Inspur Corporation

Inspur NS5162M5 (Intel Xeon Silver 4109T)

| SPECrate2017_fp_base = 77.4 |
| SPECrate2017_fp_peak = 77.0 |

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

Hardware

| Copies | 0 | 15.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | 360 |
|--------|---|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 503.bwaves_r | 32 | 61.7 |       |      |      |      |      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 507.cactuBSSN_r | 32 | 61.3 | 54.0 | 54.1 | 54.9 | 54.1 | 54.1 | 54.7 | 54.7 | 54.3 | 54.3 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 |
| 508.namd_r | 32 | 54.0 | 54.1 | 54.9 | 54.1 | 54.1 | 54.1 | 54.7 | 54.7 | 54.3 | 54.3 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 |
| 510.parest_r | 32 | 54.0 | 54.1 | 54.9 | 54.1 | 54.1 | 54.1 | 54.7 | 54.7 | 54.3 | 54.3 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 |
| 511.povray_r | 32 | 82.3 |       |      |      |      |      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 519.lbm_r | 32 | 54.8 | 54.3 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 |
| 521.wrf_r | 32 | 68.7 | 70.3 | 65.4 | 64.5 | 64.5 | 64.5 | 64.5 | 64.5 | 64.5 | 64.5 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 |
| 526.blender_r | 32 | 54.0 | 54.1 | 54.9 | 54.1 | 54.1 | 54.1 | 54.7 | 54.7 | 54.3 | 54.3 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 |
| 527.cam4_r | 32 | 68.7 | 70.3 | 65.4 | 64.5 | 64.5 | 64.5 | 64.5 | 64.5 | 64.5 | 64.5 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 | 94.7 |
| 538.imagick_r | 32 | 105 |       |      |      |      |      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 544.nab_r | 32 | 91.2 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 |
| 549.fotonik3d_r | 32 | 76.4 | 66.3 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 |
| 554.roms_r | 32 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 | 49.6 |

SPECrate2017_fp_base (77.4)  SPECrate2017_fp_peak (77.0)

Software

OS: SUSE Linux Enterprise Server 12 SP2
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
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
## SPEC CPU2017 Floating Point Rate Result

**Insapur Corporation**

**Inspur NS5162M5 (Intel Xeon Silver 4109T)**

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3358</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Inspur Corporation</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Inspur Corporation</td>
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<tr>
<td>Test Date:</td>
<td>Jun-2019</td>
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<td>Software Availability:</td>
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### Results Table

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</tbody>
</table>

**SPECrate2017_fp_base = 77.4**

**SPECrate2017_fp_peak = 77.0**

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.:

```
umactl --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)
SPEC CPU2017 Floating Point Rate Result

Inspur Corporation

Inspur NS5162M5 (Intel Xeon Silver 4109T)

SPECrate2017_fp_base = 77.4
SPECrate2017_fp_peak = 77.0

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<td>Software Availability: Mar-2018</td>
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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
- 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-q537 Wed Jun 19 22:59:56 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) Silver 4109T CPU @ 2.00GHz
- 2 "physical id"s (chips)
- 32 "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: 8
  - siblings: 16
  - physical 0: cores 0 1 2 3 4 5 6 7
  - physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 32
- On-line CPU(s) list: 0-31
- Thread(s) per core: 2
- Core(s) per socket: 8
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85

(Continued on next page)
**SPEC CPU2017 Floating Point Rate Result**

**Inspur Corporation**

**Inspur NS5162M5 (Intel Xeon Silver 4109T)**

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**CPU2017 License:** 3358  
**Test Sponsor:** Inspur Corporation  
**Test Date:**  
**Hardware Availability:** Oct-2017  
**Software Availability:** Mar-2018

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**Platform Notes (Continued)**

```
Model name:            Intel(R) Xeon(R) Silver 4109T CPU @ 2.00GHz
Stepping:              4  
CPU MHz:               2299.276  
CPU max MHz:           3000.0000  
CPU min MHz:           800.0000  
BogoMIPS:              3990.61  
Virtualization:        VT-x  
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              11264K
NUMA node0 CPU(s):     0-7,16-23
NUMA node1 CPU(s):     8-15,24-31
```

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 bs rep_good nopl xtopology nx pdpe32 ts pxrt 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 pni ptm pts dtes64_64bit_sec hwp hwp_act_window hwp_epp hwp_nosec hwcap32 hwcap64 intel_pt ssbd cxtstate stibp RETPOLINE kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  

```
/from /proc/cpuinfo

cache size : 11264 KB
```

```
From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a physical chip.  
available: 2 nodes (0-1)  
node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23  
node 0 size: 192963 MB  
node 0 free: 181771 MB  
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31  
node 1 size: 193384 MB  
node 1 free: 184003 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10
```

```
From /proc/meminfo
MemTotal:       395620848 kB  
HugePages_Total:       0  
Hugepagesize:       2048 kB
```

```
/usr/bin/lsb_release -d
```

(Continued on next page)
**SPEC CPU2017 Floating Point Rate Result**

**Inspur Corporation**

Inspur NS5162M5 (Intel Xeon Silver 4109T)

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**Hardware Availability:** Oct-2017  
**Software Availability:** Mar-2018

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**Platform Notes (Continued)**

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

uname -a:

```
Linux linux-q537 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 Jun 19 11:23 last=5

SPEC is set to: `/home/CPU2017`

```
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sdb3 xfs 407G 66G 342G 17% /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 4.0.1 08/30/2018
- Memory:
  - 4x NO DIMM NO DIMM
  - 12x Samsung M393A4K40CB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
## SPEC CPU2017 Floating Point Rate Result

**Inspur Corporation**  
Inspur NS5162M5 (Intel Xeon Silver 4109T)  

| CPU2017 License: | 3358 |
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**SPECrate2017_fp_base** = 77.4  
**SPECrate2017_fp_peak** = 77.0

### Compiler Version Notes

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<tr>
<th>Compiler</th>
<th>Version</th>
<th>Date</th>
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<tbody>
<tr>
<td>CC 519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)</td>
<td>icc (ICC) 18.0.0 20170811</td>
<td>Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>CC 519.lbm_r(peak) 544.nab_r(peak)</td>
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(Continued on next page)
## Compiler Version Notes (Continued)

### FC 507.cactuBSSN_r(base)

---

```markdown
icpc (ICC) 18.0.0 20170811
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)

---

```markdown
icpc (ICC) 18.0.0 20170811
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)

---

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

---

### FC 554.roms_r(peak)

---

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

---

### CC 521.wrf_r(base) 527.cam4_r(base)

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

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

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### CC 521.wrf_r(peak) 527.cam4_r(peak)

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(Continued on next page)
### Compiler Version Notes (Continued)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
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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`
### SPEC CPU2017 Floating Point Rate Result

**Inspur Corporation**

**Inspur NS5162M5 (Intel Xeon Silver 4109T)**

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>77.4</td>
<td>77.0</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3358  
**Test Sponsor:** Inspur Corporation  
**Tested by:** Inspur Corporation  
**Test Date:** Jun-2019  
**Hardware Availability:** Oct-2017  
**Software Availability:** Mar-2018

#### Base Optimization Flags

- **C benchmarks:**
  -xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch
  -ffinite-math-only -qopt-mem-layout-trans=3

- **C++ benchmarks:**
  -xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch
  -ffinite-math-only -qopt-mem-layout-trans=3

- **Fortran benchmarks:**
  -xCORE-AVX512 -ipo -03 -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-AVX512 -ipo -03 -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-AVX512 -ipo -03 -no-prec-div -qopt-prefetch
  -ffinite-math-only -qopt-mem-layout-trans=3

- **Benchmarks using Fortran, C, and C++:**
  -xCORE-AVX512 -ipo -03 -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

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**Tested by:**  Inspur Corporation  
**Test Date:**  Jun-2019  
**Hardware Availability:**  Oct-2017  
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### Base Other Flags (Continued)

Benchmarks using Fortran, C, and C++:

- `-m64 -std=c11`

### 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-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: Same as 519.lbm_r`

(Continued on next page)
Peak Optimization Flags (Continued)

C++ benchmarks:
- 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

Fortran benchmarks:
503.bwaves_r: -xCORE-AVX512 -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-AVX512
- 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-AVX512 -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-AVX512 -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-AVX512 -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

(Continued on next page)
Inspur Corporation

Inspur NS5162M5 (Intel Xeon Silver 4109T)

SPECrate2017_fp_peak = 77.0
SPECrate2017_fp_base = 77.4

CPU2017 License: 3358
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Peak Other Flags (Continued)

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

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

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

Tested with SPEC CPU2017 v1.0.5 on 2019-06-19 22:59:55-0400.
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