## SPEC® CPU2017 Floating Point Rate Result

### Lenovo Global Technology

ThinkSystem SR570  
(2.00 GHz, Intel Xeon Gold 6138T)

| SPECrate2017_fp_base | 177 |
| SPECrate2017_fp_peak | 181 |

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

### Hardware

<table>
<thead>
<tr>
<th>Software</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OS:</td>
<td>Red Hat Enterprise Linux Server release 7.4 (Maipo)</td>
</tr>
<tr>
<td>Compiler:</td>
<td>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</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Lenovo BIOS Version TEE119J 1.20 released Sep-2017</td>
</tr>
<tr>
<td>File System:</td>
<td>btrfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

### Lenovo Global Technology

<table>
<thead>
<tr>
<th>Lenovo Global Technology</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon Gold 6138T</td>
</tr>
<tr>
<td>Max MHz.:</td>
<td>3700</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2000</td>
</tr>
<tr>
<td>Enabled:</td>
<td>40 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>27.5 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 800 GB SAS SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
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ThinkSystem SR570
(2.00 GHz, Intel Xeon Gold 6138T)

SPECrate2017_fp_base = 177
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>80</td>
<td>1799</td>
<td>446</td>
<td>1797</td>
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<td>80</td>
<td>1800</td>
<td>446</td>
<td>1797</td>
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<tr>
<td>507.cactuBSSN_r</td>
<td>80</td>
<td>626</td>
<td>162</td>
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<tr>
<td>544.nab_r</td>
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<td>269</td>
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<td>549.fotonik3d_r</td>
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<td>83.9</td>
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<td>86.5</td>
<td>1470</td>
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<td>1476</td>
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</tr>
</tbody>
</table>

SPECrate2017_fp_base = 177
SPECrate2017_fp_peak = 181

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
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>
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)
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Tested by: Lenovo Global Technology
Hardware Availability: Nov-2017
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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

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
MONITORWAIT 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 96c45e4568ad54c135fd618bccc9c0f
running on localhost.localdomain Sat Dec 9 23:35:54 2017

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 6138T CPU @ 2.00GHz
  2 "physical id"s (chips)
  80 "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 : 20
siblings : 40
physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

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Platform Notes (Continued)

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 80
On-line CPU(s) list: 0-79
Thread(s) per core: 2
Core(s) per socket: 2
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6138T CPU @ 2.00GHz
Stepping: 4
CPU MHz: 2000.000
BogoMIPS: 4000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-2,5,6,10-12,15,16,40-42,45,46,50-52,55,56
NUMA node1 CPU(s): 3,4,7-9,13,14,17-19,43,44,47-49,53,54,57-59
NUMA node2 CPU(s): 20-22,25,26,30-32,35,36,60-62,65,66,70-72,75,76
NUMA node3 CPU(s): 23,24,27-29,33,34,37-39,63,64,67-69,73,74,77-79
Flags:
    fpu vme vmx vx 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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 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_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erva invpcid rtm cqm mpx rdthead rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsxveopt xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pni pts

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 5 6 10 11 12 15 16 40 41 42 45 46 50 51 52 55 56
node 0 size: 48529 MB

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Platform Notes (Continued)

.node 0 free: 46658 MB
.node 1 cpus: 3 4 7 8 9 13 14 17 18 19 43 44 47 48 49 53 54 57 58 59
.node 1 size: 49152 MB
.node 1 free: 47507 MB
.node 2 cpus: 20 21 22 25 26 30 31 32 35 36 60 61 62 65 66 70 71 72 75 76
.node 2 size: 49152 MB
.node 2 free: 47245 MB
.node 3 cpus: 23 24 27 28 29 33 34 37 38 39 63 64 67 68 69 73 74 77 78 79
.node 3 size: 49152 MB
.node 3 free: 47236 MB

From /proc/meminfo
MemTotal: 197410280 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.4 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.4"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:
Linux localhost.localdomain 3.10.0-693.el7.x86_64 #1 SMP Thu Jul 6 19:56:57 EDT 2017
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 9 09:03

SPEC is set to: /home/cpu2017.1.0.2.ic18.0

/ filesystem  Type  Size  Used Avail Use% Mounted on
/dev/sdb2  btrfs  740G  20G  718G  3% /

Additional information from dmidecode follows. WARNING: Use caution when you interpret

(Continued on next page)
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**Platform Notes (Continued)**

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

(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.

==============================================================================
**CXXC 508.namd_r(base) 510.parest_r(base)**
==============================================================================

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

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

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

icc (ICC) 18.0.0 20170811
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Collector: Lenovo Global Technology

Compiler Version Notes (Continued)

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

---------------------------------------------------------------------

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)

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Compiler Version Notes (Continued)

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

Base Compiler Invocation

C benchmarks:
iccc

C++ benchmarks:
icpcc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpcc icc

Benchmarks using Fortran, C, and C++:
icpcc icc ifort

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64

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Base Portability Flags (Continued)

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
-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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(2.00 GHz, Intel Xeon Gold 6138T)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
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<td>177</td>
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Dec-2017
Hardware Availability: Nov-2017
Software Availability: Sep-2017

Base Other Flags (Continued)

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`

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
Lenovo Global Technology
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SPEC CPU2017 Floating Point Rate Result
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SPECrate2017_fp_base = 177
SPECrate2017_fp_peak = 181

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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

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
# Lenovo Global Technology

**ThinkSystem SR570**

(2.00 GHz, Intel Xeon Gold 6138T)

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## 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

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/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/Intel-ic18.0-official-linux64.xml)

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