### Lenovo Global Technology

**ThinkSystem SR550**  
(2.10 GHz, Intel Xeon Gold 6230T)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>10.0</th>
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</thead>
<tbody>
<tr>
<td>SPECspeed®2017_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:** Aug-2019  
**Hardware Availability:** Jul-2019  
**Software Availability:** Dec-2018

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_int_base (10.0)</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench_s 80</td>
<td></td>
</tr>
<tr>
<td>602.gcc_s 80</td>
<td></td>
</tr>
<tr>
<td>605.mcf_s 80</td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s 80</td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s 80</td>
<td></td>
</tr>
<tr>
<td>625.x264_s 80</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s 80</td>
<td></td>
</tr>
<tr>
<td>641 lleela_s 80</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s 80</td>
<td></td>
</tr>
<tr>
<td>657.xz_s 80</td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6230T  
- **Max MHz:** 3900  
- **Nominal:** 2100  
- **Enabled:** 40 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:** 27.5 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

<table>
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</table>
| **OS:** | SUSE Linux Enterprise Server 12 SP4 (x86_64)  
| | Kernel 4.12.14-94.41-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:** | Yes  
| **Firmware:** | Lenovo BIOS Version TEE142E 2.30 released Aug-2019 tested as TEE141E 2.30 Jul-2019  
| **File System:** | xfs  
| **System State:** | Run level 3 (multi-user)  
| **Base Pointers:** | 64-bit  
| **Peak Pointers:** | Not Applicable  
| **Other:** | jemalloc memory allocator V5.0.1  
| **Power Management:** | -- |
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 perlbench_s</td>
<td>80</td>
<td>266.67</td>
<td>6.67</td>
<td>263.74</td>
<td>6.74</td>
<td>262.67</td>
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<tr>
<td>602 gcc_s</td>
<td>80</td>
<td>409.73</td>
<td>9.73</td>
<td>406.80</td>
<td>9.80</td>
<td>404.87</td>
<td>9.87</td>
</tr>
<tr>
<td>605 mcf_s</td>
<td>80</td>
<td>379.12</td>
<td>12.5</td>
<td>380.12</td>
<td>12.4</td>
<td>380.12</td>
<td>12.4</td>
</tr>
<tr>
<td>620 omnetpp_s</td>
<td>80</td>
<td>200.81</td>
<td>8.16</td>
<td>197.82</td>
<td>8.29</td>
<td>196.83</td>
<td>8.34</td>
</tr>
<tr>
<td>623 xalancbmk_s</td>
<td>80</td>
<td>114.12</td>
<td>12.5</td>
<td>114.12</td>
<td>12.4</td>
<td>113.12</td>
<td>12.6</td>
</tr>
<tr>
<td>625 x264_s</td>
<td>80</td>
<td>123.14</td>
<td>14.3</td>
<td>123.14</td>
<td>14.4</td>
<td>123.14</td>
<td>14.3</td>
</tr>
<tr>
<td>631 deepsjeng_s</td>
<td>80</td>
<td>264.54</td>
<td>5.43</td>
<td>264.54</td>
<td>5.43</td>
<td>264.54</td>
<td>5.43</td>
</tr>
<tr>
<td>641 leela_s</td>
<td>80</td>
<td>358.47</td>
<td>4.77</td>
<td>358.47</td>
<td>4.77</td>
<td>358.47</td>
<td>4.77</td>
</tr>
<tr>
<td>657 xz_s</td>
<td>80</td>
<td>264.23</td>
<td>23.4</td>
<td>264.23</td>
<td>23.4</td>
<td>264.23</td>
<td>23.4</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_int_base = 10.0**

**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-ic19.0u1/lib/intel64"
- `LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19.0u1/je5.0.1-64"
- `OMP_STACKSIZE = "192M"

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
```

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)
SPEC CPU®2017 Integer Speed Result

Lenovo Global Technology
ThinkSystem SR550
(2.10 GHz, Intel Xeon Gold 6230T)

SPECSpeed®2017_int_base = 10.0
SPECSpeed®2017_int_peak = Not Run

CPU2017 License: 9017
Test Date: Aug-2019
Test Sponsor: Lenovo Global Technology
Hardware Availability: Jul-2019
Tested by: Lenovo Global Technology
Software Availability: Dec-2018

General Notes (Continued)


Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
Memory Power Management set to Automatic
CPU P-state Control set to Cooperative
MONITOR/MWAIT set to Enable
LLC dead line alloc set to Disable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-h2e9 Wed Aug 21 13:02:02 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 6230T CPU @ 2.10GHz
  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 6230T CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000

(Continued on next page)
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology

#### Platform Notes (Continued)

- **CPU max MHz:** 3900.0000  
- **CPU min MHz:** 800.0000  
- **BogoMIPS:** 4200.00  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 28160K  
- **NUMA node0 CPU(s):** 0-19,40-59  
- **NUMA node1 CPU(s):** 20-39,60-79  
- **Flags:** fpu vme de pse tsc msr pae mca cmov pat pse36 clflsh dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdp16 rdtsscp 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 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_pin ssbd mba ibrs ibpb stibp tpr_shadow vmm NonstopTsc cpuid capabilites

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 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59  
- **node 0 size:** 193090 MB  
- **node 0 free:** 192085 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:** 193505 MB  
- **node 1 free:** 193201 MB  
- **node distances:**  
  - 0: 10 21  
  - 1: 21 10

From `/proc/meminfo`  
- **MemTotal:** 395873920 kB  
- **HugePages_Total:** 0  
- **Hugepagesize:** 2048 kB

(Continued on next page)
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**Platform Notes (Continued)**

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

```
SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 4

SuSE-release:
    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 Aug 21 12:59**

**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>892G</td>
<td>31G</td>
<td>861G</td>
<td>4%</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 -[TEE141E-2.30]- 07/02/2019**

**Memory:**

- 12x SK Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666

(End of data from sysinfo program)
Lenovo Global Technology
ThinkSystem SR550
(2.10 GHz, Intel Xeon Gold 6230T)

SPEC CPU®2017 Integer Speed Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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SPECspeed®2017_int_peak = Not Run

Test Date: Aug-2019
Hardware Availability: Jul-2019
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Compiler Version Notes

C
| 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)
| 625.x264_s(base) 657.xz_s(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.

C++
| 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
| 641.leela_s(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.

Fortran
| 648.exchange2_s(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

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)
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### Base Portability Flags (Continued)

- 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:**
- -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_and_libraries_2019.1.144/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)