## Lenovo Global Technology

ThinkSystem SD630 V2  
(2.60 GHz, Intel Xeon Platinum 8358)

<table>
<thead>
<tr>
<th>Spec CPU®2017 Floating Point Rate Result</th>
</tr>
</thead>
</table>

**SPECrater®2017 fp_base = 420**  
**SPECrater®2017 fp_peak = Not Run**

---

### Hardware

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Platinum 8358</td>
</tr>
<tr>
<td>Max MHz</td>
<td>3400</td>
</tr>
<tr>
<td>Nominal</td>
<td>2600</td>
</tr>
<tr>
<td>Enabled</td>
<td>64 cores, 2 chips</td>
</tr>
<tr>
<td>Orderable</td>
<td>2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td></td>
<td>1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td></td>
<td>48 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 480 GB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Red Hat Enterprise Linux 8.3</td>
</tr>
<tr>
<td></td>
<td>(Ootpa)</td>
</tr>
<tr>
<td></td>
<td>Kernel 4.18.0-240.el8.x86_64</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 2021.1 of Intel oneAPI DPC++/C++</td>
</tr>
<tr>
<td></td>
<td>Compiler Build 20201113 for Linux;</td>
</tr>
<tr>
<td></td>
<td>Fortran: Version 2021.1 of Intel Fortran Compiler</td>
</tr>
<tr>
<td></td>
<td>Classic Build 20201112 for Linux;</td>
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<td></td>
<td>C/C++: Version 2021.1 of Intel C/C++ Compiler</td>
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<td></td>
<td>Classic Build 20201112 for Linux</td>
</tr>
<tr>
<td>Parallel</td>
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</tr>
<tr>
<td>Firmware</td>
<td>Lenovo BIOS Version U8E109PT1 1.01</td>
</tr>
<tr>
<td></td>
<td>released Apr-2021</td>
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<tr>
<td>File System</td>
<td>xfs</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>Not Applicable</td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management</td>
<td>BIOS and OS set to prefer performance</td>
</tr>
<tr>
<td></td>
<td>at the cost of additional power usage</td>
</tr>
</tbody>
</table>

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Copies

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate®2017_fp_base</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>64</td>
<td>592</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>64</td>
<td>271</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>64</td>
<td>348</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>64</td>
<td>271</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>64</td>
<td>524</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>64</td>
<td>273</td>
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<tr>
<td>521.wrf_r</td>
<td>64</td>
<td>402</td>
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<td>526.blender_r</td>
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<td>527.cam4_r</td>
<td>64</td>
<td>1130</td>
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<tr>
<td>538.imagick_r</td>
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<td>544.nab_r</td>
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<tr>
<td>554.roms_r</td>
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</tbody>
</table>

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**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  
**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Jul-2021  
**Software Availability:** Feb-2021
Lenovo Global Technology  
ThinkSystem SD630 V2  
(2.60 GHz, Intel Xeon Platinum 8358)

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</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:

```bash
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"

MALLOCONF = "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 SD630 V2
(2.60 GHz, Intel Xeon Platinum 8358)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>420</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

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
Hyper-Threading set to Disabled
DCU Streamer Prefetcher set to Disabled
SNC set to Enabled
Adjacent Cache Prefetch set to Disabled

Sysinfo program /home/cpu2017-1.1.5-ic2021.1-revB/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Thu May 20 06:32:13 2021

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 8358 CPU @ 2.60GHz
   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 : 32
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

From lscpu:

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD630 V2
(2.60 GHz, Intel Xeon Platinum 8358)

SPECrated®2017_fp_base = 420
SPECrated®2017_fp_peak = Not Run

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

Test Date: May-2021

Platform Notes (Continued)

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 1
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8358 CPU @ 2.60GHz
Stepping: 6
CPU Mhz: 1929.891
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s): 0-15
NUMA node1 CPU(s): 16-31
NUMA node2 CPU(s): 32-47
NUMA node3 CPU(s): 48-63
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpc pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsv e avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsbg base tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsave xsaves cqm_llc cqm_occu llc cqm_mb_total cqm_mb_local split_lock detect wbinvd dtherm ida arat pln pts avx512vbmi umip pkp ospke avx512_vbmi2 gfn vaes vpcm16dqv avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdeld md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data
cache size: 49152 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 8 9 10 11 12 13 14 15
    node 0 size: 126192 MB

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

ThinkSystem SD630 V2  
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---

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base =</th>
<th>420</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
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**CPU2017 License:** 9017  
**Test Date:** May-2021  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Hardware Availability:** Jul-2021  
**Software Availability:** Feb-2021

---

**Platform Notes (Continued)**

node 0 free: 127929 MB  
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31  
node 1 size: 126782 MB  
node 1 free: 127850 MB  
node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47  
node 2 size: 127464 MB  
node 2 free: 128523 MB  
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63  
node 3 size: 126777 MB  
node 3 free: 128506 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: 528005988 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

/sbin/tuned-adm active  
Current active profile: balanced

From /etc/*release* /etc/*version*  
```
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 localhost.localdomain 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:  

<table>
<thead>
<tr>
<th>CVE-2018-12207 (iTLB Multihit):</th>
<th>Not affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVE-2018-3620 (L1 Terminal Fault):</td>
<td>Not affected</td>
</tr>
</tbody>
</table>

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD630 V2
(2.60 GHz, Intel Xeon Platinum 8358)

SPECrating Overview

SPECrating®2017_fp_base = 420
SPECrating®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)

Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass):
- Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- Mitigation: usercopy/swapgs barriers and __user pointer sanitation

CVE-2017-5753 (Spectre variant 1):

CVE-2017-5715 (Spectre variant 2):
- Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 May 20 02:05

SPEC is set to: /home/cpu2017-1.1.5-ic2021.1-revB
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda5 xfs 372G 66G 307G 18% /home

From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SD630 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

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

ThinkSystem SD630 V2  
(2.60 GHz, Intel Xeon Platinum 8358)  

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**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.

<table>
<thead>
<tr>
<th>C++</th>
<th>508.namd_r(base) 510.parest_r(base)</th>
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Intel (R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
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<table>
<thead>
<tr>
<th>C++, C</th>
<th>511.povray_r(base) 526.blender_r(base)</th>
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Intel (R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
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<th>C++, C, Fortran</th>
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Intel (R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
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</table>

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.
Lenovo Global Technology
ThinkSystem SD630 V2
(2.60 GHz, Intel Xeon Platinum 8358)

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

SPECrater®2017_fp_base = 420
SPECrater®2017_fp_peak = Not Run

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

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
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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.libm_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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD630 V2
(2.60 GHz, Intel Xeon Platinum 8358)

SPECrate®2017_fp_base = 420
SPECrate®2017_fp_peak = Not Run

Copyright 2017-2021 Standard Performance Evaluation Corporation

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)
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
-ff1to -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 -ff1to
-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
-ff1to -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
-ff1to -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
-ff1to -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles

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

**Lenovo Global Technology**

ThinkSystem SD630 V2  
(2.60 GHz, Intel Xeon Platinum 8358)

<table>
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<th>SPECrate®2017_fp_base</th>
<th>420</th>
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<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

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### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

- `-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)  

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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 2021-05-19 18:32:13-0400.  
Report generated on 2021-06-08 20:01:30 by CPU2017 PDF formatter v6442.  
Originally published on 2021-06-08.