**Lenovo Global Technology**  
ThinkSystem SD530  
(2.30 GHz, Intel Xeon Gold 5218N)  

<table>
<thead>
<tr>
<th>SPECrate2017_int_base =</th>
<th>175</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Apr-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018

<table>
<thead>
<tr>
<th>Software Availability</th>
<th>Lenovo BIOS Version TEE135R 2.10 released Feb-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 15 (x86_64)</td>
</tr>
<tr>
<td>Compiler</td>
<td>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</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
</tr>
<tr>
<td>Firmware</td>
<td>Lenovo BIOS Version TEE135R 2.10 released Feb-2019</td>
</tr>
<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>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardware Availability</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Intel Xeon Gold 5218N</td>
</tr>
<tr>
<td>Max MHz.:</td>
<td>3700</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2300</td>
</tr>
<tr>
<td>Enabled:</td>
<td>32 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>22 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)</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>

**Hardware**

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate2017_int_base (175)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>15.0</td>
</tr>
<tr>
<td>500</td>
<td>134</td>
</tr>
</tbody>
</table>
Lenovo Global Technology

ThinkSystem SD530
(2.30 GHz, Intel Xeon Gold 5218N)

SPEC CPU2017 Integer Rate Result

SPECrate2017_int_base =  175
SPECrate2017_int_peak =  Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>64</td>
<td>762</td>
<td>134</td>
<td>762</td>
<td>134</td>
<td>763</td>
<td>133</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>64</td>
<td>621</td>
<td>146</td>
<td>622</td>
<td>146</td>
<td>621</td>
<td>146</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>64</td>
<td>441</td>
<td>234</td>
<td>439</td>
<td>236</td>
<td>441</td>
<td>234</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>64</td>
<td>702</td>
<td>120</td>
<td>704</td>
<td>119</td>
<td>702</td>
<td>120</td>
</tr>
<tr>
<td>523.xalanbmk_r</td>
<td>64</td>
<td>336</td>
<td>201</td>
<td>334</td>
<td>202</td>
<td>335</td>
<td>202</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>64</td>
<td>334</td>
<td>336</td>
<td>334</td>
<td>336</td>
<td>333</td>
<td>336</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>64</td>
<td>513</td>
<td>143</td>
<td>512</td>
<td>143</td>
<td>513</td>
<td>143</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>64</td>
<td>749</td>
<td>141</td>
<td>761</td>
<td>139</td>
<td>748</td>
<td>142</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>64</td>
<td>539</td>
<td>311</td>
<td>540</td>
<td>310</td>
<td>541</td>
<td>310</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>64</td>
<td>581</td>
<td>119</td>
<td>581</td>
<td>119</td>
<td>582</td>
<td>119</td>
</tr>
</tbody>
</table>

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.
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)
## Lenovo Global Technology
ThinkSystem SD530  
(2.30 GHz, Intel Xeon Gold 5218N)

### General Notes (Continued)

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
- DCU Streamer Prefetcher set to Disable
- MONITOR/MWAIT set to Enable
- SNC set to Enable

```
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-qxkw Fri Apr 19 17:37:27 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) Gold 5218N CPU @ 2.30GHz
  2 "physical id"s (chips)
   64 "processors"
core, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

```
From lscpu:
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: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
```

(Continued on next page)
SPEC CPU2017 Integer Rate Result

Lenovo Global Technology
ThinkSystem SD530
(2.30 GHz, Intel Xeon Gold 5218N)

SPECratenet_int_base = 175
SPECratenet_int_peek = Not Run

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

Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Gold 5218N CPU @ 2.30GHz
Stepping: 6
CPU MHz: 2300 000
CPU max MHz: 3900 0000
CPU min MHz: 1000 0000
BogoMIPS: 4600 00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-3, 8-11, 32-35, 40-43
NUMA node1 CPU(s): 4-7, 12-15, 36-39, 44-47
NUMA node2 CPU(s): 16-19, 24-27, 48-51, 56-59
NUMA node3 CPU(s): 20-23, 28-31, 52-55, 60-63
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 art 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 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault ebp cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb tpr_shadow vmi flexpriority ept vpid fsgsbase tsc_adjust bm1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512bw xsaveopt xsaves xsavec xgetbv1 xsave cqm_llc cqmm_mbb_total cqmm_mbb_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: 4 nodes (0-3)
   node 0 cpus: 0 1 2 3 8 9 10 11 32 33 34 35 40 41 42 43
   node 0 size: 96367 MB
   node 0 free: 93019 MB
   node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47
   node 1 size: 96725 MB
   node 1 free: 96478 MB
   node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
   node 2 size: 96754 MB
   node 2 free: 96334 MB
   node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63
   node 3 size: 96752 MB
   node 3 free: 96529 MB
   node distances:
   node 0 1 2 3

(Continued on next page)
**Lenovo Global Technology**  
ThinkSystem SD530  
(2.30 GHz, Intel Xeon Gold 5218N)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base = 175</th>
<th>Test Date: Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak = Not Run</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>CPU2017 License: 9017</td>
<td>Software Availability: Nov-2018</td>
</tr>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td></td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td></td>
</tr>
</tbody>
</table>

---

### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>0:</th>
<th>10</th>
<th>11</th>
<th>21</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:</td>
<td>11</td>
<td>10</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>2:</td>
<td>21</td>
<td>21</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>3:</td>
<td>21</td>
<td>21</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>

From `/proc/meminfo`

- MemTotal: 395877708 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From `/etc/*release*/etc/*version*`

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

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_FW

run-level 3 Apr 19 17:36

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>xfs</td>
<td>737G</td>
<td>79G</td>
<td>659G</td>
<td>11%</td>
<td>/</td>
</tr>
</tbody>
</table>

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 M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2666

(Continued on next page)
# SPEC CPU2017 Integer Rate Result

**Lenovo Global Technology**  
ThinkSystem SD530  
(2.30 GHz, Intel Xeon Gold 5218N)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base =</th>
<th>175</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

| CPU2017 License:         | 9017 |
| Test Sponsor:            | Lenovo Global Technology |
| Tested by:               | Lenovo Global Technology |
| Test Date:               | Apr-2019 |
| Hardware Availability:   | Apr-2019 |
| Software Availability:   | Nov-2018 |

**Platform Notes (Continued)**

(End of data from sysinfo program)

**Compiler Version Notes**

---

CC  500.perlbench_r(base)  502.gcc_r(base)  505.mcf_r(base)  525.x264_r(base)  
557.xz_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  520.omnetpp_r(base)  523.xalancbmk_r(base)  531.deepsjeng_r(base)  
541.leela_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.

---

FC  548.exchange2_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.

---

**Base Compiler Invocation**

C benchmarks:  
icc -m64 -std=c11

C++ benchmarks:  
icpc -m64

Fortran benchmarks:  
ifort -m64
Lenovo Global Technology
ThinkSystem SD530
(2.30 GHz, Intel Xeon Gold 5218N)

SPECrate2017_int_base = 175
SPECrate2017_int_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: Nov-2018

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

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
**Lenovo Global Technology**  
ThinkSystem SD530  
(2.30 GHz, Intel Xeon Gold 5218N)  

<table>
<thead>
<tr>
<th>CPU2017 License: 9017</th>
<th>Test Date: Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Nov-2018</td>
</tr>
</tbody>
</table>

**SPECrate2017_int_base** = 175  
**SPECrate2017_int_peak** = Not Run

---

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2019-04-19 05:37:26-0400.  