## Lenovo Global Technology

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

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

<table>
<thead>
<tr>
<th>SPECrate2017_int_base = 183</th>
</tr>
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<tbody>
<tr>
<td>SPECrate2017_int_peak = Not Run</td>
</tr>
</tbody>
</table>

**Test Date:** May-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018

### Hardware

- **CPU Name:** Intel Xeon Gold 5218  
- **Max MHz.:** 3900  
- **Nominal:** 2300  
- **Enabled:** 32 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:** 22 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)  
- **Storage:** 1 x 800 GB SATA SSD  
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 15 (x86_64)  
- **Kernel:** 4.12.14-25.13-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  
- **Parallel:** No  
- **Firmware:** Lenovo BIOS Version TEE135R 2.10 released Feb-2019  
- **File System:** btrfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None

### Test Results

<table>
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<tr>
<th>SPECrate2017_int_base</th>
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</table>

**Copies**  
| 500.perlbench_r | 64 | 502.gcc_r | 64 | 505.mcf_r | 64 | 520.omnetpp_r | 64 | 523.xalancmk_r | 64 | 525.x264_r | 64 | 531.deepsjeng_r | 64 | 541.leela_r | 64 | 548.exchange2_r | 64 | 557.xz_r | 64 |
|------------------|----|----------|----|----------|----|-------------|----|-------------|----|-----------|----|-------------|----|-------------|----|-------------|----|-----------|
|                  | 141|          | 152|          | 142|             | 125|             | 132|           | 110|              | 117|             | 117|              | 117|           |
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### Results Table

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<tr>
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<td>531.deepsjeng_r</td>
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<tr>
<td>557.xz_r</td>
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<td>123</td>
<td>563</td>
<td>123</td>
<td>563</td>
<td>123</td>
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### 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>
```

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)
**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-ov0t Tue May 21 14:42:31 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 5218 CPU @ 2.30GHz
  2 "physical id"s (chips)
64 "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 : 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)
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Tested by: Lenovo Global Technology
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Hardware Availability: Apr-2019
Software Availability: Nov-2018

Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Gold 5218 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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid apicvmx 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 bmi1 hle avx2 smep bmi2 erms invpcid rd注意力 rt a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_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.

/proc/cpuinfo cache data
cache size = 22528 KB

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: 47983 MB
node 0 free: 30616 MB
node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47
node 1 size: 48370 MB
node 1 free: 43563 MB
node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
node 2 size: 48341 MB
node 2 free: 48031 MB
node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63
node 3 size: 48368 MB
node 3 free: 42503 MB
node distances:
node 0 1 2 3

(Continued on next page)
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Platform Notes (Continued)

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

From /proc/meminfo
MemTotal: 197696880 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

```
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:
Linux linux-ov0t 4.12.14-25.13-default #1 SMP Tue Aug 14 15:07:35 UTC 2018 (947aa51)
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 May 21 11:38

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

```
Filesystem   Type      Size  Used Avail Use% Mounted on
/dev/sdb3    btrfs      892G  41G  851G   5% /home
```

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 SM BIOS" standard.

BIOS Lenovo -[TEE135R-2.10]- 02/26/2019
Memory:
4x NO DIMM NO DIMM
12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2666
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**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
SPEC CPU2017 Integer Rate Result

Lenovo Global Technology
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SPECRate2017_int_peak = Not Run

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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.keela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-W1, -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:
-W1, -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:
-W1, -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
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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 2019-05-21 02:42:31-0400.  
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