SPEC® MPIM2007 Result

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Hewlett Packard Enterprise
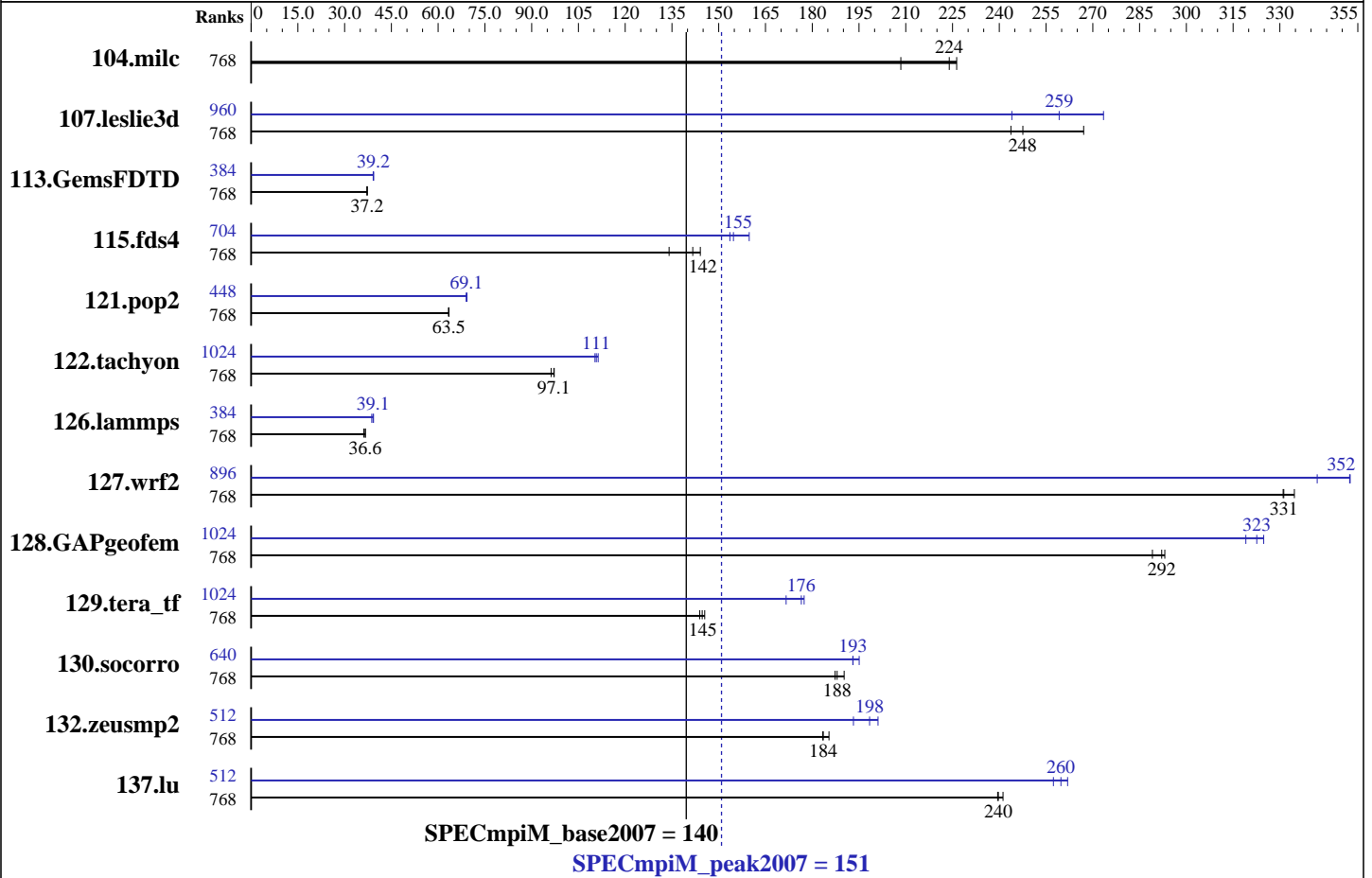
SGI 8600
(Intel Xeon Gold 6148, 2.40 GHz)

SPECmpiM_peak2007 =   151

SPECmpiM_base2007 =   140

MPI2007 license: 1	**Test date:** Oct-2017
Test sponsor: HPE	**Hardware Availability:** Jul-2017
Tested by: HPE	**Software Availability:** Nov-2017

SPECmpiM_base2007 = 140

SPECmpiM_peak2007 = 151

Results Table

Benchmark	Ranks	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Ranks	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak 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

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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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

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

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

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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`

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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
```

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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.

Tested with SPEC MPI2007 v2.0.1.
Report generated on Wed Oct 25 17:11:56 2017 by SPEC MPI2007 PS/PDF formatter v1463.
Originally published on 25 October 2017.