**SPEC CPU®2017 Integer Speed Result**

**Lenovo Global Technology**

ThinkSystem SD530
(3.00 GHz, Intel Xeon Gold 6248R)

| Test Date: | Jul-2020 |
| Hardware Availability: | Mar-2020 |
| Software Availability: | Apr-2020 |

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

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<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Results</th>
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</thead>
<tbody>
<tr>
<td><strong>600.perlbench_s</strong></td>
<td>96</td>
</tr>
<tr>
<td><strong>602.gcc_s</strong></td>
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<tr>
<td><strong>605.mcf_s</strong></td>
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<td><strong>620.omnetpp_s</strong></td>
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<tr>
<td><strong>623.xalancbmk_s</strong></td>
<td>96</td>
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<tr>
<td><strong>625.x264_s</strong></td>
<td>96</td>
</tr>
<tr>
<td><strong>631.deepsjeng_s</strong></td>
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</tr>
<tr>
<td><strong>641.leela_s</strong></td>
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<td><strong>648.exchange2_s</strong></td>
<td>96</td>
</tr>
<tr>
<td><strong>657.xz_s</strong></td>
<td>96</td>
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</tbody>
</table>

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**Hardware**

- **CPU Name:** Intel Xeon Gold 6248R
- **Max MHz:** 4000
- **Nominal:** 3000
- **Enabled:** 48 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:** 35.75 MB I+D on chip per chip
- **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 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: Version 19.1.1.217 of Intel Fortran
- **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  
(3.00 GHz, Intel Xeon Gold 6248R)  

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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</tbody>
</table>

### 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)
### 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 295195f888a3d7ed81e6e46a485a0011
running on linux-4xwo Mon Jul  6 15:18:13 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) Gold 6248R CPU @ 3.00GHz
  2 "physical id"s (chips)
  96 "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 : 24
  siblings : 48
  physical 0: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
  physical 1: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
```

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): 96
On-line CPU(s) list: 0-95
```

(Continued on next page)
Platform Notes (Continued)

Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6248R CPU @ 3.00GHz
Stepping: 7
CPU MHz: 3000.000
CPU max MHz: 4000.0000
CPU min MHz: 1200.0000
BogoMIPS: 6000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0–23,48–71
NUMA node1 CPU(s): 24–47,72–95
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
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
fx16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
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 xsaveopt xsavec xgetbv1 xsaveas cqm_llc cqm_occup_llc cqm_mbb_total
cqm_mbb_local dtherm ida arat ptn pls hwp act_window hwp_epp hwp_pkg_req pku
ospke avx512_vnni md_clear flush_l1d arch_capabilities

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 12 13 14 15 16 17 18 19 20 21 22 23 48 49 50 51
52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
node 0 size: 96339 MB
node 0 free: 92466 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 72
73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
node 1 size: 96757 MB
node 1 free: 96384 MB

(Continued on next page)
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<tr>
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<tr>
<td>SPECspeed®2017_int_peak</td>
<td>Not Run</td>
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jul-2020
Tested by: Lenovo Global Technology
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Platform Notes (Continued)

node distances:
node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo
MemTotal: 197730944 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 sanitization
  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 Jul 6 15:12

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1

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## Lenovo Global Technology

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### SPECspeed®2017_int_base = 11.5

### SPECspeed®2017_int_peak = Not Run

### Platform Notes (Continued)

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<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
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</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>btrfs</td>
<td>744G</td>
<td>48G</td>
<td>696G</td>
<td>7%</td>
<td>/home</td>
</tr>
</tbody>
</table>

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

(End of data from sysinfo program)

### Compiler Version Notes

```plaintext
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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

(Continued on next page)
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Compiler Version Notes (Continued)

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
- Wl, - 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
-Wl,-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
-lqkmalloc

(Continued on next page)
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### Base Optimization Flags (Continued)

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](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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.xml)

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