SPEC® MPIL2007 Result

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Hewlett Packard Enterprise

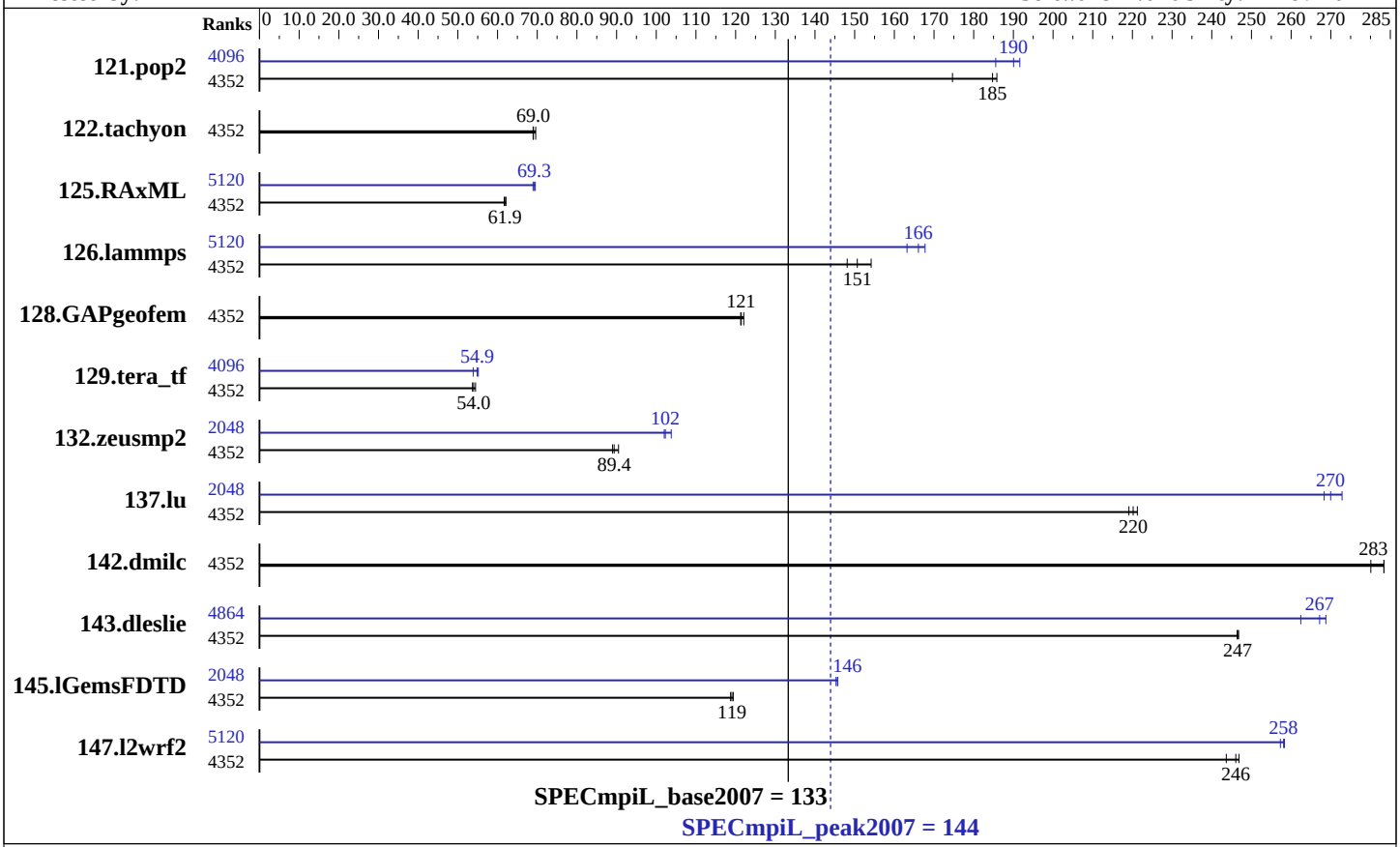
SGI 8600
(Intel Xeon Gold 6148, 2.40 GHz)

SPECmpiL_peak2007 = 144

SPECmpiL_base2007 = 133

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
121.pop2	4352	22.3	175	20.9	186	**21.1**	**185**	4096	21.0	186	**20.5**	**190**	20.3	192
122.tachyon	4352	28.2	69.0	27.9	69.6	**28.2**	**69.0**	4352	28.2	69.0	27.9	69.6	**28.2**	**69.0**
125.RAxML	4352	**47.2**	**61.9**	47.0	62.1	47.3	61.7	5120	**42.1**	**69.3**	42.0	69.5	42.3	68.9
126.lammps	4352	16.6	148	**16.3**	**151**	16.0	154	5120	14.7	168	15.1	163	**14.8**	**166**
128.GAPgeofem	4352	**48.9**	**121**	48.9	121	48.6	122	4352	**48.9**	**121**	48.9	121	48.6	122
129.tera_tf	4352	20.5	53.7	**20.4**	**54.0**	20.2	54.5	4096	20.4	53.9	**20.0**	**54.9**	19.9	55.2
132.zeusmp2	4352	23.4	90.5	23.8	89.0	**23.7**	**89.4**	2048	20.4	104	20.8	102	**20.7**	**102**
137.lu	4352	19.0	221	19.2	219	**19.1**	**220**	2048	15.7	268	**15.6**	**270**	15.4	273
142.dmilc	4352	**13.0**	**283**	13.2	280	13.0	283	4352	**13.0**	**283**	13.2	280	13.0	283
143.dleslie	4352	12.6	247	12.6	246	**12.6**	**247**	4864	11.5	269	11.8	262	**11.6**	**267**
145.lGemsFDTD	4352	**37.0**	**119**	37.2	119	36.9	119	2048	**30.3**	**146**	30.3	146	30.4	145
147.l2wrf2	4352	**33.3**	**246**	33.7	244	33.2	247	5120	31.8	258	**31.8**	**258**	31.9	257

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

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Hardware Availability: Jul-2017
Software Availability: Nov-2017

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:	128
Total Chips:	256
Total Cores:	5120
Total Threads:	10240
Total Memory:	24 TB
Base Ranks Run:	4352
Minimum Peak Ranks:	2048
Maximum Peak Ranks:	5120

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:	128
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
Ports Used:	1
Interconnect Type:	InfiniBand

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

Node Description: Lustre FS

Hardware

Number of nodes:	4
Uses of the node:	fileserver

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Software

Adapter:	Mellanox MT27700 with ConnectX-4 ASIC
Adapter Driver:	OFED-3.3-1.0.0.0

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Node Description: Lustre FS

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

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:	30
Number of Ports:	36
Data Rate:	InfiniBand 4X EDR
Firmware:	11.0350.0394
Topology:	Enhanced Hypercube
Primary Use:	MPI and I/O traffic

Software

Base Tuning Notes

```
src.alt used: 143.dleslie->integer_overflow
```

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:

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-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`

Benchmarks using both Fortran and C:
`-lmpi`

Peak Compiler Invocation

C benchmarks (except as noted below):
`icc`

125.RAxML: `/sw/sdev/intel/parallel_studio_xe_2017_update4/compilers_and_libraries_2017.4.196/linux/bin/intel64/icc`

C++ benchmarks:

126.lammps: `icpc`

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Peak Compiler Invocation (Continued)

Fortran benchmarks (except as noted below):
ifort

143.dleslie: /sw/sdev/intel/parallel_studio_xe_2017_update4/compilers_and_libraries_2017.4.196/linux/bin/intel64/ifort

Benchmarks using both Fortran and C:
icc ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

122.tachyon: basepeak = yes

125.RAxML: -O3 -xCORE-AVX512 -no-prec-div -ipo

142.dmilc: basepeak = yes

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:

121.pop2: -O3 -xCORE-AVX512 -no-prec-div -ipo

128.GAPgeofem: basepeak = yes

132.zeusmp2: Same as 121.pop2

147.l2wrf2: Same as 121.pop2

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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