# SPEC® MPIL2007 Result

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## Intel Corporation

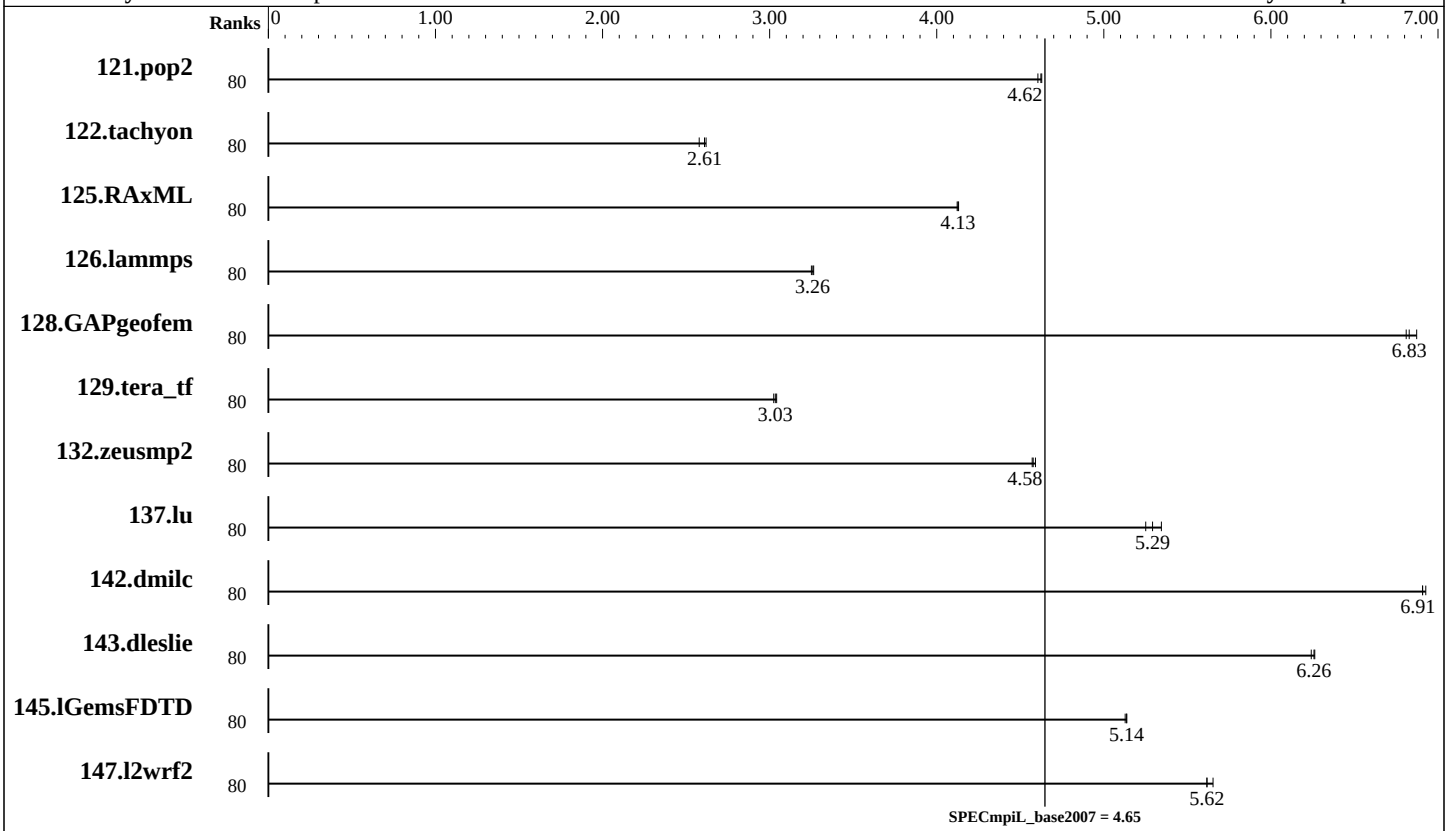
Intel Server System R2208WFTZS (Intel Xeon Gold 6148, 2.40 GHz)

SPECmpiL_peak2007 = Not Run

SPECmpiL_base2007 = 4.65

**MPI2007 license:** 13
**Test sponsor:** Intel Corporation
**Tested by:** Intel Corporation

**Test date:** Jul-2017
**Hardware Availability:** Jul-2017
**Software Availability:** Sep-2017




## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 121.pop2 | 80 | **842** | **4.62** | 845 | 4.61 | 841 | 4.63 | | | | | | | |
| 122.tachyon | 80 | 742 | 2.62 | **745** | **2.61** | 754 | 2.58 | | | | | | | |
| 125.RAxML | 80 | 707 | 4.13 | **707** | **4.13** | 708 | 4.12 | | | | | | | |
| 126.lammps | 80 | 757 | 3.25 | 753 | 3.26 | **755** | **3.26** | | | | | | | |
| 128.GAPgeofem | 80 | **869** | **6.83** | 871 | 6.81 | 863 | 6.87 | | | | | | | |
| 129.tera_tf | 80 | 361 | 3.04 | **362** | **3.03** | 363 | 3.02 | | | | | | | |
| 132.zeusmp2 | 80 | 462 | 4.59 | **463** | **4.58** | 464 | 4.57 | | | | | | | |
| 137.lu | 80 | **794** | **5.29** | 800 | 5.25 | 786 | 5.34 | | | | | | | |
| 142.dmilc | 80 | 533 | 6.91 | 532 | 6.93 | **533** | **6.91** | | | | | | | |
| 143.dleslie | 80 | 495 | 6.26 | **495** | **6.26** | 497 | 6.24 | | | | | | | |
| 145.lGemsFDTD | 80 | 860 | 5.13 | 859 | 5.14 | **859** | **5.14** | | | | | | | |
| 147.l2wrf2 | 80 | 1451 | 5.65 | **1461** | **5.62** | 1461 | 5.62 | | | | | | | |

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: | Endeavor Node |
| Interconnects: | Intel Omni-Path<br>Intel Omni-Path |
| File Server Node: | Lustre FS |
| Total Compute Nodes: | 2 |
| Total Chips: | 4 |
| Total Cores: | 80 |
| Total Threads: | 160 |
| Total Memory: | 384 GB |
| Base Ranks Run: | 80 |
| Minimum Peak Ranks: | -- |
| Maximum Peak Ranks: | -- |

### Software Summary

| | |
|---|---|
| C Compiler: | Intel C++ Composer XE 2017 for Linux Version 17.0.4.196 Build 20170411 |
| C++ Compiler: | Intel C++ Composer XE 2017 for Linux Version 17.0.4.196 Build 20170411 |
| Fortran Compiler: | Intel Fortran Composer XE 2017 for Linux Version 17.0.4.196 Build 20170411 |
| Base Pointers: | 64-bit |
| Peak Pointers: | Not Applicable |
| MPI Library: | Intel MPI Library 17u4 for Linux |
| Other MPI Info: | None |
| Pre-processors: | No |
| Other Software: | None |

## Node Description: Endeavor Node

### Hardware

| | |
|---|---|
| Number of nodes: | 2 |
| Uses of the node: | compute |
| Vendor: | Intel |
| Model: | Intel Server System R2208WFTZS (Intel Xeon Gold 6148, 2.4 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 3.7 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 DDR4-2666 ECC Registered) |
| Disk Subsystem: | 1 x 800 GB SSD (INTEL SSDSC2BA80) |
| Other Hardware: | None |
| Adapter: | Intel Omni-Path Fabric Adapter 100 series |
| Number of Adapters: | 1 |
| Slot Type: | PCI-Express x16 |
| Data Rate: | 12.5 GB/s |
| Ports Used: | 1 |
| Interconnect Type: | Intel Omni-Path Fabric Adapter 100 series |
| Adapter: | Intel Omni-Path Edge Switch 100 series |
| Number of Adapters: | 1 |
| Slot Type: | PCI-Express x16 |
| Data Rate: | 12.5 GB/s |
| Ports Used: | 1 |
| Interconnect Type: | Intel Omni-Path Fabric Adapter 100 series |

### Software

| | |
|---|---|
| Adapter: | Intel Omni-Path Fabric Adapter 100 series |
| Adapter Driver: | IFS 10.4 |
| Adapter Firmware: | 0.9-46 |
| Adapter: | Intel Omni-Path Edge Switch 100 series |
| Adapter Driver: | IFS 10.4 |
| Adapter Firmware: | 0.9-46 |
| Operating System: | Oracle Linux Server release 7.3, Kernel 3.10.0-514.6.2.0.1.el7.x86_64.knl1 |
| Local File System: | Linux/xfs |
| Shared File System: | LFS |
| System State: | Multi-User |
| Other Software: | IBM Platform LSF Standard 9.1.1.1 |

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**Hardware Availability:** Jul-2017
**Software Availability:** Sep-2017

## Node Description: Lustre FS

### Hardware

| | |
|---|---|
| Number of nodes: | 11 |
| Uses of the node: | fileserver |
| Vendor: | Intel |
| Model: | Intel Server System R2224GZ4GC4 |
| CPU Name: | Intel Xeon E5-2680 |
| CPU(s) orderable: | 1-2 chips |
| Chips enabled: | 2 |
| Cores enabled: | 16 |
| Cores per chip: | 8 |
| Threads per core: | 2 |
| CPU Characteristics: | Intel Turbo Boost Technology disabled |
| CPU MHz: | 2700 |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 2 MB I+D on chip per chip |
| L3 Cache: | 20 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 64 GB (8 x 8GB 1600MHz Reg ECC DDR3) |
| Disk Subsystem: | 2.1 TB |
| Other Hardware: | None |
| Adapter: | Intel Omni-Path Fabric Adapter 100 series |
| Number of Adapters: | 1 |
| Slot Type: | PCI-Express x16 |
| Data Rate: | 12.5 GB/s |
| Ports Used: | 1 |
| Interconnect Type: | Intel Omni-Path Fabric Adapter 100 series |

### Software

| | |
|---|---|
| Adapter: | Intel Omni-Path Fabric Adapter 100 series |
| Adapter Driver: | IFS 10.4 |
| Adapter Firmware: | 0.9-46 |
| Operating System: | Redhat* Enterprise Linux* Server Release 7.2, Kernel 3.10.0-514.6.2.0.1.el7.x86_64.knl1 |
| Local File System: | None |
| Shared File System: | Lustre FS |
| System State: | Multi-User |
| Other Software: | None |

## Interconnect Description: Intel Omni-Path

### Hardware

| | |
|---|---|
| Vendor: | Intel |
| Model: | Intel Omni-Path 100 series |
| Switch Model: | Intel Omni-Path Edge Switch 100 series |
| Number of Switches: | 24 |
| Number of Ports: | 48 |
| Data Rate: | 12.5 GB/s |
| Firmware: | 0.9-46 |
| Topology: | Fat tree |
| Primary Use: | MPI traffic |

### Software

## Interconnect Description: Intel Omni-Path

| Hardware | | Software |
|---|---|---|
| Vendor: | Intel Corporation | |
| Model: | Intel Omni-Path 100 series | |
| Switch Model: | Intel Omni-Path Edge Switch 100 series | |
| Number of Switches: | 1 | |
| Number of Ports: | 48 | |
| Data Rate: | 12.5 GB/s | |
| Firmware: | 0.9-46 | |
| Topology: | Fat tree | |
| Primary Use: | Cluster File System | |

## Submit Notes

```
The config file option 'submit' was used.
```

## General Notes

```
MPI startup command:
  mpiexec.hydra command was used to start MPI jobs.
Software environment:
  export I_MPI_COMPATIBILITY=3
  export I_MPI_FABRICS=shm:tmi
  export I_MPI_HYDRA_PMI_CONNECT=alltoall
Network:
  Endeavour Omni-Path fabric consists of 48-port switches = 24 core switches
  connected to each leaf of the rack switch.
Job placement:
  Each MPI job was assigned to a topologically compact set of nodes, i.e.
  the minimal needed number of leaf switches was used for each job = 1 switch
  for 40/80/160/320/640 ranks, 2 switches for 1280 and 1980 ranks.
IBM Platform LSF was used for job submission. It has no impact on performance.
  Information can be found at: http://www.ibm.com
```

# Base Compiler Invocation

C benchmarks:
`mpiicc`

C++ benchmarks:

126.lammps: `mpiicpc`

Fortran benchmarks:
`mpiifort`

Continued on next page

## Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
mpiicc mpiifort

## Base Portability Flags

121.pop2: -DSPEC_MPI_CASE_FLAG
126.lammps: -DMPICH_IGNORE_CXX_SEEK

## Base Optimization Flags

C benchmarks:
-O3 -xCORE-AVX512 -no-prec-div

C++ benchmarks:

126.lammps: -O3 -xCORE-AVX512 -no-prec-div

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

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

The flags file that was used to format this result can be browsed at
http://www.spec.org/mpi2007/flags/EM64T_Intel140_flags.20170822.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/mpi2007/flags/EM64T_Intel140_flags.20170822.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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