**Lenovo Global Technology**

**ThinkSystem SD530**  
(2.20 GHz, Intel Xeon Silver 4209T)

**SPECrate2017_fp_base = 93.2**  
**SPECrate2017_fp_peak = Not Run**

| Copies | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 |
| 503.bwaves_r | 32 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 | 67.2 |
| 507.cactuBSSN_r | 32 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 | 60.8 |
| 508.namd_r | 32 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 | 57.6 |
| 510.parest_r | 32 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 | 93.2 |
| 511.povray_r | 32 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 | 68.6 |
| 519.lbm_r | 32 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 |
| 521.wrf_r | 32 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 | 77.2 |
| 526.blender_r | 32 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 | 87.8 |
| 527.cam4_r | 32 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 | 97.5 |
| 538.imagick_r | 32 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 |
| 544.nab_r | 32 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 |
| 549.fotonik3d_r | 32 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 |
| 554.roms_r | 32 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 |

**Hardware**

- **CPU Name:** Intel Xeon Silver 4209T
- **Max MHz.:** 3200
- **Nominal:** 2200
- **Enabled:** 16 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 11 MB I+D on chip per chip
- **Other:** None
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)
- **Storage:** 1 x 800 GB SATA SSD
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 12 SP4 (x86_64)
- **Kernel:** 4.12.14-94.41-default
- **Compiler:** C/C++: Version 19.0.1.144 of Intel C/C++
- **Compiler Build:** 20181018 for Linux;
- **Fortran:** Version 19.0.1.144 of Intel Fortran
- **Compiler Build:** 20181018 for Linux
- **Firmware:** Lenovo BIOS Version TEE135R 2.10 released Feb-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
Lenovo Global Technology
ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4209T)

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

Results Table

<table>
<thead>
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<th>Benchmark</th>
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SPECrate2017_fp_base = 93.2
SPECrate2017_fp_peak = Not Run

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/cpu2017-1.0.5-ic19.0u1/lib/intel64"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
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>
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)
**Lenovo Global Technology**

**ThinkSystem SD530**  
(2.20 GHz, Intel Xeon Silver 4209T)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
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<th>Test Date:</th>
<th>Apr-2019</th>
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<td>Hardware Availability:</td>
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<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Dec-2018</td>
</tr>
</tbody>
</table>

**SPECrate2017_fp_base = 93.2**

**SPECrate2017_fp_peak = Not Run**

### 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.

Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4) is mitigated in the system as tested and documented.

### Platform Notes

**BIOS configuration:**
Choose Operating Mode set to Maximum Performance  
Choose Operating Mode set to Custom Mode  
Intel Virtualization Technology set to Disable  
MONITOR/MWAIT set to Enable  
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on linux-9o25 Fri Apr 26 02:18:45 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 4209T CPU @ 2.20GHz
  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
```

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

Lenovo Global Technology
ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4209T)

SPECrate2017_fp_base = 93.2
SPECrate2017_fp_peak = Not Run

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

Test Date: Apr-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2018

Platform Notes (Continued)

CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Silver 4209T CPU @ 2.20GHz
Stepping:              6
CPU MHz:               2200.000
CPU max MHz:           3200.0000
CPU min MHz:           1000.0000
BogoMIPS:              4400.00
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 ept ms xsm xpost tm cmov mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmrperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xptr pdcm pcid dca sse4_1 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single ssbd mba ibrs ibpb tpr_shadow vnumi flexpriority ept vpid
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f
avx512dq rsseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

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: 96328 MB
node 0 free: 95449 MB
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
node 1 size: 96741 MB
node 1 free: 95957 MB
node distances:
node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
MemTotal: 197703824 kB
 HugePages_Total: 0

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4209T)

SPEC CPU2017 Floating Point Rate Result

<table>
<thead>
<tr>
<th>CPU2017 License: 9017</th>
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</table>

**SPECrate2017_fp_base = 93.2**

**SPECrate2017_fp_peak = Not Run**

---

**Platform Notes (Continued)**

- **Hugepagesize:** 2048 kB
- From `/etc/*release*` /etc/*version*
  - SuSE-release:
    - SUSE Linux Enterprise Server 12 (x86_64)
    - VERSION = 12
    - PATCHLEVEL = 4
    - # 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-SP4"
    - VERSION_ID="12.4"
    - PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
    - ID="sles"
    - ANSI_COLOR="0;32"
    - CPE_NAME="cpe:/o:suse:sles:12:sp4"

  `uname -a`:
  - x86_64 x86_64 x86_64 GNU/Linux

  Kernel self-reported vulnerability status:
  - CVE-2017-5754 (Meltdown): Not affected
  - CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
  - CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_PW

  run-level 3 Apr 25 17:51

  SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
  - Filesystem Type Size Used Avail Use% Mounted on
  - /dev/sda3 xfs 744G 35G 709G 5% /

  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 -[TEE135R-2.10]- 02/26/2019
  - Memory:
    - 4x NO DIMM NO DIMM
    - 12x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2400

  (End of data from sysinfo program)
Lenovo Global Technology

ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4209T)

**SPECrate2017_fp_base = 93.2**

**SPECrate2017_fp_peak = Not Run**

**Compiler Version Notes**

==============================================================================
CC 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
CXXC 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
CC 511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
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Lenovo Global Technology
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SPECratio2017_fp_base = 93.2
SPECratio2017_fp_peak = Not Run

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

Compiler Version Notes (Continued)

------------------------------------------------------------------------------
| CC  521.wrf_r(base) 527.cam4_r(base) |
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

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

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**SPECrate2017_fp_base = 93.2**
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### Base Portability Flags (Continued)

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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

**C++ benchmarks:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

**Fortran benchmarks:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.html

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-CLX-A.xml
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<th>Lenovo Global Technology</th>
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</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak = Not Run</td>
<td></td>
</tr>
<tr>
<td>Lenovo Global Technology</td>
<td>Lenovo Global Technology</td>
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<tr>
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</tr>
</tbody>
</table>

**Lenovo Global Technology**

**ThinkSystem SD530**

(2.20 GHz, Intel Xeon Silver 4209T)

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

**SPECrate2017_fp_base = 93.2**  
**SPECrate2017_fp_peak = Not Run**  

**Test Date:** Apr-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Dec-2018

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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 2019-04-25 14:18:45-0400.  