SPEC® MPIM2007 Result

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Hewlett Packard Enterprise

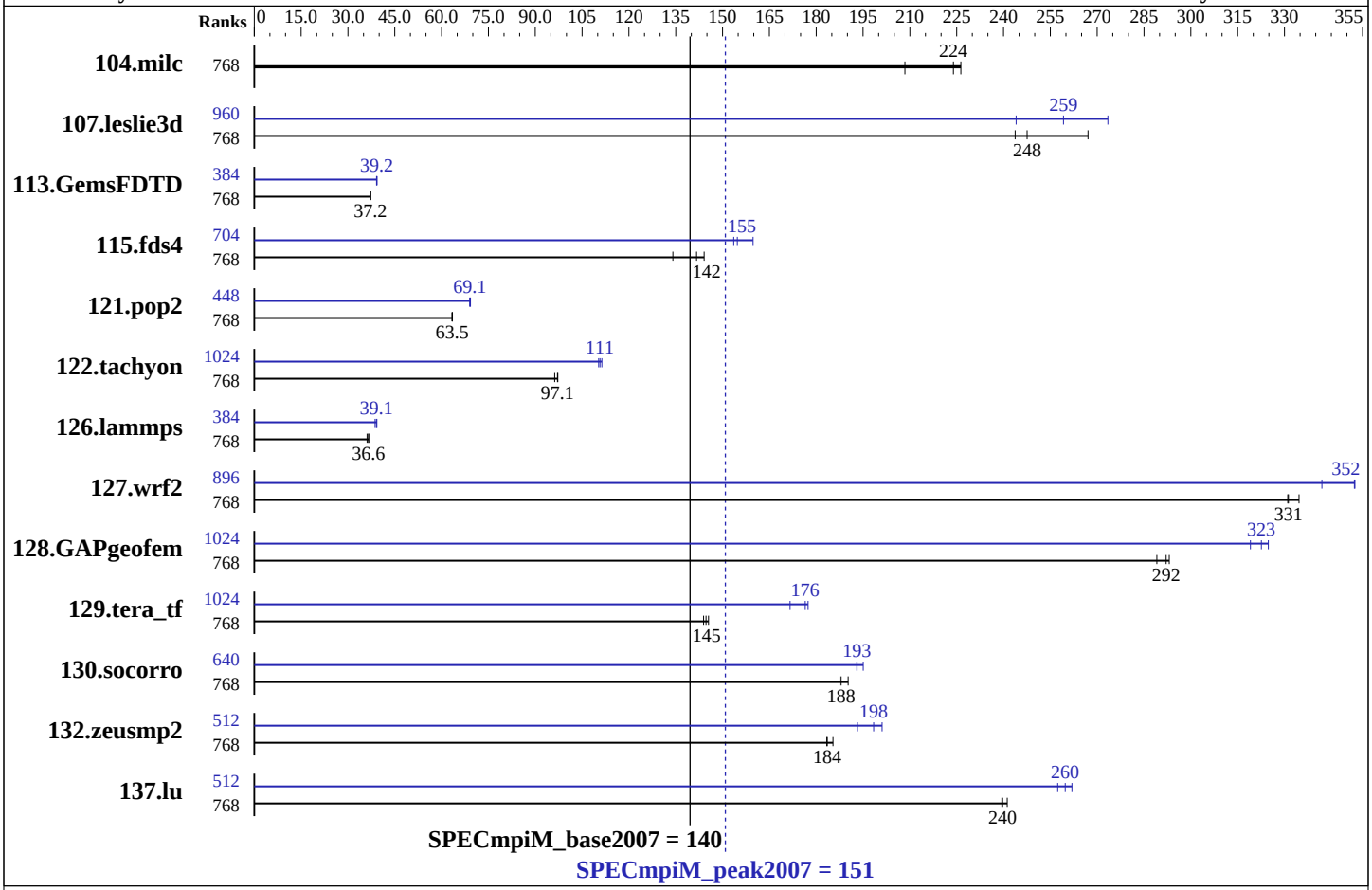
SGI 8600
(Intel Xeon Gold 6148, 2.40 GHz)

SPECmpiM_peak2007 = 151

SPECmpiM_base2007 = 140

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

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



Results Table

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	768	7.51	208	6.91	226	**6.99**	**224**	768	7.51	208	6.91	226	**6.99**	**224**
107.leslie3d	768	21.4	244	**21.1**	**248**	19.5	267	960	**20.1**	**259**	21.4	244	19.1	273
113.GemsFDTD	768	**169**	**37.2**	169	37.2	170	37.2	384	160	39.3	**161**	**39.2**	161	39.2
115.fds4	768	14.6	134	13.5	144	**13.8**	**142**	704	12.2	160	12.7	154	**12.6**	**155**
121.pop2	768	65.0	63.5	65.2	63.3	**65.0**	**63.5**	448	59.6	69.3	59.8	69.0	**59.7**	**69.1**
122.tachyon	768	**28.8**	**97.1**	28.8	97.2	29.1	96.2	1024	**25.3**	**111**	25.4	110	25.1	111
126.lammps	768	79.6	36.6	80.7	36.1	**79.6**	**36.6**	384	**74.5**	**39.1**	74.2	39.3	75.3	38.7
127.wrf2	768	23.3	335	23.5	331	**23.5**	**331**	896	22.1	353	**22.1**	**352**	22.8	342
128.GAPgeofem	768	**7.07**	**292**	7.05	293	7.14	289	1024	6.47	319	6.36	325	**6.40**	**323**
129.tera_tf	768	19.0	146	19.2	144	**19.1**	**145**	1024	**15.7**	**176**	15.6	177	16.1	172

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	768	**20.3**	**188**	20.1	190	20.4	187	640	**19.8**	**193**	19.8	193	19.6	195
132.zeusmp2	768	16.9	183	16.7	185	**16.9**	**184**	512	16.1	193	15.4	201	**15.6**	**198**
137.lu	768	15.4	239	15.2	241	**15.3**	**240**	512	14.3	257	**14.2**	**260**	14.0	262

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:	HPE XA730i Gen10 Server Node
Interconnect:	InfiniBand (MPI and I/O)
File Server Node:	Lustre FS
Total Compute Nodes:	32
Total Chips:	64
Total Cores:	1280
Total Threads:	2560
Total Memory:	6 TB
Base Ranks Run:	768
Minimum Peak Ranks:	384
Maximum Peak Ranks:	1024

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:	64-bit
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:	32
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

Continued on next page

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

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 48 x 8+2 2TB 7200 RPM
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:	4
Number of Ports:	36
Data Rate:	InfiniBand 4X EDR
Firmware:	11.0350.0394
Topology:	Enhanced Hypercube

Software

Continued on next page

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_CONNECTIONS_THRESHOLD=0
   export MPI_REQUEST_MAX=65536
   export MPI_TYPE_MAX=32768
   export MPI_IB_RAILS=2
   export MPI_IB_IMM_UPGRADE=false
   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

Continued on next page

Base Compiler Invocation (Continued)

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-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:
`-lmpi`

C++ benchmarks:

126.lammps: `-lmpi`

Fortran benchmarks:
`-lmpi`

Continued on next page

Base Other Flags (Continued)

Benchmarks using both Fortran and C:
`-lmpi`

Peak Compiler Invocation

C benchmarks:
`icc`

C++ benchmarks:

126.lammps: `icpc`

Fortran benchmarks:
`ifort`

Benchmarks using both Fortran and C (except as noted below):
`icc ifort`

130.socorro: `/sw/sdev/intel/parallel_studio_xe_2017_update4/compilers_and_libraries_2017.4.196/linux/bin/intel64/icc`
`/sw/sdev/intel/parallel_studio_xe_2017_update4/compilers_and_libraries_2017.4.196/linux/bin/intel64/`

Peak Portability Flags

`Same as Base Portability Flags`

Peak Optimization Flags

C benchmarks:

104.milc: `basepeak = yes`

122.tachyon: `-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`

Peak Other Flags

Same as Base Other Flags

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.

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