



# SPEC® OMPG2012 Result

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## Intel

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

SPECompG\_peak2012 = 40.2

SPECompG\_base2012 = 34.1

OMP2012 license:13

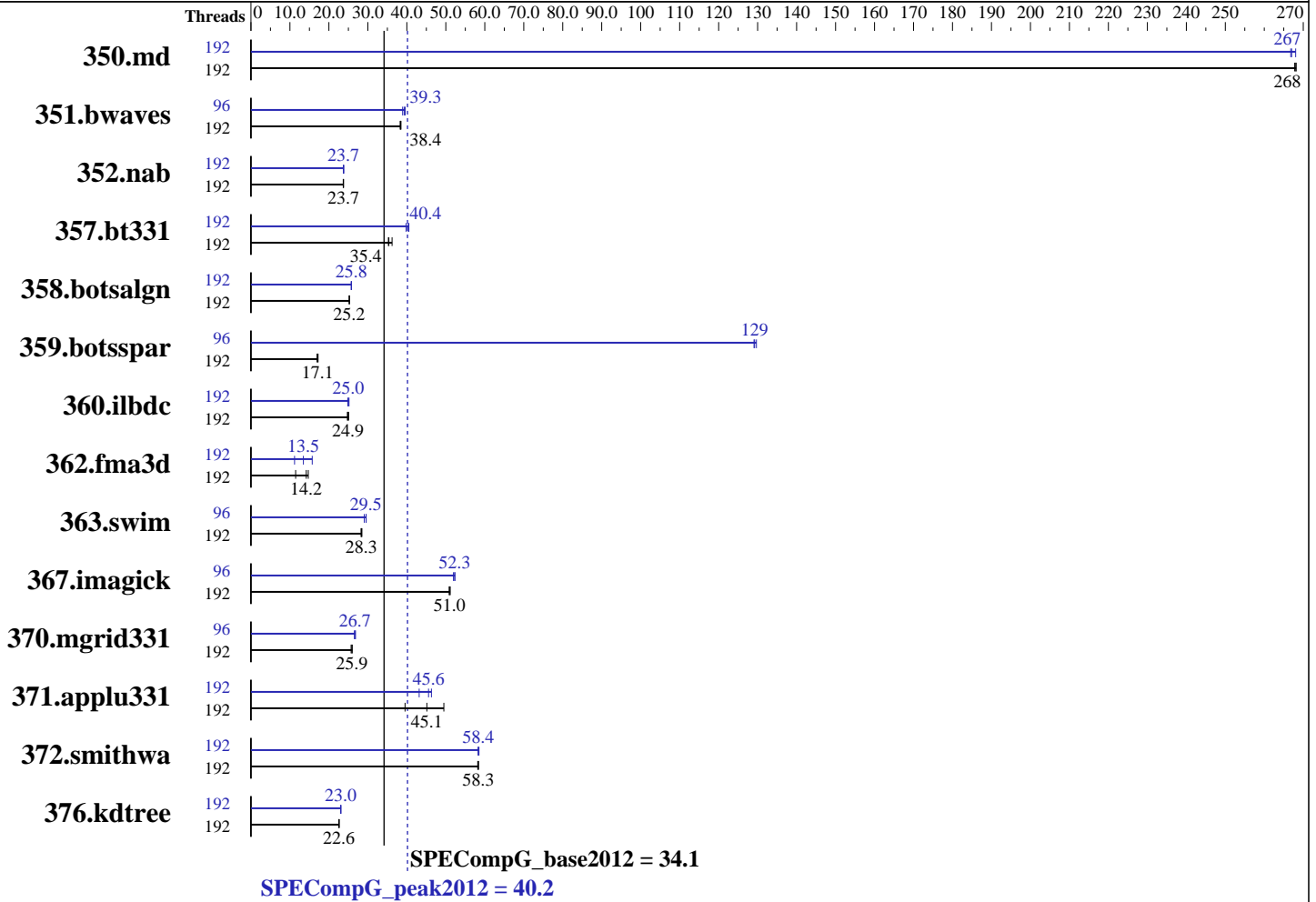
Test sponsor: Intel

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 : Disabled  
 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	17.3	268	<u>17.3</u>	<u>268</u>	17.3	268	192	17.3	268	<u>17.3</u>	<u>267</u>	17.4	267
351.bwaves	192	<b>118</b>	<b>38.4</b>	118	38.3	118	38.5	96	<b>115</b>	<b>39.3</b>	114	39.6	116	38.9
352.nab	192	164	23.7	164	23.8	<b>164</b>	<b>23.7</b>	192	<b>164</b>	<b>23.7</b>	163	23.8	164	23.7
357.bt331	192	131	36.2	134	35.3	<b>134</b>	<b>35.4</b>	192	117	40.5	119	39.8	<b>117</b>	<b>40.4</b>
358.botsalgn	192	172	25.2	172	25.2	<b>172</b>	<b>25.2</b>	192	169	25.8	<b>169</b>	<b>25.8</b>	169	25.8
359.botsspar	192	305	17.2	310	17.0	<b>307</b>	<b>17.1</b>	96	40.5	130	40.7	129	<b>40.6</b>	<b>129</b>
360.ilbdc	192	142	25.1	<b>143</b>	<b>24.9</b>	144	24.7	192	<b>142</b>	<b>25.0</b>	142	25.2	143	24.8
362.fma3d	192	<b>268</b>	<b>14.2</b>	258	14.7	331	11.5	192	340	11.2	242	15.7	<b>282</b>	<b>13.5</b>
363.swim	192	159	28.5	<b>160</b>	<b>28.3</b>	160	28.3	96	156	29.1	<b>153</b>	<b>29.5</b>	153	29.6
367.imagick	192	<b>138</b>	<b>51.0</b>	138	50.9	137	51.1	96	<b>134</b>	<b>52.3</b>	135	52.0	134	52.3
370.mgrid331	192	<b>171</b>	<b>25.9</b>	170	26.0	172	25.7	96	<b>166</b>	<b>26.7</b>	167	26.5	165	26.8
371.applu331	192	122	49.5	153	39.5	<b>134</b>	<b>45.1</b>	192	<b>133</b>	<b>45.6</b>	131	46.3	140	43.2
372.smithwa	192	91.8	58.4	92.1	58.2	<b>91.9</b>	<b>58.3</b>	192	<b>91.8</b>	<b>58.4</b>	91.6	58.5	92.0	58.3
376.kdtree	192	199	22.6	<b>199</b>	<b>22.6</b>	199	22.6	192	<b>195</b>	<b>23.0</b>	195	23.1	195	23.0

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 eca009 Wed Nov 6 02:23:43 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:      394837152 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 eca009 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 15:10

```

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 144T 126T 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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## 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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