



# SPEC® OMPG2012 Result

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## Intel

Intel Server System S9248WK1HLC (2 x Intel Xeon Platinum 9242, 2.3Ghz)

SPECompG\_peak2012 = 44.1

SPECompG\_base2012 = 37.0

OMP2012 license:13

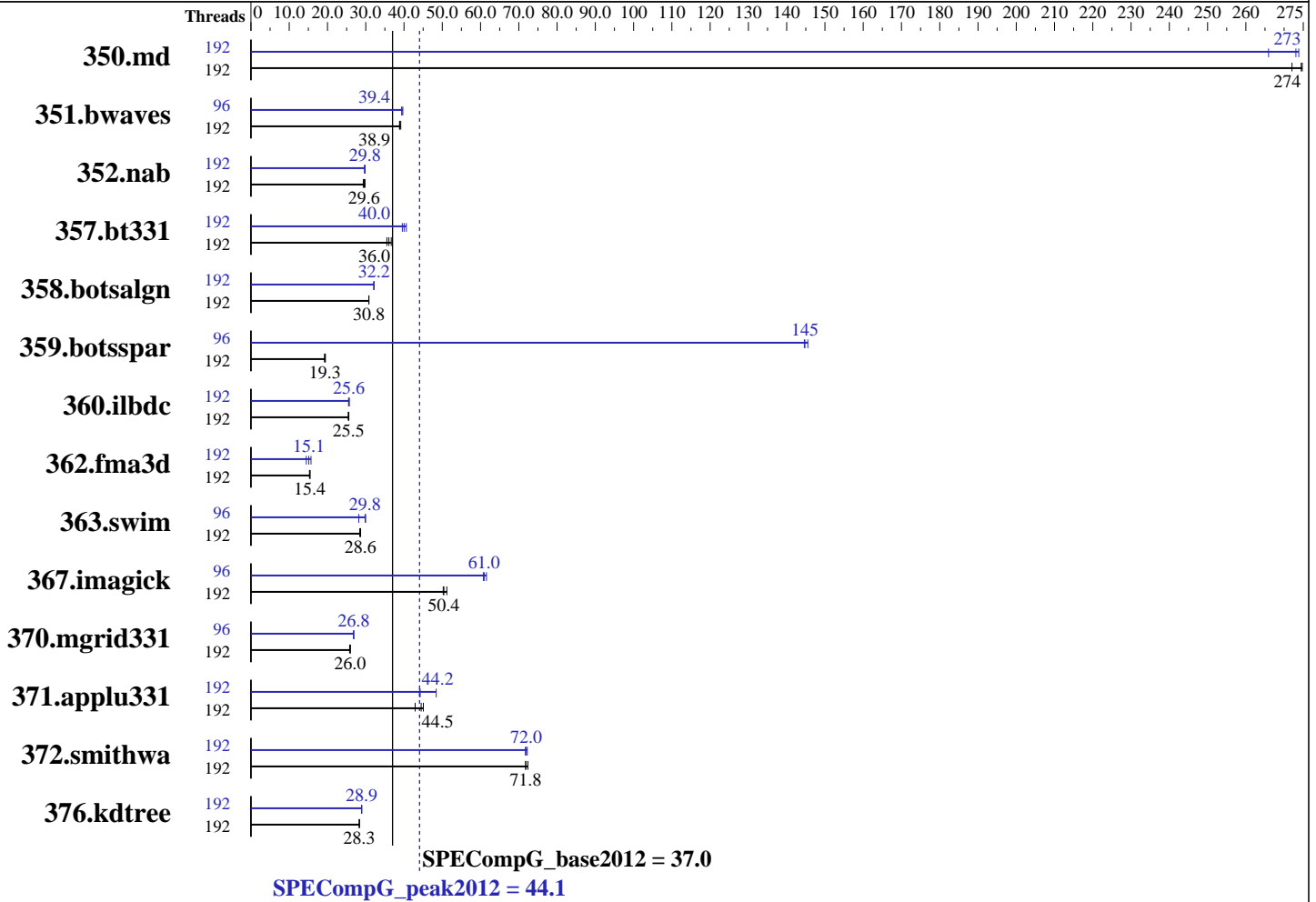
Test sponsor: Intel

Tested by: Intel

Test date: Nov-2019

Hardware Availability: Jun-2019

Software Availability: Jan-2019



### Hardware

CPU Name: Intel Xeon Platinum 9242  
 CPU Characteristics: Intel Turbo Boost Technology : Up to 3.80 Ghz  
 CPU MHz: 2300  
 CPU MHz Maximum: 3800  
 FPU: Integrated  
 CPU(s) enabled: 96 cores, 2 chips, 48 cores/chip, 2 threads/core  
 CPU(s) orderable: 1,2 Chips  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 1 MB I+D on chip per core  
 L3 Cache: 71.5 MB I+D on chip per chip, 35.75 MB shared / 24 cores  
 Other Cache: None  
 Memory: 384 GB (24 x 16 GB 2Rx8 DDR4-2993Y-R)  
 Disk Subsystem: Panasas ActiveStor 14 (124TB connected via 10GB Ethernet)  
 Other Hardware: --

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### Software

Operating System: CentOS Linux release 7.7.1908 (Core)  
 Compiler: C/C++/Fortran: Version 19.0.2.187 of Intel Composer XE for Linux  
 Auto Parallel: No  
 File System: Linux ext3  
 System State: Run Level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other Software: None



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Base Threads Run: 192  
Minimum Peak Threads: 96  
Maximum Peak Threads: 192

## Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
350.md	192	17.0	272	<u>16.9</u>	<u>274</u>	16.9	275	192	<u>17.0</u>	<u>273</u>	16.9	274	17.4	266
351.bwaves	192	<b>116</b>	<b>38.9</b>	117	38.8	116	39.2	96	115	39.4	<b>115</b>	<b>39.4</b>	114	39.7
352.nab	192	133	29.3	<b>131</b>	<b>29.6</b>	131	29.8	192	130	29.8	<b>131</b>	<b>29.8</b>	131	29.7
357.bt331	192	133	35.5	129	36.7	<b>132</b>	<b>36.0</b>	192	<b>118</b>	<b>40.0</b>	120	39.6	117	40.6
358.botsalgn	192	<b>141</b>	<b>30.8</b>	141	30.8	141	30.8	192	135	32.2	<b>135</b>	<b>32.2</b>	135	32.1
359.botsspar	192	<b>272</b>	<b>19.3</b>	270	19.5	273	19.2	96	36.1	146	36.3	145	<b>36.3</b>	<b>145</b>
360.ilbdc	192	<b>139</b>	<b>25.5</b>	139	25.6	140	25.4	192	<b>139</b>	<b>25.6</b>	138	25.7	140	25.5
362.fma3d	192	249	15.3	246	15.4	<b>247</b>	<b>15.4</b>	192	242	15.7	263	14.5	<b>251</b>	<b>15.1</b>
363.swim	192	<b>158</b>	<b>28.6</b>	158	28.7	159	28.4	96	<b>152</b>	<b>29.8</b>	151	30.0	161	28.2
367.imagick	192	137	51.2	140	50.2	<b>139</b>	<b>50.4</b>	96	114	61.6	<b>115</b>	<b>61.0</b>	116	60.7
370.mgrid331	192	170	26.0	<b>170</b>	<b>26.0</b>	171	25.8	96	165	26.8	<b>165</b>	<b>26.8</b>	165	26.9
371.applu331	192	141	42.9	<b>136</b>	<b>44.5</b>	135	45.1	192	125	48.4	<b>137</b>	<b>44.2</b>	138	44.1
372.smithwa	192	74.6	71.8	<b>74.6</b>	<b>71.8</b>	74.1	72.4	192	74.2	72.2	74.7	71.7	<b>74.5</b>	<b>72.0</b>
376.kdtree	192	159	28.3	<b>159</b>	<b>28.3</b>	159	28.3	192	<b>156</b>	<b>28.9</b>	156	28.9	155	29.0

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

## Platform Notes

Sysinfo program /global/panfs02/innl/aknyazel/OMP2012/1.1/Docs/sysinfo  
Revision 563 of 2016-06-10 (097295389cf6073d8c3b03fa376740a5)  
running on eca063 Tue Nov 5 02:49:23 2019

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:  
<http://www.spec.org/omp2012/Docs/config.html#sysinfo>

From /proc/cpuinfo

```
model name : Intel(R) Xeon(R) Platinum 9242 CPU @ 2.30GHz
4 "physical id"s (chips)
192 "processors"
```

cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

```
cpu cores : 24
siblings : 48
```

```
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27
28 29
```

```
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27
28 29
```

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### Platform Notes (Continued)

```

physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27
28 29
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27
28 29
cache size : 36608 KB

```

From /proc/meminfo

MemTotal: 394837156 kB

HugePages\_Total: 0

Hugepagesize: 2048 kB

From /etc/\*release\* /etc/\*version\*

centos-release: CentOS Linux release 7.7.1908 (Core)

centos-release-upstream: Derived from Red Hat Enterprise Linux 7.7 (Source)

os-release:

NAME="CentOS Linux"

VERSION="7 (Core)"

ID="centos"

ID\_LIKE="rhel fedora"

VERSION\_ID="7"

PRETTY\_NAME="CentOS Linux 7 (Core)"

ANSI\_COLOR="0;31"

CPE\_NAME="cpe:/o:centos:centos:7"

redhat-release: CentOS Linux release 7.7.1908 (Core)

system-release: CentOS Linux release 7.7.1908 (Core)

system-release-cpe: cpe:/o:centos:centos:7

uname -a:

Linux eca063 3.10.0-1062.4.1.el7.crt1.x86\_64 #1 SMP Fri Oct 18 09:12:13 MDT 2019 x86\_64 x86\_64 x86\_64 GNU/Linux

run-level 3 Nov 4 15:11

SPEC is set to: /global/panfs02/innl/aknyazel/OMP2012/1.1

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
panfs://36.101.212.1/innl	panfs	269T	145T	125T	54%	/global/panfs02/innl

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

(End of data from sysinfo program)

### General Notes

=====

General base OMP Library Settings

ENV\_KMP\_AFFINITY=compact,0,granularity=fine,verbose

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Standard Performance Evaluation Corporation

info@spec.org

http://www.spec.org/



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### General Notes (Continued)

=====

General peak OMP Library Settings

ENV\_KMP\_AFFINITY=compact,0,granularity=fine,verbose

=====

Per benchmark peak OMP Library Settings

=====

System settings notes:

Intel Turbo Boost Technology (Turbo) : Enabled

=====

General OMP Library Settings

KMP\_LIBRARY=turnaround

KMP\_STACKSIZE=292M

KMP\_BLOCKTIME=infinite

OMP\_DYNAMIC=FALSE

OMP\_NESTED=FALSE

OMP\_SCHEDULE=static

Spectre and Meltdown

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

=====

351.bwaves:peak:

ENV\_KMP\_AFFINITY=compact,1,granularity=fine,verbose

=====

359.botsspar:peak:

ENV\_KMP\_AFFINITY=compact,1,granularity=fine,verbose

=====

363.swim:peak:

ENV\_KMP\_AFFINITY=compact,1,granularity=fine,verbose

=====

367.imagick:peak:

ENV\_KMP\_AFFINITY=compact,1,granularity=fine,verbose

=====

370.mgrid331:peak:

ENV\_KMP\_AFFINITY=compact,1,granularity=fine,verbose

=====

370.mgrid331:peak:

Compiler: Fortran: Version 19.0.3.199 of Intel Composer XE for Linux



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## Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

## Base Portability Flags

350.md: -FR  
357.bt331: -mmodel=medium  
363.swim: -mmodel=medium  
367.imagick: -std=c99

## Base Optimization Flags

C benchmarks:

-O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high -fp-model fast=2  
-ansi-alias -no-prec-div -no-prec-sqrt -ipo -qopt-prefetch=0

C++ benchmarks:

-O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high -fp-model fast=2  
-ansi-alias -no-prec-div -no-prec-sqrt -ipo -qopt-prefetch=0

Fortran benchmarks:

-O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high -fp-model fast=2  
-ansi-alias -no-prec-div -no-prec-sqrt -ipo -qopt-prefetch=0  
-align all

## Peak Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks (except as noted below):

ifort

371.applu331: /opt/intel/compiler/2019u3/bin/ifort



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## Peak Portability Flags

350.md: -FR  
357.bt331: -mcmmodel=medium  
363.swim: -mcmmodel=medium  
367.imagick: -std=c99

## Peak Optimization Flags

### C benchmarks:

352.nab: -O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high  
-fp-model fast=2 -ansi-alias -no-prec-div -no-prec-sqrt  
-ipo -qopt-prefetch=0  
358.botsalgn: -O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high  
-fp-model fast=2 -fno-alias -no-prec-div -no-prec-sqrt  
359.botsspar: Same as 358.botsalgn  
367.imagick: -O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high  
-fp-model fast=2 -fno-alias -no-prec-div -no-prec-sqrt -ipo  
372.smithwa: Same as 352.nab

### C++ benchmarks:

-O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high -fp-model fast=2  
-fno-alias -no-prec-div -no-prec-sqrt -qopt-prefetch=1

### Fortran benchmarks:

350.md: -O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high  
-fp-model fast=2 -ansi-alias -no-prec-div -no-prec-sqrt  
-ipo -qopt-prefetch=0 -align all  
351.bwaves: -O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high  
-fp-model fast=2 -fno-alias -no-prec-div -no-prec-sqrt  
-ipo -qopt-prefetch=2 -align all  
357.bt331: -O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high  
-fp-model fast=2 -fno-alias -no-prec-div -no-prec-sqrt  
-ipo -qopt-prefetch=1 -align all  
360.ilbdc: -O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high  
-fp-model fast=2 -fno-alias -no-prec-div -no-prec-sqrt  
-ipo -qopt-prefetch=4 -align all  
362.fma3d: Same as 350.md

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## Peak Optimization Flags (Continued)

363.swim: -O3 -qopenmp -xCORE-AVX512 -qopt-zmm-usage=high  
-fp-model fast=2 -no-prec-div -no-prec-sqrt -fno-alias  
-qopt-malloc-options=3 -ipo -qopt-prefetch=0 -align all

370.mgrid331: -O3 -qopenmp -xCORE-AVX2 -fp-model fast=2 -no-prec-div  
-no-prec-sqrt -fno-alias -qopt-malloc-options=3 -ipo  
-qopt-prefetch=0 -align all

371.applu331: Same as 350.md

The flags file that was used to format this result can be browsed at

<http://www.spec.org/omp2012/flags/Intel-ic19-linux64.20191218.html>

You can also download the XML flags source by saving the following link:

<http://www.spec.org/omp2012/flags/Intel-ic19-linux64.20191218.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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