SPEC® MPIM2007 Result

Hewlett Packard Enterprise

SGI 8600
(Intel Xeon Gold 6148, 2.40 GHz)

SPECmpiM_peak2007 = Not Run
SPECmpiM_base2007 = 49.3

MPI2007 license: 1
Test sponsor: HPE
Tested by: HPE

Test date: Oct-2017
Hardware Availability: Jul-2017
Software Availability: Nov-2017

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Ranks</th>
<th>Seconds</th>
<th>Ratio</th>
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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.
Hewlett Packard Enterprise

SGI 8600
(Intel Xeon Gold 6148, 2.40 GHz)

**SPECmpiM_peak2007 = Not Run**

**SPECmpiM_base2007 = 49.3**

Test date: Oct-2017
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### Results Table (Continued)

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

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### Hardware Summary

- Type of System: Homogeneous
- Compute Node: HPE XA730i Gen10 Server Node
- Interconnect: InfiniBand (MPI and I/O)
- File Server Node: Lustre FS
- Total Compute Nodes: 4
- Total Chips: 160
- Total Threads: 320
- Total Memory: 768 GB
- Base Ranks Run: 160
- Minimum Peak Ranks: --
- Maximum Peak Ranks: --

### Software Summary

- C Compiler: Intel C Composer XE for Linux, Version 18.0.0.128 Build 20170811
- C++ Compiler: Intel C++ Composer XE for Linux, Version 18.0.0.128 Build 20170811
- Fortran Compiler: Intel Fortran Composer XE for Linux, Version 18.0.0.128 Build 20170811
- Base Pointers: 64-bit
- Peak Pointers: Not Applicable
- MPI Library: HPE Performance Software - Message Passing Interface 2.17
- Other MPI Info: OFED 3.2.2
- Pre-processors: None
- Other Software: None

### Node Description: HPE XA730i Gen10 Server Node

#### Hardware

- Number of nodes: 4
- Uses of the node: compute
- Vendor: Hewlett Packard Enterprise
- Model: SGI 8600 (Intel Xeon Gold 6148, 2.40 GHz)
- CPU Name: Intel Xeon Gold 6148
- CPU(s) orderable: 1-2 chips
- Chips enabled: 2
- Cores enabled: 40
- Cores per chip: 20
- Threads per core: 2
- CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
- CPU MHz: 2400
- Primary Cache: 32 KB I + 32 KB D on chip per core
- Secondary Cache: 1 MB I+D on chip per core
- L3 Cache: 27.5 MB I+D on chip per chip
- Other Cache: None
- Memory: 192 GB (12 x 16 GB 2Rx4 PC4-2666V-R)
- Disk Subsystem: None
- Other Hardware: None
- Adapter: Mellanox MT27700 with ConnectX-4 ASIC
- Number of Adapters: 2
- Slot Type: PCIe x16 Gen3 8GT/s
- Data Rate: InfiniBand 4X EDR

#### Software

- Adapter: Mellanox MT27700 with ConnectX-4 ASIC
- Adapter Driver: OFED-3.4-2.1.8.0
- Adapter Firmware: 12.18.1000
- Operating System: Red Hat Enterprise Linux Server 7.3 (Maipo), Kernel 3.10.0-514.2.2.el7.x86_64
- Local File System: LFS
- Shared File System: LFS
- System State: Multi-user, run level 3
- Other Software: SGI Management Center Compute Node 3.5.0, Build 716r171.rhel73-1705051353

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SPEC MPIM2007 Result

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SPECmpiM_base2007 = 49.3

Node Description: HPE XA730i Gen10 Server Node

- Ports Used: 1
- Interconnect Type: InfiniBand

Node Description: Lustre FS

Hardware
- Number of nodes: 4
- Uses of the node: fileserver
- Vendor: Hewlett Packard Enterprise
- Model: Rackable C1104-GP2 (Intel Xeon E5-2690 v3, 2.60 GHz)
- CPU Name: Intel Xeon E5-2690 v3
- CPU(s) orderable: 1-2 chips
- Chips enabled: 2
- Cores enabled: 24
- Cores per chip: 12
- Threads per core: 1
- CPU Characteristics: Intel Turbo Boost Technology up to 3.50 GHz
- Hyper-Threading Technology disabled
- CPU MHz: 2600
- Primary Cache: 32 KB I + 32 KB D on chip per core
- Secondary Cache: 256 KB I+D on chip per core
- L3 Cache: 30 MB I+D on chip per chip
- Other Cache: None
- Memory: 128 GB (8 x 16 GB 2Rx4 PC4-2133P-R)
- Disk Subsystem: 684 TB RAID 6
- Other Hardware: None
- Adapter: Mellanox MT27700 with ConnectX-4 ASIC
- Number of Adapters: 2
- Slot Type: PCIe x16 Gen3
- Data Rate: InfiniBand 4X EDR
- Ports Used: 1
- Interconnect Type: InfiniBand

Software
- Adapter: Mellanox MT27700 with ConnectX-4 ASIC
- Adapter Driver: OFED-3.3-1.0.0.0
- Adapter Firmware: 12.14.2036
- Operating System: Red Hat Enterprise Linux Server 7.3 (Maipo), Kernel 3.10.0-514.2.2.el7.x86_64
- Local File System: ext3
- Shared File System: LFS
- System State: Multi-user, run level 3
- Other Software: None

Interconnect Description: InfiniBand (MPI and I/O)

Hardware
- Vendor: Mellanox Technologies and SGI
- Model: SGI P0002145
- Switch Model: SGI P0002145
- Number of Switches: 1
- Number of Ports: 36
- Data Rate: InfiniBand 4X EDR
- Firmware: 11.0350.0394
- Topology: Enhanced Hypercube

Software
- Adapter: Mellanox MT27700 with ConnectX-4 ASIC
- Adapter Driver: OFED-3.3-1.0.0.0
- Adapter Firmware: 12.14.2036
- Operating System: Red Hat Enterprise Linux Server 7.3 (Maipo), Kernel 3.10.0-514.2.2.el7.x86_64
- Local File System: ext3
- Shared File System: LFS
- System State: Multi-user, run level 3
- Other Software: None

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Interconnect Description: InfiniBand (MPI and I/O)

Primary Use: MPI and I/O traffic

Base Tuning Notes
src.alt used: 129.tera_tf->add_rank_support
src.alt used: 130.socorro->nullify_ptrs

Submit Notes
The config file option 'submit' was used.

General Notes

Software environment:
- export MPI_REQUEST_MAX=65536
- export MPI_TYPE_MAX=32768
- export MPI_IB_RAILS=2
- export MPI_IB_IMM_UPGRADE=false
- export MPI_CONNECTIONS_THRESHOLD=0
- export MPI_IB_DCIS=2
- export MPI_IB_HYPER_LAZY=false
- ulimit -s unlimited

BIOS settings:
AMI BIOS version SAED7177, 07/17/2017

Job Placement:
Each MPI job was assigned to a topologically compact set of nodes.

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.

Base Compiler Invocation

C benchmarks:
- icc

C++ benchmarks:

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Base Compiler Invocation (Continued)

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-AVX512 -no-prec-div -ipo

C++ benchmarks:
126.lammps: -O3 -xCORE-AVX512 -no-prec-div -ansi-alias -ipo

Fortran benchmarks:
-O3 -xCORE-AVX512 -no-prec-div -ipo

Benchmarks using both Fortran and C:
-O3 -xCORE-AVX512 -no-prec-div -ipo

Base Other Flags

C benchmarks:
-1mpi

C++ benchmarks:
126.lammps: -1mpi

Fortran benchmarks:
-1mpi

Benchmarks using both Fortran and C:
-1mpi
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The flags file that was used to format this result can be browsed at
http://www.spec.org/mpi2007/flags/HPE_x86_64_Intel18_flags.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/mpi2007/flags/HPE_x86_64_Intel18_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.