## Lenovo Global Technology

**ThinkSystem SD530**  
*(3.80 GHz, Intel Xeon Gold 5222)*

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Nov-2018</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>64.1</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

### Hardware

- **CPU Name:** Intel Xeon Gold 5222  
  - **Max MHz.:** 3900  
  - **Nominal:** 3800  
  - **Enabled:** 8 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:** 16.5 MB I+D on chip per chip  
  - **Other:** None  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)  
- **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:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None

---

**Copies**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base (64.1)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>500.perlbench_r</td>
<td>16</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>16</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>16</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>16</td>
</tr>
<tr>
<td>523.xalanchmk_r</td>
<td>16</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>16</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>16</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>16</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>16</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>16</td>
</tr>
</tbody>
</table>

---

**SPECrate2017_int_base** = 64.1  
**SPECrate2017_int_peak** = Not Run
Lenovo Global Technology  
ThinkSystem SD530  
(3.80 GHz, Intel Xeon Gold 5222)  

SPECrate2017_int_base = 64.1  
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>16</td>
<td>525</td>
<td>48.5</td>
<td>526</td>
<td>48.4</td>
<td>535</td>
<td>47.6</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>16</td>
<td>426</td>
<td>53.1</td>
<td>422</td>
<td>53.7</td>
<td>421</td>
<td>53.8</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>16</td>
<td>294</td>
<td>87.8</td>
<td>296</td>
<td>87.3</td>
<td>296</td>
<td>87.4</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>16</td>
<td>517</td>
<td>40.6</td>
<td>516</td>
<td>40.7</td>
<td>517</td>
<td>40.6</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>16</td>
<td>201</td>
<td>84.0</td>
<td>203</td>
<td>83.4</td>
<td>202</td>
<td>83.6</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>16</td>
<td>212</td>
<td>132</td>
<td>211</td>
<td>133</td>
<td>213</td>
<td>132</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>16</td>
<td>351</td>
<td>52.2</td>
<td>351</td>
<td>52.2</td>
<td>351</td>
<td>52.2</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>16</td>
<td>554</td>
<td>47.8</td>
<td>554</td>
<td>47.8</td>
<td>551</td>
<td>48.1</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>16</td>
<td>370</td>
<td>113</td>
<td>377</td>
<td>111</td>
<td>375</td>
<td>112</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>16</td>
<td>420</td>
<td>41.1</td>
<td>420</td>
<td>41.1</td>
<td>420</td>
<td>41.1</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-ic19.0ul/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
(3.80 GHz, Intel Xeon Gold 5222)

**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-x86c Wed Apr 17 15:08:35 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 5222 CPU @ 3.80GHz
  2 "physical id"s (chips)
  16 "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 : 4
  siblings : 8
  physical 0: cores 2 5 8 13
  physical 1: cores 5 8 9 13

From `/usr/local/lscpu`
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 16
  On-line CPU(s) list: 0-15
  Thread(s) per core: 2
  Core(s) per socket: 4
  Socket(s): 2
  NUMA node(s): 4
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 85

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(3.80 GHz, Intel Xeon Gold 5222)

SPECrate2017_int_base = 64.1
SPECrate2017_int_peak = Not Run

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

Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Gold 5222 CPU @ 3.80GHz
Stepping: 6
CPU MHz: 3800.000
CPU max MHz: 3900.0000
CPU min MHz: 1200.0000
BogoMIPS: 7600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0,2,8,10
NUMA node1 CPU(s): 1,3,9,11
NUMA node2 CPU(s): 4,7,12,15
NUMA node3 CPU(s): 5,6,13,14
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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid pti msr pbe首创 intel_pmm_pstate struct前辈 phtt bit🧪 deadtime_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb tpr_shadow vmi flexpriority ept vpds fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clfshopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1 xsaves cqm_l1c cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

warning:

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 2 8 10
node 0 size: 47985 MB
node 0 free: 44736 MB
node 1 cpus: 1 3 9 11
node 1 size: 48372 MB
node 1 free: 48187 MB
node 2 cpus: 4 7 12 15
node 2 size: 48341 MB
node 2 free: 48106 MB
node 3 cpus: 5 6 13 14
node 3 size: 48372 MB
node 3 free: 48106 MB
node distances:
node 0 1 2 3

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(3.80 GHz, Intel Xeon Gold 5222)

SPECrate2017_int_base = 64.1
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

Platform Notes (Continued)

0: 10 11 21 21
1: 11 10 21 21
2: 21 21 10 11
3: 21 21 11 10

From /proc/meminfo
MemTotal: 197705916 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 17 15:06

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda3 xfs 744G 42G 702G 6% /

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 M393A2K43CB2-CVF 16 GB 2 rank 2933

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(3.80 GHz, Intel Xeon Gold 5222)

SPECrate2017_int_base = 64.1
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

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
(3.80 GHz, Intel Xeon Gold 5222)

SPECrate2017_int_base = 64.1
SPECrate2017_int_peak = Not Run

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:
-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
## Lenovo Global Technology

**ThinkSystem SD530**  
(3.80 GHz, Intel Xeon Gold 5222)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base = 64.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak = Not Run</td>
</tr>
</tbody>
</table>

<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>

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 2019-04-17 03:08:35-0400.  