# SPEC CPU®2017 Floating Point Rate Result

## Lenovo Global Technology

ThinkSystem SD650 V2  
(3.10 GHz, Intel Xeon Gold 6346)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>Not Run</th>
</tr>
</thead>
</table>

### Test Details

- **CPU2017 License**: 9017
- **Test Sponsor**: Lenovo Global Technology
- **Test Date**: May-2021
- **Hardware Availability**: Jul-2021
- **Tested by**: Lenovo Global Technology
- **Software Availability**: Feb-2021

### Performance Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate2017_fp_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>64</td>
<td>395</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>64</td>
<td>299</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>64</td>
<td>177</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>64</td>
<td>316</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>64</td>
<td>250</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>64</td>
<td>283</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>64</td>
<td>289</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>64</td>
<td>302</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>64</td>
<td>207</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>64</td>
<td>480</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>64</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name**: Intel Xeon Gold 6346  
- **Max MHz**: 3600  
- **Nominal**: 3100  
- **Enabled**: 32 cores, 2 chips, 2 threads/core  
- **Orderable**: 2 chips  
- **Cache L1**: 32 KB I + 48 KB D on chip per core  
- **L2**: 1.25 MB I+D on chip per core  
- **L3**: 36 MB I+D on chip per chip  
- **Memory**: 512 GB (16 x 32 GB 2Rxn PC4-3200AA-R)  
- **Storage**: 1 x 480 GB SATA SSD  
- **Other**: None

### Software

- **OS**: Red Hat Enterprise Linux 8.3 (Ootpa)  
  Kernel 4.18.0-240.el8.x86_64  
- **Compiler**:  
  C/C++: Version 2021.1 of Intel oneAPI DPC++/C++  
  Compiler Build 20201113 for Linux;  
  Fortran: Version 2021.1 of Intel Fortran Compiler  
  Classic Build 20201112 for Linux  
- **Parallel**: No  
- **Firmware**: Lenovo BIOS Version U8E109PT1 1.01 released Apr-2021  
- **File System**: xfs  
- **System State**: Run level 3 (multi-user)  
- **Base Pointers**: 64-bit  
- **Peak Pointers**: Not Applicable  
- **Other**: jemalloc memory allocator V5.0.1  
- **Power Management**: BIOS and OS set to prefer performance at the cost of additional power usage
Lenovo Global Technology
ThinkSystem SD650 V2
(3.10 GHz, Intel Xeon Gold 6346)

SPECratenet®2017_fp_base = 306
SPECratenet®2017_fp_peak = Not Run

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>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>64</td>
<td>932</td>
<td>689</td>
<td>932</td>
<td>689</td>
<td>931</td>
<td>690</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>64</td>
<td>206</td>
<td>393</td>
<td>205</td>
<td>396</td>
<td>205</td>
<td>395</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>64</td>
<td>291</td>
<td>209</td>
<td>291</td>
<td>209</td>
<td>291</td>
<td>209</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>64</td>
<td>949</td>
<td>176</td>
<td>946</td>
<td>177</td>
<td>948</td>
<td>177</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>64</td>
<td>473</td>
<td>316</td>
<td>473</td>
<td>316</td>
<td>473</td>
<td>316</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>64</td>
<td>270</td>
<td>250</td>
<td>270</td>
<td>250</td>
<td>271</td>
<td>249</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>64</td>
<td>505</td>
<td>284</td>
<td>507</td>
<td>283</td>
<td>508</td>
<td>282</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>64</td>
<td>338</td>
<td>289</td>
<td>338</td>
<td>288</td>
<td>337</td>
<td>289</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>64</td>
<td>370</td>
<td>303</td>
<td>371</td>
<td>302</td>
<td>372</td>
<td>301</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>64</td>
<td>215</td>
<td>739</td>
<td>215</td>
<td>740</td>
<td>216</td>
<td>737</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>64</td>
<td>223</td>
<td>483</td>
<td>225</td>
<td>480</td>
<td>225</td>
<td>478</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>64</td>
<td>1210</td>
<td>206</td>
<td>1204</td>
<td>207</td>
<td>1204</td>
<td>207</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>64</td>
<td>714</td>
<td>142</td>
<td>715</td>
<td>142</td>
<td>716</td>
<td>142</td>
</tr>
</tbody>
</table>

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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
"/home/cpu2017-1.1.5-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.5-ic202
1.1-revB/je5.0.1-64"
MALLOC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1
Transparent Huge Pages enabled by default

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V2
(3.10 GHz, Intel Xeon Gold 6346)

SPECrate®2017_fp_base = 306
SPECrate®2017_fp_peak = Not Run

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

General Notes (Continued)

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>
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) 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 configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
C-States set to Legacy
CPU Frequency Limits set to Restrict maximum frequency
Patrol Scrub set to Disabled
SNC set to Enabled

Sysinfo program /home/cpu2017-1.1.5-ic2021.1-revB/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e6d2d7080afeaa89d4b38e2f1c

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 6346 CPU @ 3.10GHz
  2 "physical id"s (chips)
  64 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit

(Continued on next page)
### Lenovo Global Technology

**ThinkSystem SD650 V2**  
(3.10 GHz, Intel Xeon Gold 6346)

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

<table>
<thead>
<tr>
<th>SPECrater®2017_fp_base</th>
<th>306</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrater®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

#### Platform Notes (Continued)

- **Byte Order:** Little Endian
- **CPU(s):** 64
- **On-line CPU(s) list:** 0-63
- **Thread(s) per core:** 2
- **Core(s) per socket:** 16
- **Socket(s):** 2
- **NUMA node(s):** 4
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 106
- **Model name:** Intel(R) Xeon(R) Gold 6346 CPU @ 3.10GHz
- **Stepping:** 6
- **CPU MHz:** 1805.028
- **BogoMIPS:** 6200.00
- **Virtualization:** VT-x
- **L1d cache:** 48K
- **L1i cache:** 32K
- **L2 cache:** 1280K
- **L3 cache:** 36864K
- **NUMA node0 CPU(s):** 0-7,32-39
- **NUMA node1 CPU(s):** 8-15,40-47
- **NUMA node2 CPU(s):** 16-23,48-55
- **NUMA node3 CPU(s):** 24-31,56-63
- **Flags:**
  - fpu
  - vme
  - de
  - pse
  - mce
  - mtrr
  - pae
  - mca
  - cmov
  - pat
  - pse36
  - mpx
  - mmmx
  - fnxsr
  - sse
  - sse2
  - ss
  - ht
  - tm
  - pbe
  - syscall
  - nx
  - pdpe1gb
  - rdtscp
  - mce
  - cmov
  - pat
  - pse36
  - clflush
  - dts
  - acpi
  - sep
  - mtrr
  - pae
  - mce
  - cmov
  - pat
  - pse36
  - clflush
  - dts
  - acpi
  - sep
  - mtrr
  - pae
  - mce
  - cmov
  - pat
  - pse36
  - clflush
  - dts
  - acpi
  - sep
  - mtrr
  - pae
  - mce
  - cmov
  - pat
  - pse36

/proc/cpuinfo cache data

- **cache size:** 36864 KB

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 3 4 5 6 7 32 33 34 35 36 37 38 39
- **node 0 size:** 126680 MB
- **node 0 free:** 128007 MB
- **node 1 cpus:** 8 9 10 11 12 13 14 15 40 41 42 43 44 45 46 47

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Lenovo Global Technology
ThinkSystem SD650 V2
(3.10 GHz, Intel Xeon Gold 6346)

SPECrade®2017_fp_base = 306
SPECrade®2017_fp_peak = Not Run

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

Test Date: May-2021
Hardware Availability: Jul-2021
Software Availability: Feb-2021

Platform Notes (Continued)

node 1 size: 127026 MB
node 1 free: 127860 MB
node 2 cpus: 16 17 18 19 20 21 22 23 48 49 50 51 52 53 54 55
node 2 size: 127030 MB
node 2 free: 128476 MB
node 3 cpus: 24 25 26 27 28 29 30 31 56 57 58 59 60 61 62 63
node 3 size: 126753 MB
node 3 free: 128489 MB
node distances:
node 0 1 2 3
0: 10 11 20 20
1: 11 10 20 20
2: 20 20 10 11
3: 20 20 11 10

From /proc/meminfo
MemTotal: 528005908 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance
/usr/bin/lsb_release -d
Red Hat Enterprise Linux release 8.3 (Ootpa)

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.3"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
Linux ip10-245-59-38.labs.lenovo.com 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-12207 (iTLB Multihit): Not affected

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V2
(3.10 GHz, Intel Xeon Gold 6346)

SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECratement®2017_fp_base = 306
SPECratement®2017_fp_peak = Not Run

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

Platform Notes (Continued)

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 May 20 18:05
SPEC is set to: /home/cpu2017-1.1.5-ic2021.1-revB

From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SD650 V2
Product Family: ThinkSystem
Serial: 1234567890

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.
Memory:
16x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200

BIOS:
BIOS Vendor: Lenovo
BIOS Version: U8E109PT1-1.01
BIOS Date: 04/28/2021
BIOS Revision: 1.1
Firmware Revision: 1.40

(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V2
(3.10 GHz, Intel Xeon Gold 6346)

SPECrater®2017_fp_base = 306
SPECrater®2017_fp_peak = Not Run

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

Test Date: May-2021
Hardware Availability: Jul-2021
Software Availability: Feb-2021

Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
C++             | 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
C++, C          | 511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
C++, C, Fortran | 507.cactuBSSN_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Fortran         | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V2
(3.10 GHz, Intel Xeon Gold 6346)

SPECratenew2017_fp_base = 306
SPECratenew2017_fp_peak = Not Run

---

Compiler Version Notes (Continued)

Fortran, C      | 521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
   Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
   Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx 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

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Lenovo Global Technology
ThinkSystem SD650 V2
(3.10 GHz, Intel Xeon Gold 6346)

SPECraten®2017_fp_base = 306
SPECraten®2017_fp_peak = Not Run

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

Test Date: May-2021
Hardware Availability: Jul-2021
Software Availability: Feb-2021

Base Portability Flags (Continued)

544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only

(Continued on next page)
**Lenovo Global Technology**

ThinkSystem SD650 V2  
(3.10 GHz, Intel Xeon Gold 6346)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base =</th>
<th>306</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** May-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** Feb-2021

---

### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- `-qopt-multiple-gather-scatter-by-shuffles`
- `-mbranches-within-32B-boundaries -nostandard-realloc-lhs`
- `-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

The flags files that were used to format this result can be browsed at:

You can also download the XML flags sources by saving the following links:
- [http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-D.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-D.xml)

---

SPEC CPU and SPECrate are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU®2017 v1.1.5 on 2021-05-20 11:53:26-0400.  
Report generated on 2021-06-08 20:01:32 by CPU2017 PDF formatter v6442.  
Originally published on 2021-06-08.