



# SPEC<sup>®</sup> MPIL2007 Result

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## Intel Corporation

SPECmpiL\_peak2007 = Not Run

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

SPECmpiL\_base2007 = 35.5

MPI2007 license: 13

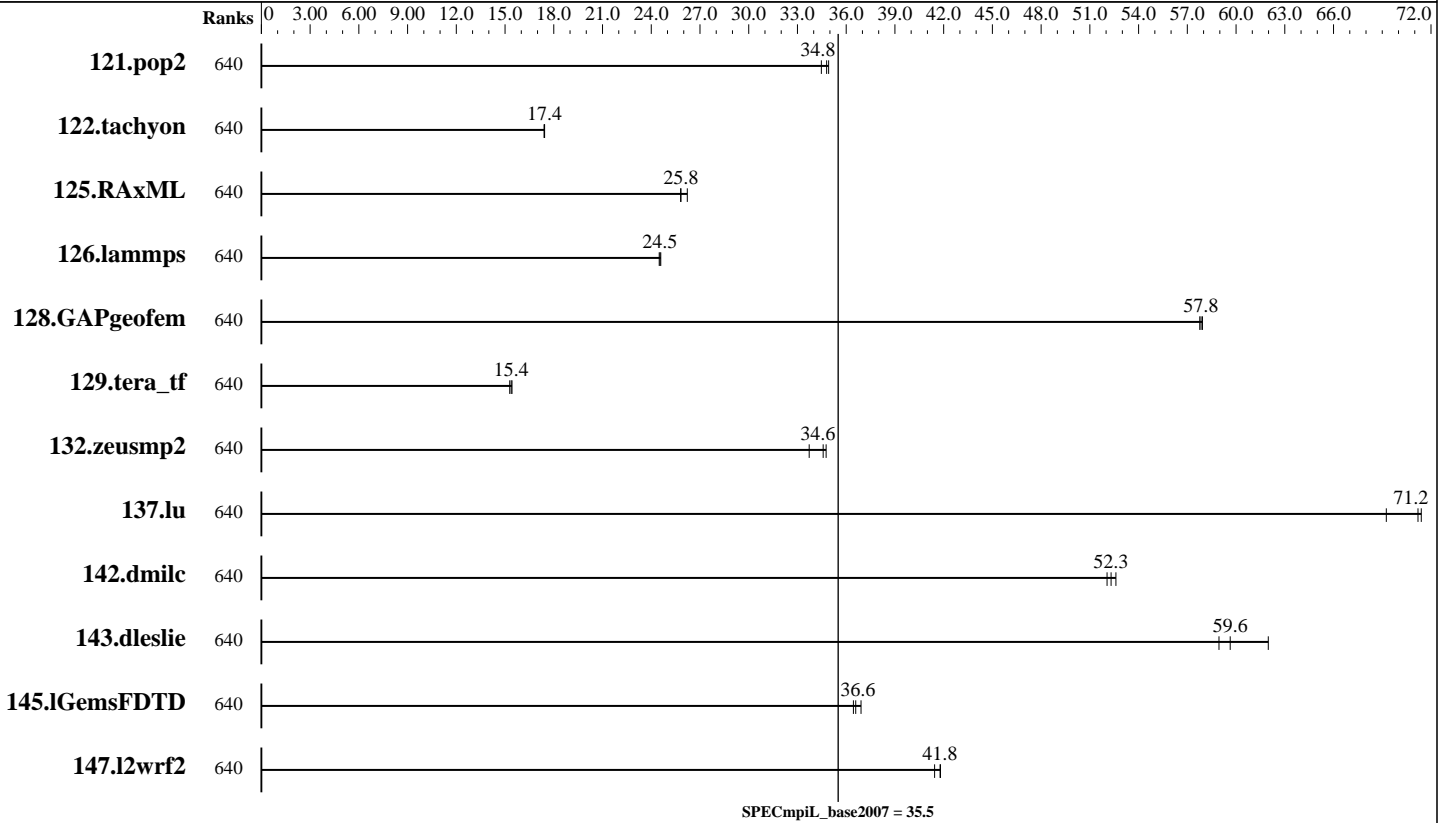
Test date: Jul-2017

Test sponsor: Intel Corporation

Hardware Availability: Jul-2017

Tested by: Intel Corporation

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	640	113	34.5	111	34.9	<u>112</u>	<u>34.8</u>									
122.tachyon	640	112	17.4	112	17.4	<u>112</u>	<u>17.4</u>									
125.RAxML	640	111	26.2	<u>113</u>	<u>25.8</u>	113	25.8									
126.lammps	640	<u>100</u>	<u>24.5</u>	100	24.5	100	24.6									
128.GAPgeofem	640	102	57.9	103	57.8	<u>103</u>	<u>57.8</u>									
129.tera_tf	640	71.2	15.4	71.9	15.3	<u>71.5</u>	<u>15.4</u>									
132.zeusmp2	640	62.9	33.7	61.0	34.8	<u>61.3</u>	<u>34.6</u>									
137.lu	640	58.9	71.4	60.7	69.2	<u>59.0</u>	<u>71.2</u>									
142.dmilc	640	70.0	52.6	<u>70.4</u>	<u>52.3</u>	70.8	52.1									
143.dleslie	640	52.6	58.9	50.0	62.0	<u>52.0</u>	<u>59.6</u>									
145.lGemsFDTD	640	121	36.4	<u>121</u>	<u>36.6</u>	119	36.9									
147.l2wrf2	640	<u>196</u>	<u>41.8</u>	196	41.8	198	41.4									

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

Standard Performance Evaluation Corporation

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http://www.spec.org/



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### Hardware Summary

### Software Summary

Type of System: Homogeneous  
 Compute Node: Endeavor Node  
 Interconnects: Intel Omni-Path  
 Intel Omni-Path  
 File Server Node: Lustre FS  
 Total Compute Nodes: 16  
 Total Chips: 32  
 Total Cores: 640  
 Total Threads: 1280  
 Total Memory: 3 TB  
 Base Ranks Run: 640  
 Minimum Peak Ranks: --  
 Maximum Peak Ranks: --

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

### Software

Number of nodes: 16  
 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

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/xfst  
 Shared File System: LFS  
 System State: Multi-User  
 Other Software: IBM Platform LSF Standard 9.1.1.1



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### Node Description: Lustre FS

Hardware		Software	
Number of nodes:	11	Adapter:	Intel Omni-Path Fabric Adapter 100 series
Uses of the node:	fileserver	Adapter Driver:	IFS 10.4
Vendor:	Intel	Adapter Firmware:	0.9-46
Model:	Intel Server System R2224GZ4GC4	Operating System:	Redhat* Enterprise Linux* Server Release 7.2, Kernel 3.10.0-514.6.2.0.1.el7.x86_64.knl1
CPU Name:	Intel Xeon E5-2680	Local File System:	None
CPU(s) orderable:	1-2 chips	Shared File System:	Lustre FS
Chips enabled:	2	System State:	Multi-User
Cores enabled:	16	Other Software:	None
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		

### Interconnect Description: Intel Omni-Path

Hardware		Software	
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		



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## 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

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## 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 -ipo

C++ benchmarks:

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

Fortran benchmarks:

-O3 -xCORE-AVX512 -no-prec-div -ipo

Benchmarks using both Fortran and C:

-O3 -xCORE-AVX512 -no-prec-div -ipo

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](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](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](mailto:webmaster@spec.org).

Tested with SPEC MPI2007 v2.0.1.

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