### Lenovo Global Technology

**ThinkSystem SD530**
(2.40 GHz, Intel Xeon Silver 4210R)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 129</th>
</tr>
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<tbody>
<tr>
<td>SPECrate®2017_fp_peak = Not Run</td>
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<table>
<thead>
<tr>
<th>Hardware</th>
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</tr>
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<tbody>
<tr>
<td>CPU Name: Intel Xeon Silver 4210R</td>
<td>OS: SUSE Linux Enterprise Server 12 SP5 (x86_64)</td>
</tr>
<tr>
<td>Max MHz: 3200</td>
<td>Kernel 4.12.14-120-default</td>
</tr>
<tr>
<td>Nominal: 2400</td>
<td>Compiler: C/C++: Version 19.1.1.217 of Intel</td>
</tr>
<tr>
<td>Enabled: 20 cores, 2 chips, 2 threads/core</td>
<td>C/C++ Compiler for Linux;</td>
</tr>
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<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>Compiler for Linux;</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>Firmware: Lenovo BIOS Version TEE155L 2.61 released May-2020</td>
</tr>
<tr>
<td>L3: 13.75 MB I+D on chip per chip</td>
<td>File System: btrfs</td>
</tr>
<tr>
<td>Other: None</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Storage: 1 x 800 GB SATA SSD</td>
<td>Peak Pointers: Not Applicable</td>
</tr>
<tr>
<td>Other: None</td>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management: BIOS set to prefer performance at the cost of additional power usage</td>
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<tr>
<td>Tested by: Lenovo Global Technology</td>
</tr>
<tr>
<td>CPU2017 License: 9017</td>
</tr>
<tr>
<td>Test Date: Jun-2020</td>
</tr>
<tr>
<td>Test Date:</td>
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</tr>
<tr>
<td>549.fotonik3d_r</td>
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<td></td>
</tr>
<tr>
<td>554.roms_r</td>
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Lenovo Global Technology
ThinkSystem SD530
(2.40 GHz, Intel Xeon Silver 4210R)

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

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

### Results Table

<table>
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SPECrater®2017_fp_base = 129
SPECrater®2017_fp_peak = Not Run

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"

MALLOC_CONF = "retain:true"
Lenovo Global Technology
ThinkSystem SD530
(2.40 GHz, Intel Xeon Silver 4210R)

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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:
    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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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 295195f888a3d7edeb1e6e46a485a0011
running on linux-4xwo Thu Jun 25 15:13:40 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:
    model name : Intel(R) Xeon(R) Silver 4210R CPU @ 2.40GHz
    2 "physical id"s (chips)
    40 "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 : 10
    siblings : 20
    physical 0: cores 0 1 2 3 4 8 9 10 11 12
    physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
    Architecture: x86_64

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(2.40 GHz, Intel Xeon Silver 4210R)

SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 129
SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test Date: Jun-2020
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): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4210R CPU @ 2.40GHz
Stepping: 7
CPU MHz: 2400.000
CPU max MHz: 3200.0000
CPU min MHz: 1000.0000
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39
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 rdtsscp
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
xtrpr pdcm pcd 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_patin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmi
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 xsavec xgetbv1 xsavec cqm_llc cqm_occupp_llc cqm_mbttotal
cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d
arch_capabilities

/proc/cpuinfo cache data
Cache size: 14080 KB

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 8 9 20 21 22 23 24 25 26 27 28 29
node 0 size: 96345 MB
node 0 free: 92920 MB

(Continued on next page)
Platform Notes (Continued)

node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 1 size: 96763 MB
node 1 free: 96235 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo
  MemTotal: 197743048 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 5
    # 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-SP5"
    VERSION_ID="12.5"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP5"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp5"

  uname -a:
    Linux linux-4xwo 4.12.14-120-default #1 SMP Thu Nov 7 16:39:09 UTC 2019 (fd9dc36)
    x86_64 x86_64 x86_64 GNU/Linux

  Kernel self-reported vulnerability status:

  itlb_multihit: KVM: Vulnerable
  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: usercopy/swapgs barriers and __user pointer sanitization
  CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
  tsx_async_abort: Mitigation: Clear CPU buffers; SMT vulnerable

  (Continued on next page)
Lenovo Global Technology

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Test Date: Jun-2020
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Platform Notes (Continued)

run-level 3 Jun 25 15:11

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1
Filesystem     Type   Size  Used Avail Use% Mounted on
/dev/sda3      btrfs  744G   48G  696G   7% /home

From /sys/devices/virtual/dmi/id
BIOS:    Lenovo -[TEE155L-2.61]- 05/20/2020
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, configured at 2400

compiler version notes

==============================================================================
C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_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.
------------------------------------------------------------------------------
==============================================================================
C++             | 508.namd_r(base) 510.parest_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.
------------------------------------------------------------------------------
==============================================================================
C++, C          | 511.povray_r(base) 526.blender_r(base)
(Continued on next page)
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Compiler Version Notes (Continued)

------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------

C++, C, Fortran | 507.cactuBSSN_r(base)
------------------------------------------------------------------------------
C++, C, Fortran | 507.cactuBSSN_r(base)
------------------------------------------------------------------------------

Fortran | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
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Fortran | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------

Fortran, C | 521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------
Fortran, C | 521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icc

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

Lenovo Global Technology
ThinkSystem SD530
(2.40 GHz, Intel Xeon Silver 4210R)

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Base Compiler Invocation (Continued)

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

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 -mnextgen -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 -gopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(2.40 GHz, Intel Xeon Silver 4210R)

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

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

**SPECrate®2017_fp_base = 129**

**SPECrate®2017_fp_peak = Not Run**

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`
- `-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)
**Lenovo Global Technology**

ThinkSystem SD530  
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**SPECrate®2017_fp_base = 129**

**SPECrate®2017_fp_peak = Not Run**

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You can also download the XML flags sources by saving the following links:

- [http://www.spec.org/cpu2017/flags/Lenovo-PlatformSPECcpu2017-Flags-V1.2-CLX-f.xml](http://www.spec.org/cpu2017/flags/Lenovo-PlatformSPECcpu2017-Flags-V1.2-CLX-f.xml)

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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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