**Lenovo Global Technology**  
**ThinkSystem SR570**  
(2.60 GHz, Intel Xeon Silver 4112)  

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
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<tbody>
<tr>
<td>51.3</td>
<td>52.9</td>
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<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Silver 4112</th>
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<table>
<thead>
<tr>
<th>Max MHz.:</th>
<th>3000</th>
</tr>
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<table>
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<tr>
<th>Nominal:</th>
<th>2600</th>
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</table>

<table>
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<tr>
<th>Enabled:</th>
<th>8 cores, 2 chips, 2 threads/core</th>
</tr>
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<table>
<thead>
<tr>
<th>Orderable:</th>
<th>1.2 chips</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Cache L1:</th>
<th>32 KB I + 32 KB D on chip per core</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>L2:</th>
<th>1 MB I+D on chip per core</th>
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<table>
<thead>
<tr>
<th>L3:</th>
<th>8.25 MB I+D on chip per core</th>
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<table>
<thead>
<tr>
<th>Other:</th>
<th>None</th>
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</table>

<table>
<thead>
<tr>
<th>Memory:</th>
<th>192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Storage:</th>
<th>1 x 800 GB SAS SSD</th>
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<table>
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<tr>
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### SPECrate2017_fp_results

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<tr>
<th>Copy</th>
<th>bwaves_r</th>
<th>cactuBSSN_r</th>
<th>namd_r</th>
<th>parest_r</th>
<th>povray_r</th>
<th>ibm_r</th>
<th>wrf_r</th>
<th>blender_r</th>
<th>cam4_r</th>
<th>imagick_r</th>
<th>nab_r</th>
<th>fotonik3d_r</th>
<th>roms_r</th>
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**SPECrate2017_fp_base (51.3)**  
**SPECrate2017_fp_peak (52.9)**
Lenovo Global Technology
ThinkSystem SR570
(2.60 GHz, Intel Xeon Silver 4112)

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

SPECrate2017_fp_base = 51.3
SPECrate2017_fp_peak = 52.9

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<th>Seconds</th>
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<th>Seconds</th>
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<td>228</td>
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<td>691</td>
<td>36.8</td>
</tr>
</tbody>
</table>

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/cpu2017.1.0.2.ic18.0/lib/ia32:/home/cpu2017.1.0.2.ic18.0/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017.1.0.2.ic18.0/je5.0.1-32:/home/cpu2017.1.0.2.ic18.0/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
File system 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>
No: 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

Lenovo Global Technology
ThinkSystem SR570
(2.60 GHz, Intel Xeon Silver 4112)

SPECraten2017_fp_base = 51.3
SPECraten2017_fp_peak = 52.9

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jan-2018
Hardware Availability: Nov-2017
Tested by: Lenovo Global Technology
Software Availability: Sep-2017

General Notes (Continued)

No: 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.
No: 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.

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
DCU Streamer Prefetcher set to Enable
MONITORM/WAIT set to Enable
SNC set to Enable
XPT Prefetcher set to Enable
Stale AtoS set to Enable
LLC Deadline Alloc set to Disable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b091c0f
running on linux-uru4 Thu Jan 18 15:16:14 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) Silver 4112 CPU @ 2.60GHz
  2 "physical id"s (chips)
  16 "processors"
core, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
  cpu cores : 4
  siblings : 8
  physical 0: cores 1 2 3 4

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(2.60 GHz, Intel Xeon Silver 4112)

**SPECrate2017_fp_base** = 51.3
**SPECrate2017_fp_peak** = 52.9

**CPU2017 License:** 9017
**Test Date:** Jan-2018
**Test Sponsor:** Lenovo Global Technology
**Hardware Availability:** Nov-2017
**Tested by:** Lenovo Global Technology
**Software Availability:** Sep-2017

---

**Platform Notes (Continued)**

```
physical 1: cores 1 2 4 5

From lscpu:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                16
On-line CPU(s) list:   0-15
Thread(s) per core:    2
Core(s) per socket:    4
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Silver 4112 CPU @ 2.60GHz
Stepping:              4
CPU MHz:               2593.906
BogoMIPS:              5187.81
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              8448K
NUMA node0 CPU(s):     0-3,8-11
NUMA node1 CPU(s):     4-7,12-15
Flags:                 fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrunc 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 pni pclmulqdq dtes64_64 smep bmi1 bmi2 512 bits xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc pku ospke
```

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 8 9 10 11
node 0 size: 96060 MB
node 0 free: 94847 MB
node 1 cpus: 4 5 6 7 12 13 14 15
node 1 size: 96749 MB
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(2.60 GHz, Intel Xeon Silver 4112)

Platform Notes (Continued)

node 1 free: 95910 MB
node distances:
node  0  1
  0:  10 21
  1:  21 10

From /proc/meminfo
  MemTotal:       197437636 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 3
    # 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-SP3"
    VERSION_ID="12.3"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
  Linux linux-uru4 4.4.73-5-default #1 SMP Tue Jul 4 15:33:39 UTC 2017 (b7ce4e4) x86_64
  x86_64 x86_64 GNU/Linux

run-level 3 Jan 18 05:55

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
  Filesystem     Type Size  Used Avail Use% Mounted on
  /dev/sdb2      btrfs  744G  32G  711G  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 Lenovo -[TEE119J-1.20]- 09/06/2017
  Memory:
    4x NO DIMM NO DIMM
    12x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
Lenovo Global Technology
ThinkSystem SR570
(2.60 GHz, Intel Xeon Silver 4112)

SPECrate2017_fp_base = 51.3
SPECrate2017_fp_peak = 52.9

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Jan-2018
Hardware Availability: Nov-2017
Software Availability: Sep-2017

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.
==============================================================================
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
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
CC  511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
iccc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
CC   511.povray_r(peak) 526.blender_r(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
iccc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
(Continued on next page)
Lenovo Global Technology 
ThinkSystem SR570 
(2.60 GHz, Intel Xeon Silver 4112) 

SPECrate2017_fp_base = 51.3 
SPECrate2017_fp_peak = 52.9

CPU2017 License: 9017 
Test Sponsor: Lenovo Global Technology 
Tested by: Lenovo Global Technology 

Test Date: Jan-2018 
Hardware Availability: Nov-2017 
Software Availability: Sep-2017 

Compiler Version Notes (Continued)

FC 507.cactuBSSN_r(base)

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)

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)

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 
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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

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.

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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(2.60 GHz, Intel Xeon Silver 4112)

SPECrate2017_fp_base = 51.3
SPECrate2017_fp_peak = 52.9

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Jan-2018
Hardware Availability: Nov-2017
Software Availability: Sep-2017

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
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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
Lenovo Global Technology
ThinkSystem SR570
(2.60 GHz, Intel Xeon Silver 4112)

**SPECrate2017_fp_base = 51.3**

**SPECrate2017_fp_peak = 52.9**

---

**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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ThinkSystem SR570
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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

## Lenovo Global Technology

**ThinkSystem SR570**

(2.60 GHz, Intel Xeon Silver 4112)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>51.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>52.9</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology

**Test Date:** Jan-2018  
**Hardware Availability:** Nov-2017  
**Software Availability:** Sep-2017

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### 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`

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(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(2.60 GHz, Intel Xeon Silver 4112)

SPECrate2017_fp_base = 51.3
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Test Date: Jan-2018
Hardware Availability: Nov-2017
Software Availability: Sep-2017

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

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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-A.xml

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Tested with SPEC CPU2017 v1.0.2 on 2018-01-18 02:16:13-0500.
Originally published on 2018-03-06.