SPEC® CPU2017 Floating Point Rate Result

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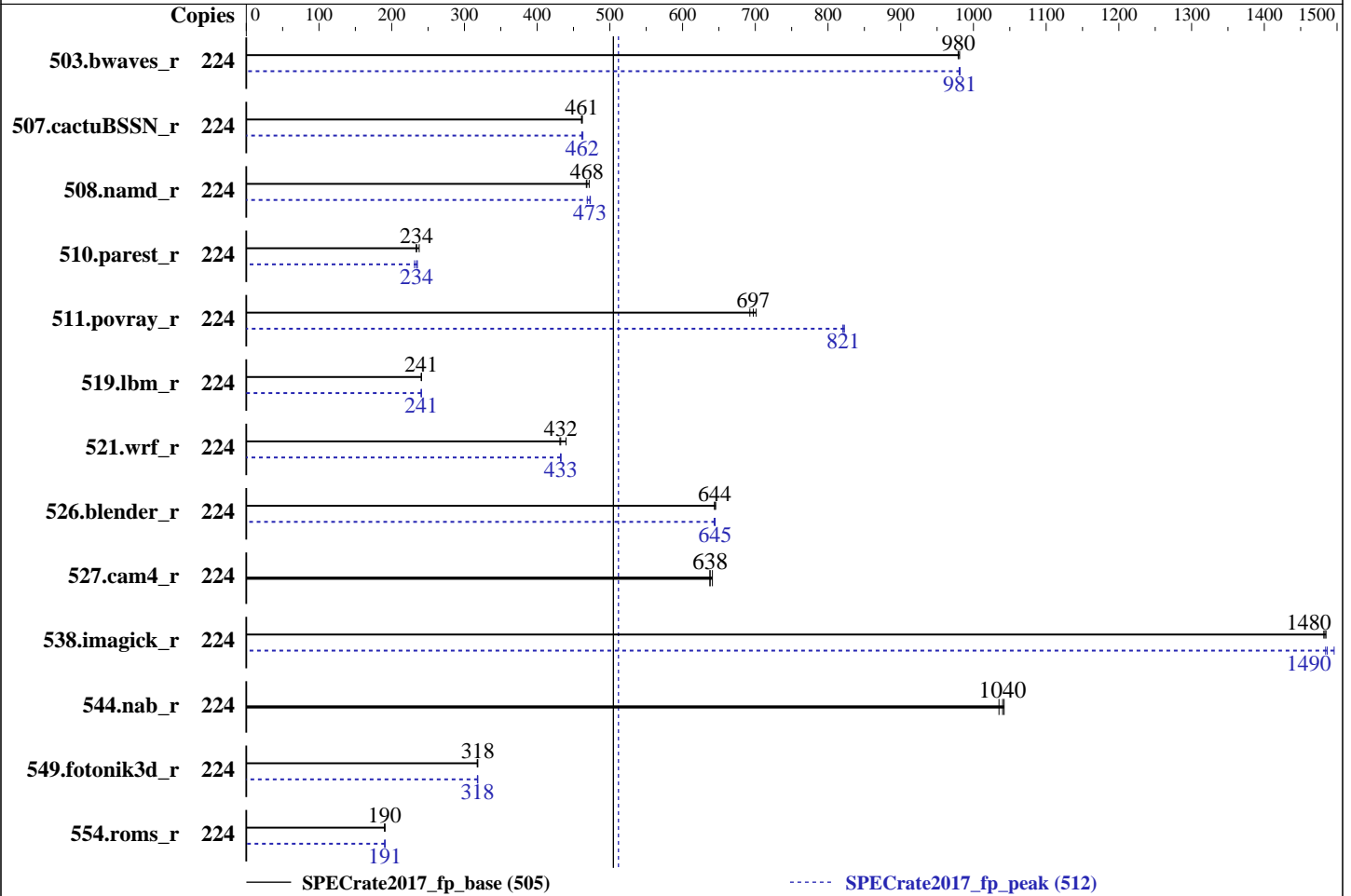## Sugon

I840-G30(Intel Xeon Platinum 8180)

SPECrate2017_fp_base = 505

SPECrate2017_fp_peak = 512

CPU2017 License: 9046
Test Sponsor: Sugon
Tested by: Sugon

Test Date: Aug-2018
Hardware Availability: Apr-2018
Software Availability: May-2018

Copies		
503.bwaves_r	224	base 980 / peak 981
507.cactuBSSN_r	224	base 461 / peak 462
508.namd_r	224	base 468 / peak 473
510.parest_r	224	base 234 / peak 234
511.povray_r	224	base 697 / peak 821
519.lbm_r	224	base 241 / peak 241
521.wrf_r	224	base 432 / peak 433
526.blender_r	224	base 644 / peak 645
527.cam4_r	224	base 638
538.imagick_r	224	base 1480 / peak 1490
544.nab_r	224	base 1040
549.fotonik3d_r	224	base 318 / peak 318
554.roms_r	224	base 190 / peak 191

—— SPECrate2017_fp_base (505)   ------ SPECrate2017_fp_peak (512)

Hardware

CPU Name: Intel Xeon Platinum 8180
 Max MHz.: 3800
 Nominal: 2500
Enabled: 112 cores, 4 chips, 2 threads/core
Orderable: 2, 4
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 38.5 MB I+D on chip per chip
Other: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1x 2.0 TB SATA, 7200 RPM
Other: None

Software

OS: Red Hat Enterprise Linux Server release 7.5
 (Maipo)
 3.10.0-862.el7.x86_64
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++
 Compiler for Linux;
 Fortran: Version 18.0.2.199 of Intel Fortran
 Compiler for Linux
Parallel: No
Firmware: American Megatrends Inc. BIOS Version 0THSY016 released Apr-2018
File System: xfs
System State: Run level 5 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None

Standard Performance Evaluation Corporation (info@spec.org)

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Results Table

Benchmark	Base						Peak					
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	224	2295	979	**2293**	**980**	2290	981	224	**2290**	**981**	2288	982	2291	980
507.cactuBSSN_r	224	**615**	**461**	615	461	614	462	224	613	463	614	462	**614**	**462**
508.namd_r	224	455	468	**454**	**468**	451	472	224	450	473	**450**	**473**	454	469
510.parest_r	224	2464	238	2509	234	**2500**	**234**	224	2532	231	2490	235	**2503**	**234**
511.povray_r	224	755	693	**750**	**697**	746	701	224	**637**	**821**	637	821	636	823
519.lbm_r	224	**980**	**241**	980	241	981	241	224	**981**	**241**	981	241	981	241
521.wrf_r	224	1141	440	1163	431	**1160**	**432**	224	1161	432	**1160**	**433**	1160	433
526.blender_r	224	528	646	530	644	**530**	**644**	224	529	645	**529**	**645**	530	643
527.cam4_r	224	611	641	614	638	**614**	**638**	224	611	641	614	638	**614**	**638**
538.imagick_r	224	**376**	**1480**	375	1480	376	1480	224	372	1500	375	1480	**375**	**1490**
544.nab_r	224	364	1040	**362**	**1040**	362	1040	224	364	1040	**362**	**1040**	362	1040
549.fotonik3d_r	224	2749	318	**2743**	**318**	2742	318	224	2741	318	**2744**	**318**	2747	318
554.roms_r	224	1867	191	1871	190	**1870**	**190**	224	1871	190	1866	191	**1866**	**191**

SPECrate2017_fp_base =	**505**
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/i840g30/benchmark/cpu2017/lib/ia32:/home/i840g30/benchmark/cpu2017/lib/intel64:
/home/i840g30/benchmark/cpu2017/je5.0.1-32:/home/i840g30/benchmark/cpu2017/je5.0.1-64"
  Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM
  memory using Redhat Enterprise Linux 7.5
  Transparent Huge Pages enabled by default
  Prior to runcpu invocation
  Filesystem page cache synced and cleared with:
  sync; echo 3>   /proc/sys/vm/drop_caches
  runcpu command invoked through numactl i.e.:
  numactl --interleave=all runcpu <etc>
  Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
  is mitigated in the system as tested and documented.

(Continued on next page)

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General Notes (Continued)

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.

Platform Notes

```
BIOS Settings:
 Sugon Performance Profile = Computing Throughput Mode
 SNC = Enable
 IMC Interleaving = 1-way Interleave
 Patrol Scrub = Disable
 Cooling Policy = Performance Mode
Sysinfo program /home/i840g30/benchmark/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Fri Aug  3 17:31:31 2018

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
   https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) Platinum 8180 CPU @ 2.50GHz
      4  "physical id"s (chips)
      224 "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 : 28
      siblings  : 56
      physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
      28 29 30
      physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
      28 29 30
      physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
      28 29 30
      physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
      28 29 30

From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                224
     On-line CPU(s) list:   0-223
     Thread(s) per core:    2
     Core(s) per socket:    28
```

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Platform Notes (Continued)

```
      Socket(s):              4
      NUMA node(s):           8
      Vendor ID:              GenuineIntel
      CPU family:             6
      Model:                  85
      Model name:             Intel(R) Xeon(R) Platinum 8180 CPU @ 2.50GHz
      Stepping:               4
      CPU MHz:                2501.000
      CPU max MHz:            2501.0000
      CPU min MHz:            1000.0000
      BogoMIPS:               5000.00
      Virtualization:         VT-x
      L1d cache:              32K
      L1i cache:              32K
      L2 cache:               1024K
      L3 cache:               39424K
      NUMA node0 CPU(s):      0-3,7-9,14-17,21-23,112-115,119-121,126-129,133-135
      NUMA node1 CPU(s):      4-6,10-13,18-20,24-27,116-118,122-125,130-132,136-139
      NUMA node2 CPU(s):      28-31,35-37,42-45,49-51,140-143,147-149,154-157,161-163
      NUMA node3 CPU(s):      32-34,38-41,46-48,52-55,144-146,150-153,158-160,164-167
      NUMA node4 CPU(s):      56-59,63-65,70-73,77-79,168-171,175-177,182-185,189-191
      NUMA node5 CPU(s):      60-62,66-69,74-76,80-83,172-174,178-181,186-188,192-195
      NUMA node6 CPU(s):      84-87,91-93,98-101,105-107,196-199,203-205,210-213,217-219
      NUMA node7 CPU(s):      88-90,94-97,102-104,108-111,200-202,206-209,214-216,220-223
      Flags:                  fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
  pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
  lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
  aperfmperf eagerfpu pni pclmulqdq dtes64 ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
  xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
  avx f16c rdrand lahf_lm abm 3dnowprefetch epb cat_l3 cdp_l3 intel_ppin intel_pt mba
  tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
  erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb
  avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc
  cqm_mbm_total cqm_mbm_local ibpb ibrs stibp dtherm ida arat pln pts pku ospke
  spec_ctrl intel_stibp

 /proc/cpuinfo cache data
    cache size : 39424 KB

 From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
 physical chip.
    available: 8 nodes (0-7)
    node 0 cpus: 0 1 2 3 7 8 9 14 15 16 17 21 22 23 112 113 114 115 119 120 121 126 127 128
    129 133 134 135
    node 0 size: 195243 MB
    node 0 free: 181521 MB
    node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 116 117 118 122 123 124 125 130 131
```

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Platform Notes (Continued)

```
    132 136 137 138 139
    node 1 size: 196608 MB
    node 1 free: 190144 MB
    node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51 140 141 142 143 147 148 149 154
    155 156 157 161 162 163
    node 2 size: 196608 MB
    node 2 free: 192004 MB
    node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 144 145 146 150 151 152 153 158
    159 160 164 165 166 167
    node 3 size: 196608 MB
    node 3 free: 191187 MB
    node 4 cpus: 56 57 58 59 63 64 65 70 71 72 73 77 78 79 168 169 170 171 175 176 177 182
    183 184 185 189 190 191
    node 4 size: 196608 MB
    node 4 free: 192029 MB
    node 5 cpus: 60 61 62 66 67 68 69 74 75 76 80 81 82 83 172 173 174 178 179 180 181 186
    187 188 192 193 194 195
    node 5 size: 196608 MB
    node 5 free: 189638 MB
    node 6 cpus: 84 85 86 87 91 92 93 98 99 100 101 105 106 107 196 197 198 199 203 204 205
    210 211 212 213 217 218 219
    node 6 size: 196608 MB
    node 6 free: 191578 MB
    node 7 cpus: 88 89 90 94 95 96 97 102 103 104 108 109 110 111 200 201 202 206 207 208
    209 214 215 216 220 221 222 223
    node 7 size: 196608 MB
    node 7 free: 189669 MB
    node distances:
    node   0   1   2   3   4   5   6   7
      0:  10  11  21  21  21  21  21  21
      1:  11  10  21  21  21  21  21  21
      2:  21  21  10  11  21  21  21  21
      3:  21  21  11  10  21  21  21  21
      4:  21  21  21  21  10  11  21  21
      5:  21  21  21  21  11  10  21  21
      6:  21  21  21  21  21  21  10  11
      7:  21  21  21  21  21  21  11  10

  From /proc/meminfo
    MemTotal:       1583922940 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

  From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux Server"
       VERSION="7.5 (Maipo)"
```

(Continued on next page)

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Platform Notes (Continued)

```
      ID="rhel"
      ID_LIKE="fedora"
      VARIANT="Server"
      VARIANT_ID="server"
      VERSION_ID="7.5"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.5 (Maipo)"
   redhat-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.5:ga:server

 uname -a:
   Linux localhost.localdomain 3.10.0-862.el7.x86_64 #1 SMP Wed Mar 21 18:14:51 EDT 2018
   x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2017-5754 (Meltdown):         Mitigation: PTI
 CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences
 CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)

 run-level 5 Jul 17 17:22

 SPEC is set to: /home/i840g30/benchmark/cpu2017
   Filesystem            Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home xfs   1.6T   11G  1.6T   1% /home

 Additional information from dmidecode follows.  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.
   BIOS American Megatrends Inc. 0THSY016 04/16/2018
   Memory:
    48x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
 CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
```

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Compiler Version Notes (Continued)

```
CC   519.lbm_r(peak) 544.nab_r(peak)
-------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
-------------------------------------------------------------------------


==========================================================================
 CXXC 508.namd_r(base) 510.parest_r(base, peak)
-------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
-------------------------------------------------------------------------


==========================================================================
CXXC 508.namd_r(peak)
-------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
-------------------------------------------------------------------------


==========================================================================
 CC  511.povray_r(base) 526.blender_r(base, peak)
-------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
-------------------------------------------------------------------------


==========================================================================
CC   511.povray_r(peak)
-------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
-------------------------------------------------------------------------


==========================================================================
 FC  507.cactuBSSN_r(base, peak)
-------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
```

(Continued on next page)

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Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------

==========================================================================
 FC   503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
--------------------------------------------------------------------------
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--------------------------------------------------------------------------


==========================================================================
FC    554.roms_r(peak)
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icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`icc -m64 -std=c11`

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

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Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
`ifort -m64 icc -m64 -std=c11`

Benchmarks using both C and C++:
`icpc -m64 icc -m64 -std=c11`

Benchmarks using Fortran, C, and C++:
`icpc -m64 icc -m64 -std=c11 ifort -m64`

Base Portability Flags

503.bwaves_r: `-DSPEC_LP64`
507.cactuBSSN_r: `-DSPEC_LP64`
508.namd_r: `-DSPEC_LP64`
510.parest_r: `-DSPEC_LP64`
511.povray_r: `-DSPEC_LP64`
519.lbm_r: `-DSPEC_LP64`
521.wrf_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
526.blender_r: `-DSPEC_LP64 -DSPEC_LINUX -funsigned-char`
527.cam4_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG`
538.imagick_r: `-DSPEC_LP64`
544.nab_r: `-DSPEC_LP64`
549.fotonik3d_r: `-DSPEC_LP64`
554.roms_r: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
`-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
`-ffinite-math-only -qopt-mem-layout-trans=3`

C++ benchmarks:
`-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
`-ffinite-math-only -qopt-mem-layout-trans=3`

Fortran benchmarks:
`-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
`-ffinite-math-only -qopt-mem-layout-trans=3 -auto`
`-nostandard-realloc-lhs`

Benchmarks using both Fortran and C:
`-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`

(Continued on next page)

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Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
```
-ffinite-math-only -qopt-mem-layout-trans=3 -auto
-nostandard-realloc-lhs
```

Benchmarks using both C and C++:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3
```

Benchmarks using Fortran, C, and C++:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -auto
-nostandard-realloc-lhs
```

Peak Compiler Invocation

C benchmarks:
```
icc -m64 -std=c11
```

C++ benchmarks:
```
icpc -m64
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using both C and C++:
```
icpc -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:
```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

Peak Portability Flags

```
Same as Base Portability Flags
```

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Peak Optimization Flags

C benchmarks:

519.lbm_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

538.imagick_r: `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

544.nab_r: `basepeak = yes`

C++ benchmarks:

508.namd_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

510.parest_r: `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

Fortran benchmarks:

503.bwaves_r: `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`

549.fotonik3d_r: `Same as 503.bwaves_r`

554.roms_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`

Benchmarks using both Fortran and C:

521.wrf_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`

527.cam4_r: `basepeak = yes`

Benchmarks using both C and C++:

511.povray_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

Sugon

I840-G30(Intel Xeon Platinum 8180)

SPECrate2017_fp_base = 505

SPECrate2017_fp_peak = 512

CPU2017 License: 9046
Test Sponsor: Sugon
Tested by: Sugon

Test Date: Aug-2018
Hardware Availability: Apr-2018
Software Availability: May-2018

Peak Optimization Flags (Continued)

526.blender_r: `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

Benchmarks using Fortran, C, and C++:
`-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.html`
`http://www.spec.org/cpu2017/flags/Sugon-Platform-Settings-revB-I.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml`
`http://www.spec.org/cpu2017/flags/Sugon-Platform-Settings-revB-I.xml`

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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