware:** 2.11.312
- **Operating System:** SUSE Linux Enterprise Server 11 SP3
- **Kernel:** --
- **Local File System:** xfs
- **Shared File System:** --
- **System State:** Multi-user, run level 3
- **Other Software:** SGI Foundation Software 2.9, Build 700r3.sles11-1004061553
**SPEC MPIM2007 Result**

**SGI**

SGI ICE X (Intel Xeon E5-2690 v2, 3.0 GHz)

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**MPI2007 license:** 4  
**Test sponsor:** SGI  
**Tested by:** SGI  
**Test date:** Dec-2013  
**Hardware Availability:** Sep-2013  
**Software Availability:** Nov-2013

### Interconnect Description: InfiniBand (MPI and I/O)

- **Firmware:** 07130007_LLR and 08130007_LLR
- **Topology:** Enhanced Hypercube
- **Primary Use:** MPI and I/O traffic

---

**Submit Notes**

The config file option 'submit' was used.

**General Notes**

130.socorro (base): "nullify_ptrs" src.alt was used.

**Software environment:**
- `export MPI_REQUEST_MAX=65536`
- `export MPI_TYPE_MAX=32768`
- `export MPI_BUFS_THRESHOLD=1`
- `export MPI_IB_RAILS=2`
- `export MPI_CONNECTIONS_THRESHOLD=0`
- `ulimit -s unlimited`

**BIOS settings:**
- AMI BIOS version 3.0
- 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 180 ranks, 4 switches for up to 320 ranks, 8 switches for 640 ranks, 10 switches for 800 ranks, 16 switches for 1280 ranks, 22 switches for 1920 ranks, and 30 switches for 2560 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.
**SGI ICE X (Intel Xeon E5-2690 v2, 3.0 GHz)**

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<tbody>
<tr>
<td>103</td>
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</tr>
</tbody>
</table>

**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
- 130.socorro: -assume nostd_intent_in

**Base Optimization Flags**

- **C benchmarks:**
  - -O3 -xAVX -no-prec-div
- **C++ benchmarks:**
  - 126.lammps: -O3 -xAVX -no-prec-div -ansi-alias
- **Fortran benchmarks:**
  - -O3 -xAVX -no-prec-div
- **Benchmarks using both Fortran and C:**
  - -O3 -xAVX -no-prec-div

**Peak Optimization Flags**

- **C benchmarks:**
  - 104.milc: basepeak = yes
  - 122.tachyon: basepeak = yes
- **C++ benchmarks:**

Continued on next page
SGI

SGI ICE X (Intel Xeon E5-2690 v2, 3.0 GHz)

| SPECmpiM_peak2007 | 103 |
| SPECmpiM_base2007 | 100 |

MPI2007 license: 4
Test sponsor: SGI
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Test date: Dec-2013
Hardware Availability: Sep-2013
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Peak Optimization Flags (Continued)

126.lammps: -O3 -xAVX -no-prec-div -ansi-alias

Fortran benchmarks:

107.leslie3d: basepeak = yes
113.GemsFDTD: -O3 -xAVX -no-prec-div
129.tera_tf: basepeak = yes
137.lu: basepeak = yes

Benchmarks using both Fortran and C:

115.fds4: -O3 -xAVX -no-prec-div
121.pop2: basepeak = yes
127.wrf2: basepeak = yes
128.GAPgeofem: basepeak = yes
130.socorro: basepeak = yes
132.zeusmp2: basepeak = yes

Other Flags

C benchmarks:
- lm mpi

C++ benchmarks:
126.lammps: -lm mpi

Fortran benchmarks:
- lm mpi

Benchmarks using both Fortran and C:
- lm mpi

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.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.xml
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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC MPI2007 v2.0.1.
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