## SPEC CPU®2017 Integer Speed Result

### Lenovo Global Technology

**ThinkSystem SD530**  
(2.30 GHz, Intel Xeon Gold 6230N)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>10.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>Not Run</td>
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</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Sep-2019  
**Hardware Availability:** Jul-2019  
**Software Availability:** May-2019

### Threads

<table>
<thead>
<tr>
<th>Test</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base (10.3)</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>80</td>
<td>6.84</td>
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<tr>
<td>602.gcc_s</td>
<td>80</td>
<td>10.1</td>
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<tr>
<td>605.mcf_s</td>
<td>80</td>
<td>12.6</td>
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<tr>
<td>620.omnetpp_s</td>
<td>80</td>
<td>8.11</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>80</td>
<td>12.5</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>80</td>
<td>14.4</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>80</td>
<td>5.47</td>
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<tr>
<td>641.leela_s</td>
<td>80</td>
<td>4.77</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>80</td>
<td>16.6</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>80</td>
<td>23.7</td>
</tr>
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### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 6230N</td>
</tr>
<tr>
<td>Max MHz</td>
<td>3500</td>
</tr>
<tr>
<td>Nominal</td>
<td>2300</td>
</tr>
<tr>
<td>Enabled</td>
<td>40 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>
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<tr>
<td>Cache L2</td>
<td>1 MB I+D on chip per core</td>
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<tr>
<td>Cache L3</td>
<td>27.5 MB I+D on chip per chip</td>
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<tr>
<td>Other</td>
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<tr>
<td>Memory</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)</td>
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<td>Storage</td>
<td>1 x 800 GB SATA SSD</td>
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### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 12 SP4 (x86_64)</td>
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<tr>
<td>Kernel</td>
<td>4.12.14-94.41-default</td>
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<tr>
<td>Compiler</td>
<td>C/C++: Version 19.0.4.227 of Intel C/C++</td>
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<tr>
<td>Compiler for Linux</td>
<td>Intel Fortran Compiler for Linux</td>
</tr>
<tr>
<td>Parallel</td>
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<tr>
<td>Firmware</td>
<td>Lenovo BIOS Version TEE142E 2.30 released Aug-2019 tested as TEE141E 2.30 Jul-2019</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
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<tr>
<td>System State</td>
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<td>Base Pointers</td>
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<tr>
<td>Peak Pointers</td>
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<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
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<tr>
<td>Power Management</td>
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</table>
### Lenovo Global Technology

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(2.30 GHz, Intel Xeon Gold 6230N)

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

<table>
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<tr>
<th>Benchmark</th>
<th>Threads</th>
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</tr>
</tbody>
</table>

**SPECspeed®2017_int_base =** 10.3  
**SPECspeed®2017_int_peak =** Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### 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:

- KMP_AFFINITY = "granularity=fine,scatter"
- LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u4/lib/intel64"
- LD_LIBRARY_PATH = "/$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19.0u4/je5.0.1-64"
- OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-799X 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
```

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.

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.

jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

(Continued on next page)
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| SPECspeed®2017_int_peak | Not Run |

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Sep-2019
Hardware Availability: Jul-2019
Tested by: Lenovo Global Technology
Software Availability: May-2019

General Notes (Continued)


Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set 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/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-rofd Mon Sep 9 10:37:05 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 6230N CPU @ 2.30GHz
  2 "physical id"s (chips)
  80 "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 : 20
siblings : 40
physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 80
On-line CPU(s) list: 0-79
Thread(s) per core: 2
Core(s) per socket: 20
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6230N CPU @ 2.30GHz
Stepping: 6
CPU MHz: 2300.000

(Continued on next page)
Lenovo Global Technology
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**SPECspeed®2017_int_base = 10.3**
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<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>CPU max MHz</td>
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<tr>
<td>CPU min MHz</td>
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<td>Virtualization</td>
<td>VT-x</td>
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<tr>
<td>L1d cache</td>
<td>32K</td>
</tr>
<tr>
<td>L1i cache</td>
<td>32K</td>
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<tr>
<td>L2 cache</td>
<td>1024K</td>
</tr>
<tr>
<td>L3 cache</td>
<td>28160K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s)</td>
<td>0-19,40-59</td>
</tr>
<tr>
<td>NUMA node1 CPU(s)</td>
<td>20-39,60-79</td>
</tr>
</tbody>
</table>
| Flags           | fpu vmx 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 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 epb cat_l3 cdp_l3 invpcid_single intel_ppin ssbd mba ibrs ibpb stibp tpr_shadow vmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mxp rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occapp_llc cqm_mbb_total cqm_mbb_local dtcperf ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni flush_l1d arch_capabilities

/platform/proc/cpuinfo cache data

```bash
cache size : 28160 KB
```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

```bash
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 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59
node 0 size: 96322 MB
node 0 free: 95862 MB
node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
node 1 size: 96737 MB
node 1 free: 95980 MB
node distances:
node 0 1
0: 10 21
1: 21 10
```

From /proc/meminfo

```bash
MemTotal: 197693176 kB
 HugePages_Total: 0
 Hugepagesize: 2048 kB
```

(Continued on next page)
Platform Notes (Continued)

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 4
  # 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-SP4"
    VERSION_ID="12.4"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp4"

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 Sep 9 10:36

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/md126p3 xfs 743G 43G 701G 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 -[TEE141E-2.30]- 07/02/2019
Memory:
  4x NO DIMM NO DIMM
  12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933

(End of data from sysinfo program)
# SPEC CPU®2017 Integer Speed Result

**Lenovo Global Technology**  
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**SPECspeed®2017_int_base = 10.3**  
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<tbody>
<tr>
<td>Test Sponsor</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

Test Date: Sep-2019  
Hardware Availability: Jul-2019  
Software Availability: May-2019

## Compiler Version Notes

### C

<table>
<thead>
<tr>
<th>600.perlbench_s(base)</th>
<th>602.gcc_s(base)</th>
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(Continued on next page)

### C++

<table>
<thead>
<tr>
<th>620.omnetpp_s(base)</th>
<th>623.xalancbmk_s(base)</th>
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<th>641.leela_s(base)</th>
</tr>
</thead>
</table>

(Continued on next page)

### Fortran

<table>
<thead>
<tr>
<th>648.exchange2_s(base)</th>
</tr>
</thead>
</table>

(Continued on next page)

## Base Compiler Invocation

C benchmarks:  
```
icc -m64 -std=c11
```

C++ benchmarks:  
```
icpc -m64
```

Fortran benchmarks:  
```
ifort -m64
```

## 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

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

<table>
<thead>
<tr>
<th>Base Portability Flags</th>
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<tbody>
<tr>
<td>623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX</td>
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</tr>
<tr>
<td>657.xz_s: -DSPEC_LP64</td>
</tr>
</tbody>
</table>

### Base Optimization Flags

**C benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4 -openmp -DSPEC_OPENMP`
- `-L/usr/local/je5.0.1-64/lib -ljemalloc`

**C++ benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_andLibraries_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc`

**Fortran benchmarks:**
- `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4`
- `-nostandard-realloc-lhs`

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