**SPEC CPU®2017 Floating Point Rate Result**

Lenovo Global Technology

ThinkSystem SD530
(3.20 GHz, Intel Xeon Silver 4215R)

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

---

### Hardware

- **CPU Name:** Intel Xeon Silver 4215R
- **Max MHz:** 4000
- **Nominal:** 3200
- **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
- **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 15 SP1 (x86_64)
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++
- **Compiler for Linux:** Fortran: Version 19.1.1.217 of Intel Fortran
- **Compiler for Linux:** Compiler for Linux
- **Parallel:** No
- **Firmware:** Lenovo BIOS Version TEE155L 2.61 released May-2020
- **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 set to prefer performance at the cost of additional power usage

---

### Specification

- **SPECr®2017_fp_base = 113**
- **SPECr®2017_fp_peak = Not Run**

---

### Results

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<td>507.cactuBSSN_r</td>
<td>32</td>
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<tr>
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<td>526.blender_r</td>
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<td>527.cam4_r</td>
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<td>538.imagick_r</td>
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<td>549.fotonik3d_r</td>
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<tr>
<td>554.roms_r</td>
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---

**Lenovo Global Technology**

ThinkSystem SD530
(3.20 GHz, Intel Xeon Silver 4215R)
Lenovo Global Technology
ThinkSystem SD530
(3.20 GHz, Intel Xeon Silver 4215R)

SPECrate®2017_fp_base = 113
SPECrate®2017_fp_peak = Not Run

Results Table

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<td>968</td>
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<td>962</td>
<td>52.9</td>
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</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

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/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/j e5.0.1-64"

MALLOCCONF = "retain:true"
**Lenovo Global Technology**

**ThinkSystem SD530**

(3.20 GHz, Intel Xeon Silver 4215R)

---

**SPEC CPU®2017 Floating Point Rate Result**

**SPECrate®2017_fp_base = 113**

**SPECrate®2017_fp_peak = Not Run**

---

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0

Transparent Huge Pages enabled by default

Prior to runcpu invocation

Filesystem page cache synced and cleared with:

```bash
sync; echo 3>/proc/sys/vm/drop_caches
```

runcpu command invoked through numactl i.e.:

```bash
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

Intel Virtualization Technology set to Disable

MONITOR/MWAIT set to Enable

Sysinfo program `/home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo`

Rev: r6365 of 2019-08-21 295195f888a3d7edbl1e6e46a485a0011

running on linux-jq95 Tue Jun 16 12:04:17 2020

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`

```bash
model name : Intel(R) Xeon(R) Silver 4215R CPU @ 3.20GHz
  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`:

```bash
Architecture: x86_64
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(3.20 GHz, Intel Xeon Silver 4215R)

SPECrate®2017_fp_base = 113
SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jun-2020
Tested by: Lenovo Global Technology
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
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
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4215R CPU @ 3.20GHz
Stepping: 7
CPU MHz: 3200.000
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 6400.00
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 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
aerpmpref perf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xptr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vldmi
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsavesopt xsaveopt xsave v pcb xsaveopt cqm_occupa llc cqm_mmm_total
cqm_mmm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear 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: 96346 MB
node 0 free: 95939 MB

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(3.20 GHz, Intel Xeon Silver 4215R)

SPECrate®2017_fp_base = 113
SPECrate®2017_fp_peak = Not Run

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

Platform Notes (Continued)

node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
node 1 size: 96764 MB
node 1 free: 96328 MB
node distances:
node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
MemTotal: 197745572 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
Linux linux-jq95 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-3620 (L1 Terminal Fault): Not affected
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
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Jun 16 12:03

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1
Filesystem Type Size Used Avail Use% Mounted on
/dev/md124p3 xfs 740G 56G 684G 8% /

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE155L-2.61]- 05/20/2020

(Continued on next page)
Lenovo Global Technology

ThinkSystem SD530
(3.20 GHz, Intel Xeon Silver 4215R)

SPECrater®2017_fp_base = 113
SPECrater®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Date: Jun-2020
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Platform Notes (Continued)

Vendor: Lenovo
Product: THINKSYSTEM SD530 -[7X21042000]-
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:
4x NO DIMM NO DIMM
12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933

(End of data from sysinfo program)
This system support 8 DIMMs per processor, total 16 DIMMs.
12 DIMM slots installed with 16 GB DIMM for this run,
and running at 2400 due to CPU limitation.

Compiler Version Notes

==============================================================================
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<tr>
<th>C</th>
<th>519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)</th>
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<tr>
<td>Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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==============================================================================
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==============================================================================
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## Lenovo Global Technology

ThinkSystem SD530  
(3.20 GHz, Intel Xeon Silver 4215R)

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

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### Compiler Version Notes (Continued)

---

**C++, C, Fortran | 507.cactuBSSN\_r(base)**

---

**Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1**  
NextGen Build 20200304  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

**Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1**  
NextGen Build 20200304  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

**Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)**  
64, Version 19.1.1.217 Build 20200306  
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 for applications running on Intel(R)**  
64, Version 19.1.1.217 Build 20200306  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

**Fortran, C | 521.wrf\_r(base) 527.cam4\_r(base)**

---

**Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)**  
64, Version 19.1.1.217 Build 20200306  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

**Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1**  
NextGen Build 20200304  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

### Base Compiler Invocation

**C benchmarks:**

- icc

**C++ benchmarks:**

- icpc

**Fortran benchmarks:**

- ifort

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(3.20 GHz, Intel Xeon Silver 4215R)

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

**SPECrade®2017_fp_base =** 113  
**SPECrade®2017_fp_peak = Not Run**

**Test Date:** Jun-2020  
**Hardware Availability:** Mar-2020  
**Software Availability:** Apr-2020

---

**Base Compiler Invocation (Continued)**

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

---

**Base Optimization Flags**

C benchmarks:  
-m64 -qnextgen -std=c11  
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs  
-fuse-ld.gold -XCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse  
-funroll-loops -qopt-mem-layout-trans=4  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:  
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries  
-Wl,-z,muldefs -fuse-ld.gold -XCORE-AVX512 -Ofast -ffast-math -flto  
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:  
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(3.20 GHz, Intel Xeon Silver 4215R)

SPECrate®2017_fp_base = 113
SPECrate®2017_fp_peak = Not Run

**Base Optimization Flags (Continued)**

Fortran benchmarks (continued):
-`-fuse-ld=gold -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`
-`-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

Benchmarks using both Fortran and C:
-`-m64 -qnextgen -std=c11`
-`-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs`
-`-fuse-ld=gold -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 -nostandard-realloc-lhs`
-`-align array32byte -auto -mbranches-within-32B-boundaries`
-`-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

Benchmarks using both C and C++:
-`-m64 -qnextgen -std=c11`
-`-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs`
-`-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse`
-`-funroll-loops -qopt-mem-layout-trans=4`
-`-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

Benchmarks using Fortran, C, and C++:
-`-m64 -qnextgen -std=c11`
-`-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs`
-`-fuse-ld=gold -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 -nostandard-realloc-lhs`
-`-align array32byte -auto -mbranches-within-32B-boundaries`
-`-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

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-I.html](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.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-I.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.xml)
### Lenovo Global Technology

**ThinkSystem SD530**  
(3.20 GHz, Intel Xeon Silver 4215R)

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

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