SPEC® OMPG2012 Result

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Intel

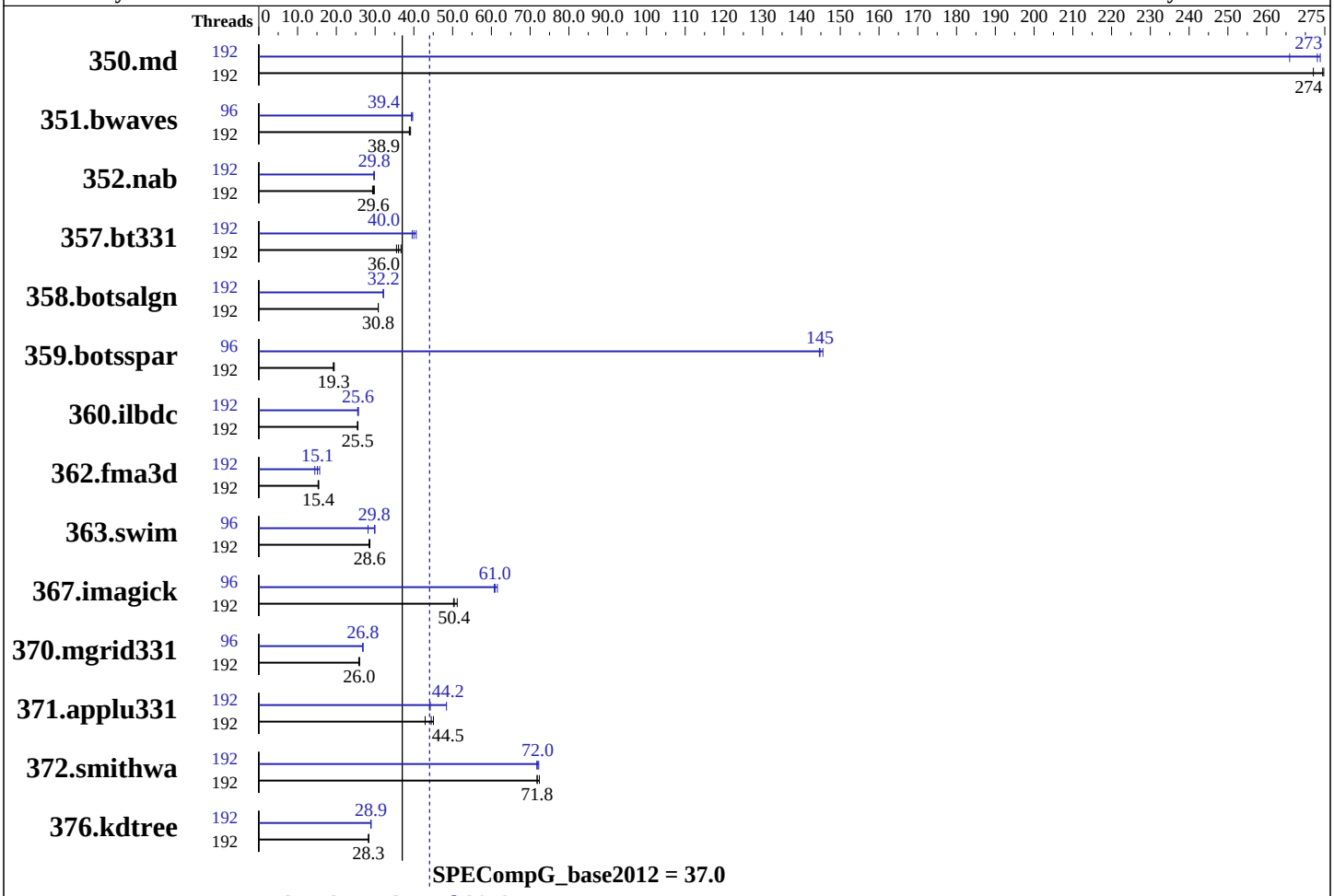
Intel Server System S9248WK1HLC (2 x Intel Xeon Platinum 9242, 2.3Ghz)

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	**16.9**	**274**	16.9	275	192	**17.0**	**273**	16.9	274	17.4	266
351.bwaves	192	**116**	**38.9**	117	38.8	116	39.2	96	115	39.4	**115**	**39.4**	114	39.7
352.nab	192	133	29.3	**131**	**29.6**	131	29.8	192	130	29.8	**131**	**29.8**	131	29.7
357.bt331	192	133	35.5	129	36.7	**132**	**36.0**	192	**118**	**40.0**	120	39.6	117	40.6
358.botsalgn	192	**141**	**30.8**	141	30.8	141	30.8	192	135	32.2	**135**	**32.2**	135	32.1
359.botsspar	192	**272**	**19.3**	270	19.5	273	19.2	96	36.1	146	36.3	145	**36.3**	**145**
360.ilbdc	192	**139**	**25.5**	139	25.6	140	25.4	192	**139**	**25.6**	138	25.7	140	25.5
362.fma3d	192	249	15.3	246	15.4	**247**	**15.4**	192	242	15.7	263	14.5	**251**	**15.1**
363.swim	192	**158**	**28.6**	158	28.7	159	28.4	96	**152**	**29.8**	151	30.0	161	28.2
367.imagick	192	137	51.2	140	50.2	**139**	**50.4**	96	114	61.6	**115**	**61.0**	116	60.7
370.mgrid331	192	170	26.0	**170**	**26.0**	171	25.8	96	165	26.8	**165**	**26.8**	165	26.9
371.applu331	192	141	42.9	**136**	**44.5**	135	45.1	192	125	48.4	**137**	**44.2**	138	44.1
372.smithwa	192	74.6	71.8	**74.6**	**71.8**	74.1	72.4	192	74.2	72.2	74.7	71.7	**74.5**	**72.0**
376.kdtree	192	159	28.3	**159**	**28.3**	159	28.3	192	**156**	**28.9**	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/aknyaze1/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/aknyaze1/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
```

Continued on next page

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
```

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Base Portability Flags

350.md: -FR
357.bt331: -mcmodel=medium
363.swim: -mcmodel=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

Peak Portability Flags

350.md: -FR
357.bt331: -mcmodel=medium
363.swim: -mcmodel=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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