## Lenovo Global Technology

### ThinkSystem SD530 (2.40 GHz, Intel Xeon Silver 4214R)

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Lenovo Global Technology</th>
<th>Test Date:</th>
<th>Jun-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Mar-2020</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Software Availability:</td>
<td>Apr-2020</td>
</tr>
</tbody>
</table>

### SPECspeed®2017_int_base = 9.74

### SPECspeed®2017_int_peak = Not Run

#### Hardware

<table>
<thead>
<tr>
<th>CPU Name</th>
<th>Intel Xeon Silver 4214R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz</td>
<td>3500</td>
</tr>
<tr>
<td>Nominal</td>
<td>2400</td>
</tr>
<tr>
<td>Enabled</td>
<td>24 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>16.5 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 800 GB SATA SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Software

| OS:                    | SUSE Linux Enterprise Server 12 SP5 (x86_64) |
|                        | Kernel 4.12.14-120-default |
| Compiler:              | C/C++: Version 19.1.1.217 of Intel |
|                        | C/C++                        |
| Compiler for Linux:    |                                    |
| Fortran:               | Fortran: Version 19.1.1.217 of Intel Fortran |
|                        | compiler for Linux           |
| Parallel:              | Yes                          |
| Firmware:              | Lenovo BIOS Version TEE155L 2.61 released May-2020 |
| File System:           | btrfs                        |
| 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 |
Lenovo Global Technology  
ThinkSystem SD530  
(2.40 GHz, Intel Xeon Silver 4214R)  

SPECspeed®2017_int_base = 9.74  
SPECspeed®2017_int_peak = Not Run  

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
<td>300</td>
<td>5.92</td>
<td>296</td>
<td>6.00</td>
<td>296</td>
<td>6.00</td>
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<tr>
<td>602.gcc_s</td>
<td>48</td>
<td>429</td>
<td>9.29</td>
<td>436</td>
<td>9.13</td>
<td>438</td>
<td>9.09</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>48</td>
<td>277</td>
<td>17.0</td>
<td>276</td>
<td>17.1</td>
<td>280</td>
<td>16.9</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>48</td>
<td>230</td>
<td>7.10</td>
<td>229</td>
<td>7.12</td>
<td>232</td>
<td>7.03</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>48</td>
<td>116</td>
<td>12.2</td>
<td>116</td>
<td>12.2</td>
<td>116</td>
<td>12.2</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>48</td>
<td>127</td>
<td>13.9</td>
<td>129</td>
<td>13.7</td>
<td>125</td>
<td>14.1</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>48</td>
<td>273</td>
<td>5.25</td>
<td>273</td>
<td>5.25</td>
<td>273</td>
<td>5.25</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>48</td>
<td>398</td>
<td>4.28</td>
<td>398</td>
<td>4.29</td>
<td>397</td>
<td>4.29</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>48</td>
<td>199</td>
<td>14.8</td>
<td>199</td>
<td>14.8</td>
<td>199</td>
<td>14.8</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>48</td>
<td>301</td>
<td>20.5</td>
<td>302</td>
<td>20.5</td>
<td>302</td>
<td>20.5</td>
</tr>
</tbody>
</table>

SPECspeed®2017_int_base = 9.74  
SPECspeed®2017_int_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

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:  
KMP_AFFINITY = "granularity=fine,scatter"  
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"  
OMP_STACKSIZE = "192M"

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:

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(2.40 GHz, Intel Xeon Silver 4214R)

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

General Notes (Continued)

sync; echo 3>/proc/sys/vm/drop_caches
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
Stale AtoS set to Disable
CPU P-state Control set to Cooperative
C-States set to Legacy
C1 Enhanced Mode set to Enable

Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbb1e6e46a485a0011
running on linux-4xwo Wed Jun 17 15:04:48 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 4214R CPU @ 2.40GHz
  2 "physical id"s (chips)
  48 "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 : 12
  siblings : 24
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13

From lscpu:
Architecture:     x86_64
CPU op-mode(s):   32-bit, 64-bit
Byte Order:       Little Endian
Address sizes:    46 bits physical, 48 bits virtual
CPU(s):           48
On-line CPU(s) list: 0-47

(Continued on next page)
SPEC CPU®2017 Integer Speed Result

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

SPECSpeed®2017_int_base = 9.74
SPECSpeed®2017_int_peak = Not Run

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

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

Platform Notes (Continued)

Thread(s) per core: 2
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4214R CPU @ 2.40GHz
Stepping: 7
CPU MHz: 2400.000
CPU max MHz: 3500.0000
CPU min MHz: 1000.0000
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0-11,24-35
NUMA node1 CPU(s): 12-23,36-47
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
aperfmperf 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 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_pstate ssbd mba ibrs ibpb stibp ibrs_enabled tpr_shadow vmmi
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invvpidd rtm
cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsavec xgetbv1 xsavevs cqm_llc cqm_occup_llc cqm_mbb_total
cqm_mbb_local dtcmm dtherm ida arat pls hwp act_window hwp_epp hwp_pkg_req pku
ospke avx512_vnni md_clear flush_lld arch_capabilities

/proccpuinfo cache data
cache size : 16896 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 10 11 24 25 26 27 28 29 30 31 32 33 34 35
node 0 size: 96373 MB
node 0 free: 92622 MB
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 96373 MB
node 1 free: 96472 MB
node distances:
node 0 1

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SPEC CPU®2017 Integer Speed Result

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ThinkSystem SD530  
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SPECSpeed®2017_int_base = 9.74
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CPU2017 License: 9017
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Tested by: Lenovo Global Technology
Test Date: Jun-2020
Hardware Availability: Mar-2020
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Platform Notes (Continued)

0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 197741544 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: Mitigation: Split huge pages
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 sanitation
CVE-2017-5715 (Spectre variant 2):
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
tsx_async_abort:
Mitigation: Clear CPU buffers; SMT vulnerable
run-level 3 Jun 17 15:03

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

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Test Date: Jun-2020
Hardware Availability: Mar-2020
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Platform Notes (Continued)

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[Tee155L-2.61]- 05/20/2020
Vendor: Lenovo
Product: THINKSYSTEM SD530 -[7X2104Z000]-
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

(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

C
| 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) |
| 625.x264_s(base) 657.xz_s(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++
| 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) |
| 641.leela_s(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.

Fortran
| 648.exchange2_s(base) |

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.1.1.217 Build 20200306

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Lenovo Global Technology
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SPECSpeed®2017_int_base = 9.74
SPECSpeed®2017_int_peak = Not Run

Compiler Version Notes (Continued)
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
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Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -qnextgen -std=c11
-ansi -plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-ansi -z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
- lqkmalloc

Fortran benchmarks:
- m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX512
- O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
- nostandard-realloc-lhs -align array32byte
- mbranches-within-32B-boundaries

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.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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