



# SPEC® CPU2017 Floating Point Rate Result

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## Inspur Corporation

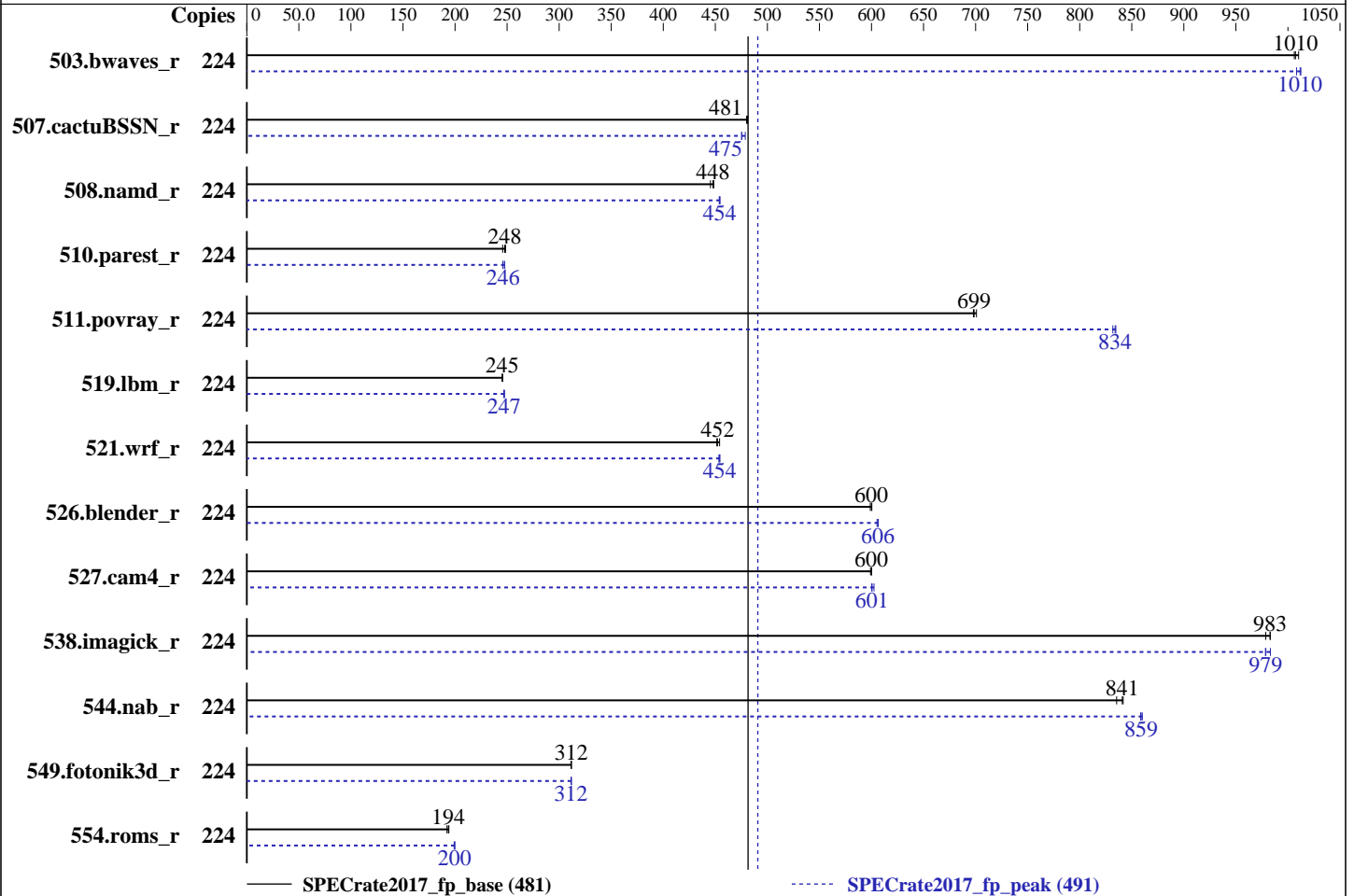
SPECrate2017\_fp\_base = 481

Inspur NF8480M5 (Intel Xeon Platinum 8180)

SPECrate2017\_fp\_peak = 491

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

Test Date: May-2019  
Hardware Availability: Oct-2017  
Software Availability: May-2018



### Hardware

CPU Name: Intel Xeon Platinum 8180  
Max MHz.: 3800  
Nominal: 2500  
Enabled: 112 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: 38.5 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



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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    | 2233        | 1010       | 2223        | 1010       | <u>2230</u> | <u>1010</u> | 224    | <u>2220</u> | <u>1010</u> | 2219        | 1010       | 2228        | 1010       |
| 507.cactuBSSN_r | 224    | <u>590</u>  | <u>481</u> | 589         | 481        | 591         | 480         | 224    | 592         | 479         | <u>597</u>  | <u>475</u> | 597         | 475        |
| 508.namd_r      | 224    | 474         | 449        | 478         | 445        | <u>475</u>  | <u>448</u>  | 224    | 469         | 454         | <u>469</u>  | <u>454</u> | 468         | 454        |
| 510.parest_r    | 224    | <u>2366</u> | <u>248</u> | 2358        | 249        | 2385        | 246         | 224    | 2365        | 248         | 2383        | 246        | <u>2379</u> | <u>246</u> |
| 511.povray_r    | 224    | <u>749</u>  | <u>699</u> | 746         | 701        | 749         | 698         | 224    | 629         | 832         | 627         | 835        | <u>627</u>  | <u>834</u> |
| 519.lbm_r       | 224    | 961         | 246        | <u>962</u>  | <u>245</u> | 962         | 245         | 224    | 954         | 247         | 957         | 247        | <u>955</u>  | <u>247</u> |
| 521.wrf_r       | 224    | <u>1110</u> | <u>452</u> | 1105        | 454        | 1111        | 451         | 224    | 1107        | 453         | <u>1105</u> | <u>454</u> | 1104        | 454        |
| 526.blender_r   | 224    | 568         | 600        | 570         | 599        | <u>569</u>  | <u>600</u>  | 224    | 564         | 605         | <u>563</u>  | <u>606</u> | 563         | 606        |
| 527.cam4_r      | 224    | <u>653</u>  | <u>600</u> | 653         | 600        | 654         | 599         | 224    | 653         | 600         | <u>652</u>  | <u>601</u> | 650         | 602        |
| 538.imagick_r   | 224    | 567         | 983        | 569         | 979        | <u>567</u>  | <u>983</u>  | 224    | <u>569</u>  | <u>979</u>  | 569         | 978        | 567         | 983        |
| 544.nab_r       | 224    | 451         | 835        | 448         | 842        | <u>448</u>  | <u>841</u>  | 224    | <u>439</u>  | <u>859</u>  | 438         | 860        | 439         | 859        |
| 549.fotonik3d_r | 224    | 2800        | 312        | <u>2801</u> | <u>312</u> | 2803        | 311         | 224    | <u>2802</u> | <u>312</u>  | 2801        | 312        | 2802        | 312        |
| 554.roms_r      | 224    | 1834        | 194        | 1851        | 192        | <u>1839</u> | <u>194</u>  | 224    | <u>1782</u> | <u>200</u>  | 1782        | 200        | 1787        | 199        |

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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/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) 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 and OS configuration:  
SCALING\_GOVERNOR set to Performance  
Hardware Prefetch set to Disable  
VT Support set to Disable  
ClE 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 Wed May 29 03:04:39 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) 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

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### Platform Notes (Continued)

```

Core(s) per socket:      28
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:                 1745.231
CPU max MHz:             3800.0000
CPU min MHz:             1000.0000
BogoMIPS:                5123.78
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
aperfmpperf 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 bmil 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 : 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: 191583 MB
node 0 free: 178584 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

```

(Continued on next page)



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### Platform Notes (Continued)

```

132 136 137 138 139
node 1 size: 193528 MB
node 1 free: 182371 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: 193528 MB
node 2 free: 182381 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: 193528 MB
node 3 free: 182360 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: 193528 MB
node 4 free: 182289 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: 193528 MB
node 5 free: 182385 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: 193528 MB
node 6 free: 182402 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: 193375 MB
node 7 free: 182241 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*

```

(Continued on next page)



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### Platform Notes (Continued)

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"

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 May 28 03:16 last=5

SPEC is set to: /home/CPU2017

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/nvme0n1p4 xfs   3.6T  133G  3.5T   4% /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)  
=====

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## Compiler Version Notes (Continued)

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.

=====  
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)

icpc (ICC) 18.0.0 20170811

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=====  
CC 511.povray\_r(base) 526.blender\_r(base)

icpc (ICC) 18.0.0 20170811

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icc (ICC) 18.0.0 20170811

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=====  
CC 511.povray\_r(peak) 526.blender\_r(peak)

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icc (ICC) 18.0.0 20170811

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=====  
FC 507.cactuBSSN\_r(base)

icpc (ICC) 18.0.0 20170811

(Continued on next page)



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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)

=====  
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=====  
FC 503.bwaves\_r(base, peak) 549.fotonik3d\_r(base, peak) 554.roms\_r(base)

=====  
ifort (IFORT) 18.0.0 20170811

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=====  
CC 521.wrf\_r(base) 527.cam4\_r(base)

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ifort (IFORT) 18.0.0 20170811

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## Compiler Version Notes (Continued)

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-----

## Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

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



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## 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  
-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



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## Peak Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

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:

(Continued on next page)



# SPEC CPU2017 Floating Point Rate Result

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Inspur Corporation

SPECrate2017\_fp\_base = 481

Inspur NF8480M5 (Intel Xeon Platinum 8180)

SPECrate2017\_fp\_peak = 491

CPU2017 License: 3358

Test Sponsor: Inspur Corporation

Tested by: Inspur Corporation

Test Date: May-2019

Hardware Availability: Oct-2017

Software Availability: May-2018

## Peak Optimization Flags (Continued)

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

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

(Continued on next page)



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## Peak Other Flags (Continued)

Benchmarks using Fortran, C, and C++:

-m64 -std=c11

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-V1.1-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-V1.1-SKL.xml>

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