SPEC® CPU2017 Floating Point Rate Result

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Inspur Corporation

Inspur NF8480M5 (Intel Xeon Gold 6136)

SPECrate2017_fp_base = 320

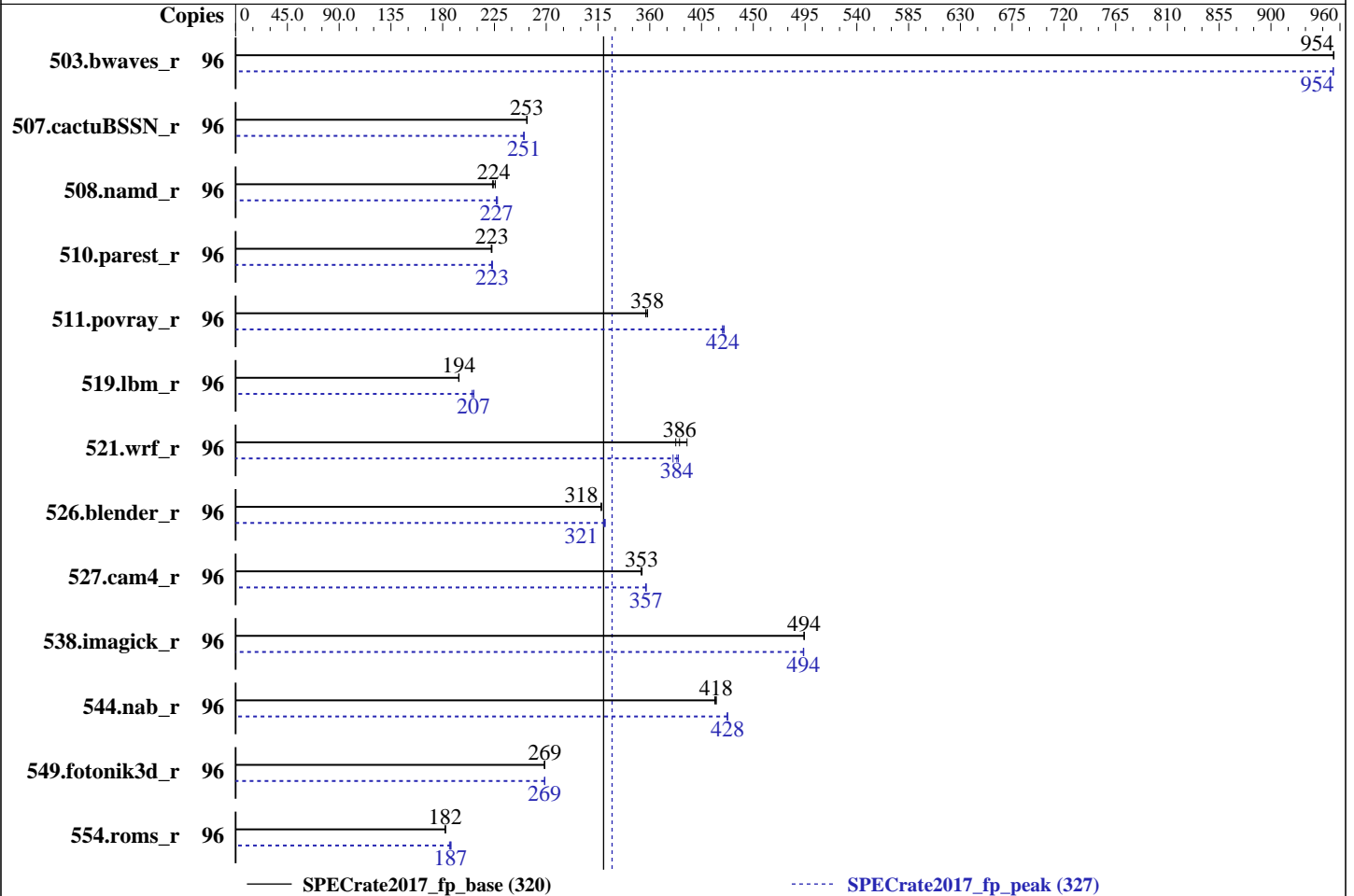**SPECrate2017_fp_peak = 327**

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Test Date: Jul-2019
Hardware Availability: Oct-2017
Software Availability: Mar-2018

Benchmark	Copies	Base	Peak
503.bwaves_r	96	954	954
507.cactuBSSN_r	96	253	251
508.namd_r	96	224	227
510.parest_r	96	223	223
511.povray_r	96	358	424
519.lbm_r	96	194	207
521.wrf_r	96	386	384
526.blender_r	96	318	321
527.cam4_r	96	353	357
538.imagick_r	96	494	494
544.nab_r	96	418	428
549.fotonik3d_r	96	269	269
554.roms_r	96	182	187

—— SPECrate2017_fp_base (320)   ····· SPECrate2017_fp_peak (327)

Hardware

CPU Name: Intel Xeon Gold 6136
 Max MHz.: 3700
 Nominal: 3000
Enabled: 48 cores, 4 chips, 2 threads/core
Orderable: 2,4 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 24.75 MB I+D on chip per chip
 Other: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 4 TB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP2
 4.4.120-92.70-default
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++
 Compiler for Linux;
 Fortran: Version 18.0.0.128 of Intel Fortran
 Compiler for Linux
Parallel: No
Firmware: Version 4.0.01AP02 released Jul-2018
File System: xfs
System State: Run level 3 (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	Copies	Base Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	96	**1009**	**954**	1009	954	1008	955	96	1009	954	1009	954	**1009**	**954**
507.cactuBSSN_r	96	479	253	**480**	**253**	480	253	96	485	251	485	250	**485**	**251**
508.namd_r	96	404	226	**407**	**224**	408	223	96	**402**	**227**	402	227	401	228
510.parest_r	96	1128	223	1130	222	**1128**	**223**	96	1125	223	1128	223	**1126**	**223**
511.povray_r	96	629	356	**627**	**358**	626	358	96	528	425	**529**	**424**	530	423
519.lbm_r	96	521	194	**521**	**194**	522	194	96	**489**	**207**	492	206	489	207
521.wrf_r	96	548	392	562	383	**557**	**386**	96	566	380	**561**	**384**	559	385
526.blender_r	96	460	318	460	318	**460**	**318**	96	457	320	455	321	**456**	**321**
527.cam4_r	96	476	352	475	353	**476**	**353**	96	470	357	471	356	**471**	**357**
538.imagick_r	96	483	494	483	494	**483**	**494**	96	**484**	**494**	484	494	483	494
544.nab_r	96	388	417	**387**	**418**	387	418	96	**378**	**428**	378	427	378	428
549.fotonik3d_r	96	**1392**	**269**	1392	269	1394	268	96	1392	269	**1392**	**269**	1393	269
554.roms_r	96	837	182	836	182	**836**	**182**	96	815	187	**816**	**187**	821	186

SPECrate2017_fp_base =   320

SPECrate2017_fp_peak =   327

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/CPU2017/lib/ia32:/home/CPU2017/lib/intel64:/home/CPU2017/je5.0.1-32:/home/CPU2017/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
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)

(Continued on next page)

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General Notes (Continued)

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.

Platform Notes

```
BIOS and OS configuration:
SCALING_GOVERNOR set to Performance
Hardware Prefetch set to Disable
VT Support set to Disable
C1E Support set to Disable
IMC (Integrated memory controller) Interleaving set to 1-way
Sub NUMA Cluster (SNC) set to Enable
Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-fofr Fri Jul 12 03:11:16 2019

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) Gold 6136 CPU @ 3.00GHz
      4  "physical id"s (chips)
      96 "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 : 12
      siblings  : 24
      physical 0: cores 0 1 2 3 4 9 10 16 18 19 25 26
      physical 1: cores 0 1 2 3 4 9 10 16 18 19 25 26
      physical 2: cores 0 3 4 5 6 7 16 18 19 20 21 22
      physical 3: cores 0 1 2 3 8 9 10 11 18 19 24 27

From lscpu:
   Architecture:          x86_64
   CPU op-mode(s):        32-bit, 64-bit
   Byte Order:            Little Endian
   CPU(s):                96
   On-line CPU(s) list:   0-95
   Thread(s) per core:    2
   Core(s) per socket:    12
   Socket(s):             4
   NUMA node(s):          8
```

(Continued on next page)

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Platform Notes (Continued)

```
          Vendor ID:              GenuineIntel
          CPU family:             6
          Model:                  85
          Model name:             Intel(R) Xeon(R) Gold 6136 CPU @ 3.00GHz
          Stepping:               4
          CPU MHz:                1200.195
          CPU max MHz:            3700.0000
          CPU min MHz:            1200.0000
          BogoMIPS:               6148.58
          Virtualization:         VT-x
          L1d cache:              32K
          L1i cache:              32K
          L2 cache:               1024K
          L3 cache:               25344K
          NUMA node0 CPU(s):      0-2,5,7,10,48-50,53,55,58
          NUMA node1 CPU(s):      3,4,6,8,9,11,51,52,54,56,57,59
          NUMA node2 CPU(s):      12-14,17,19,22,60-62,65,67,70
          NUMA node3 CPU(s):      15,16,18,20,21,23,63,64,66,68,69,71
          NUMA node4 CPU(s):      24-26,30-32,72-74,78-80
          NUMA node5 CPU(s):      27-29,33-35,75-77,81-83
          NUMA node6 CPU(s):      36-38,40,41,46,84-86,88,89,94
          NUMA node7 CPU(s):      39,42-45,47,87,90-93,95
          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 monitor 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 ida arat epb invpcid_single pln pts
      dtherm hwp hwp_act_window hwp_epp hwp_pkg_req intel_pt rsb_ctxsw spec_ctrl stibp
      retpoline kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle
      avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt
      clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc

   /proc/cpuinfo cache data
      cache size : 25344 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 5 7 10 48 49 50 53 55 58
      node 0 size: 191583 MB
      node 0 free: 184614 MB
      node 1 cpus: 3 4 6 8 9 11 51 52 54 56 57 59
      node 1 size: 193528 MB
      node 1 free: 188383 MB
      node 2 cpus: 12 13 14 17 19 22 60 61 62 65 67 70
      node 2 size: 193528 MB
```

(Continued on next page)

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CPU2017 License: 3358		**Test Date:**	Jul-2019
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Platform Notes (Continued)

```
   node 2 free: 188315 MB
   node 3 cpus: 15 16 18 20 21 23 63 64 66 68 69 71
   node 3 size: 193528 MB
   node 3 free: 188363 MB
   node 4 cpus: 24 25 26 30 31 32 72 73 74 78 79 80
   node 4 size: 193528 MB
   node 4 free: 188291 MB
   node 5 cpus: 27 28 29 33 34 35 75 76 77 81 82 83
   node 5 size: 193528 MB
   node 5 free: 188353 MB
   node 6 cpus: 36 37 38 40 41 46 84 85 86 88 89 94
   node 6 size: 193528 MB
   node 6 free: 188364 MB
   node 7 cpus: 39 42 43 44 45 47 87 90 91 92 93 95
   node 7 size: 193375 MB
   node 7 free: 188184 MB
   node distances:
   node   0   1   2   3   4   5   6   7
     0:  10  20  20  20  20  20  20  20
     1:  20  10  20  20  20  20  20  20
     2:  20  20  10  20  20  20  20  20
     3:  20  20  20  10  20  20  20  20
     4:  20  20  20  20  10  20  20  20
     5:  20  20  20  20  20  10  20  20
     6:  20  20  20  20  20  20  10  20
     7:  20  20  20  20  20  20  20  10

 From /proc/meminfo
   MemTotal:       1583237052 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

 /usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP2

 From /etc/*release* /etc/*version*
   SuSE-release:
     SUSE Linux Enterprise Server 12 (x86_64)
     VERSION = 12
     PATCHLEVEL = 2
     # This file is deprecated and will be removed in a future service pack or release.
     # Please check /etc/os-release for details about this release.
   os-release:
     NAME="SLES"
     VERSION="12-SP2"
     VERSION_ID="12.2"
     PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
```

(Continued on next page)

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Platform Notes (Continued)

```
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
   Linux linux-fofr 4.4.120-92.70-default #1 SMP Wed Mar 14 15:59:43 UTC 2018 (52a83de)
   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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Jul 11 03:46 last=5

SPEC is set to: /home/CPU2017
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/nvme0n1p4 xfs   3.6T  151G  3.5T   5% /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 Inspur 4.0.01AP02 07/23/2018
   Memory:
    48x Samsung M393A4K40CB2-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) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 CC   519.lbm_r(peak) 544.nab_r(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================
 CXXC 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 CXXC 508.namd_r(peak) 510.parest_r(peak)
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icpc (ICC) 18.0.0 20170811
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------------------------------------------------------------------------------


==============================================================================
  CC  511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
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------------------------------------------------------------------------------


==============================================================================
  FC  507.cactuBSSN_r(base)
------------------------------------------------------------------------------
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Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 FC   507.cactuBSSN_r(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
```

(Continued on next page)

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Compiler Version Notes (Continued)

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Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------


==========================================================================
 FC  503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
--------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------


==========================================================================
FC   554.roms_r(peak)
--------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
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--------------------------------------------------------------------------


==========================================================================
 CC  521.wrf_r(base) 527.cam4_r(base)
--------------------------------------------------------------------------
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icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------


==========================================================================
CC   521.wrf_r(peak) 527.cam4_r(peak)
--------------------------------------------------------------------------
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Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
icc
```

C++ benchmarks:
```
icpc
```

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Base Compiler Invocation (Continued)

Fortran benchmarks:
`ifort`

Benchmarks using both Fortran and C:
`ifort icc`

Benchmarks using both C and C++:
`icpc icc`

Benchmarks using Fortran, C, and C++:
`icpc icc ifort`

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-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3`

C++ benchmarks:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3`

Fortran benchmarks:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
```

Benchmarks using both C and C++:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3
```

Benchmarks using Fortran, C, and C++:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
```

Base Other Flags

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

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

Fortran benchmarks:
```
-m64
```

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

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

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

Peak Compiler Invocation

C benchmarks:
```
icc
```

C++ benchmarks:
```
icpc
```

(Continued on next page)

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Peak Compiler Invocation (Continued)

Fortran benchmarks:
```
ifort
```

Benchmarks using both Fortran and C:
```
ifort icc
```

Benchmarks using both C and C++:
```
icpc icc
```

Benchmarks using Fortran, C, and C++:
```
icpc icc ifort
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

519.lbm_r: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX2 -O3`
`-no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3`

538.imagick_r: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`
`-ffinite-math-only -qopt-mem-layout-trans=3`

544.nab_r: `Same as 519.lbm_r`

C++ benchmarks:
`-prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX2 -O3`
`-no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3`

Fortran benchmarks:

503.bwaves_r: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`
`-ffinite-math-only -qopt-mem-layout-trans=3`
`-nostandard-realloc-lhs -align array32byte`

(Continued on next page)

SPEC CPU2017 Floating Point Rate Result

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Inspur Corporation

Inspur NF8480M5 (Intel Xeon Gold 6136)

SPECrate2017_fp_base = 320

SPECrate2017_fp_peak = 327

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Test Date: Jul-2019
Hardware Availability: Oct-2017
Software Availability: Mar-2018

Peak Optimization Flags (Continued)

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-align array32byte

Benchmarks using both Fortran and C:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Peak Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

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

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

Benchmarks using Fortran, C, and C++:
-m64 -std=c11

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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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.html
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V1.3-SKL.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.xml
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V1.3-SKL.xml

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

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