# SPEC® MPIL2007 Result

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## Hewlett Packard Enterprise

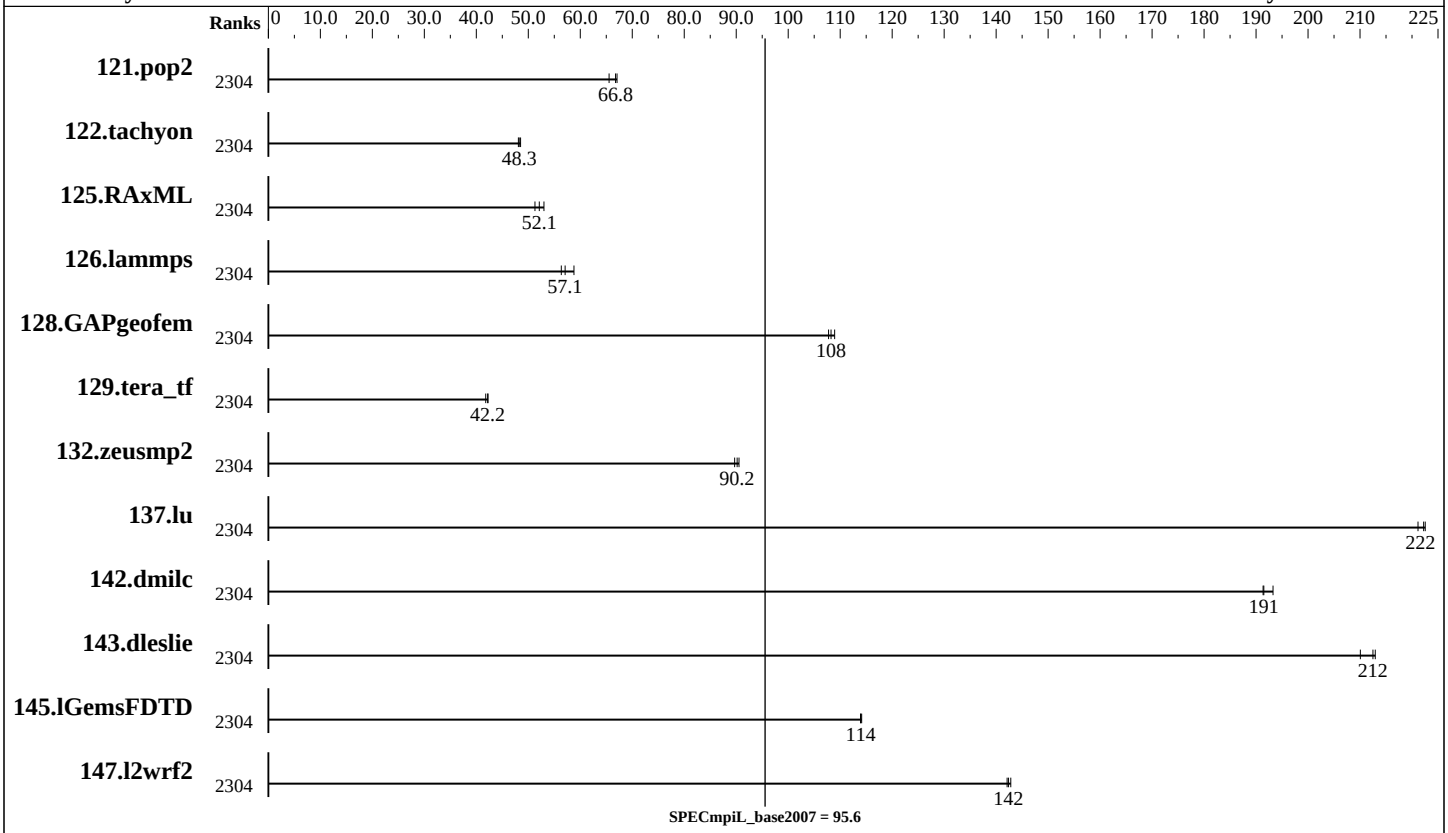
SGI 8600
(Intel Xeon Gold 6148, 2.40 GHz)

SPECmpiL_peak2007 = Not Run

SPECmpiL_base2007 = 95.6

**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 | 2304 | 59.4 | 65.5 | **58.3** | **66.8** | 58.0 | 67.1 | | | | | | | |
| 122.tachyon | 2304 | 40.4 | 48.1 | 40.1 | 48.5 | **40.3** | **48.3** | | | | | | | |
| 125.RAxML | 2304 | 55.1 | 53.0 | 56.9 | 51.3 | **56.0** | **52.1** | | | | | | | |
| 126.lammps | 2304 | **43.1** | **57.1** | 41.8 | 58.8 | 43.6 | 56.3 | | | | | | | |
| 128.GAPgeofem | 2304 | **54.8** | **108** | 54.5 | 109 | 55.1 | 108 | | | | | | | |
| 129.tera_tf | 2304 | 26.3 | 41.8 | **26.1** | **42.2** | 26.0 | 42.3 | | | | | | | |
| 132.zeusmp2 | 2304 | 23.4 | 90.5 | **23.5** | **90.2** | 23.6 | 89.7 | | | | | | | |
| 137.lu | 2304 | 19.0 | 221 | **18.9** | **222** | 18.9 | 223 | | | | | | | |
| 142.dmilc | 2304 | **19.2** | **191** | 19.3 | 191 | 19.1 | 193 | | | | | | | |
| 143.dleslie | 2304 | **14.6** | **212** | 14.8 | 210 | 14.6 | 213 | | | | | | | |
| 145.lGemsFDTD | 2304 | 38.7 | 114 | **38.7** | **114** | 38.6 | 114 | | | | | | | |
| 147.l2wrf2 | 2304 | 57.7 | 142 | **57.6** | **142** | 57.4 | 143 | | | | | | | |

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

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**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: | 64 |
| Total Chips: | 128 |
| Total Cores: | 2560 |
| Total Threads: | 5120 |
| Total Memory: | 12 TB |
| Base Ranks Run: | 2304 |
| 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: | 64 |
| 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 |

Continued on next page

### Software

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

Continued on next page

## 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<br>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<br>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: | 8 |
| 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_IB_DCIS=2
  export MPI_IB_HYPER_LAZY=false
  export MPI_CONNECTIONS_THRESHOLD=0
  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`

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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