### Lenovo Global Technology

**ThinkSystem ST550**  
(2.10 GHz, Intel Xeon Gold 6230T)

---

**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

---

**SPECrate®2017_int_base = 214**
**SPECrate®2017_int_peak = Not Run**

---

#### 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 PC4-2933Y-R)
- **Storage:** 1 x 480 GB SATA SSD
- **Other:** None

---

#### Software

- **OS:** SUSE Linux Enterprise Server 15 (x86_64)  
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++  
  Compiler for Linux;
- **Parallel:** No
- **Firmware:** Lenovo BIOS Version O0E142D 2.30 released Aug-2019  
  tested as O0E141D 2.30 Jul-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
- **Power Management:** --

---

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_int_base (214)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>80</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>80</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>80</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>80</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>80</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>80</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>80</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>80</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>80</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>80</td>
</tr>
</tbody>
</table>
Lenovo Global Technology

ThinkSystem ST550
(2.10 GHz, Intel Xeon Gold 6230T)

SPECrater®2017_int_base = 214

SPECrater®2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Copies</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Copies</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>80</td>
<td>791</td>
<td>161</td>
<td>793</td>
<td>161</td>
<td>793</td>
<td>161</td>
<td>793</td>
<td>161</td>
<td></td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>80</td>
<td>653</td>
<td>173</td>
<td>649</td>
<td>174</td>
<td>653</td>
<td>173</td>
<td>653</td>
<td>173</td>
<td></td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>80</td>
<td>471</td>
<td>275</td>
<td>471</td>
<td>274</td>
<td>473</td>
<td>273</td>
<td>473</td>
<td>273</td>
<td></td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>80</td>
<td>748</td>
<td>140</td>
<td>750</td>
<td>140</td>
<td>749</td>
<td>140</td>
<td>749</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>523.xalanbmk_r</td>
<td>80</td>
<td>359</td>
<td>235</td>
<td>361</td>
<td>234</td>
<td>359</td>
<td>235</td>
<td>359</td>
<td>235</td>
<td></td>
</tr>
<tr>
<td>525.x264_r</td>
<td>80</td>
<td>326</td>
<td>430</td>
<td>326</td>
<td>430</td>
<td>327</td>
<td>428</td>
<td>327</td>
<td>428</td>
<td></td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>80</td>
<td>519</td>
<td>177</td>
<td>518</td>
<td>177</td>
<td>519</td>
<td>177</td>
<td>519</td>
<td>177</td>
<td></td>
</tr>
<tr>
<td>541.leela_r</td>
<td>80</td>
<td>776</td>
<td>171</td>
<td>786</td>
<td>169</td>
<td>791</td>
<td>168</td>
<td>791</td>
<td>168</td>
<td></td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>80</td>
<td>483</td>
<td>434</td>
<td>485</td>
<td>432</td>
<td>487</td>
<td>431</td>
<td>487</td>
<td>431</td>
<td></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>80</td>
<td>607</td>
<td>142</td>
<td>609</td>
<td>142</td>
<td>607</td>
<td>142</td>
<td>607</td>
<td>142</td>
<td></td>
</tr>
</tbody>
</table>

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-ic19.0u4/lib/intel64"

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
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)

(Continued on next page)
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
Patrol Scrub set to Disable
SNC set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcd8f2999c33d61f64985e45859ea9
running on linux-pork Wed Sep 4 02:23:05 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 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): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6230T CPU @ 2.10GHz

(Continued on next page)
Lenovo Global Technology

ThinkSystem ST550
(2.10 GHz, Intel Xeon Gold 6230T)

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

SPECrate®2017_int_base = 214
SPECrate®2017_int_peak = Not Run

Platform Notes (Continued)

Stepping: 7
CPU MHz: 2100.000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-2,5,6,10-12,15,16,40-42,45,46,50-52,55,56
NUMA node1 CPU(s): 3,4,7-9,13,14,17-19,43,44,47-49,53,54,57-59
NUMA node2 CPU(s): 20-22,25,26,30-32,35,36,60-62,65,66,70-72,75,76
NUMA node3 CPU(s): 23,24,27-29,33,34,37-39,63,64,67-69,73,74,77-79
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 arch_perfmon pebs bts rep_good nop1 xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtntr 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 ssbd mba ibrs ibpb stibp tpr_shadow vmmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ertms invpcid rtm cmqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512bw avx512v1 xsaveopt xsavec xsaves cmq_llc cmq_occup_llc cmq_mbm_total cmq_mbm_local dtherm ida arat pin pts hwp_epp pku ospke avx512_vnni flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size : 28160 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 6 10 11 12 15 16 40 41 42 45 46 50 51 52 55 56
  node 0 size: 96365 MB
  node 0 free: 94673 MB
  node 1 cpus: 3 4 7 8 9 13 14 17 18 19 43 44 47 48 49 53 54 57 58 59
  node 1 size: 96753 MB
  node 1 free: 85748 MB
  node 2 cpus: 20 21 22 25 26 30 31 32 35 36 60 61 62 65 66 70 71 72 75 76
  node 2 size: 96753 MB
  node 2 free: 96555 MB
  node 3 cpus: 23 24 27 28 29 33 34 37 38 39 63 64 67 68 69 73 74 77 78 79
  node 3 size: 96722 MB
  node 3 free: 96525 MB
  node distances:
    node 0 1 2 3
    0: 10 11 21 23
    1: 11 10 21 23
    2: 21 21 10 11

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST550
(2.10 GHz, Intel Xeon Gold 6230T)

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECrate®2017_int_base = 214
SPECrate®2017_int_peak = Not Run

Lenovo Global Technology

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

Platform Notes (Continued)

3: 21 21 11 10

From /proc/meminfo
MemTotal: 395873584 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 Sep 4 02:18

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdc3 xfs 445G 68G 378G 16% /

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 SMIOS" standard.

BIOS Lenovo -[00E141D-2.30]- 07/03/2019
Memory:
12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)
# Lenovo Global Technology

ThinkSystem ST550  
(2.10 GHz, Intel Xeon Gold 6230T)

## SPEC CPU®2017 Integer Rate Result

- **SPECr®2017_int_base = 214**
- **SPECr®2017_int_peak = Not Run**

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

### Compiler Version Notes

<table>
<thead>
<tr>
<th></th>
<th>500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>525.x264_r(base) 557.xz_r(base)</td>
</tr>
</tbody>
</table>

---

**Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416**  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

---

**C++ benchmarks**

<table>
<thead>
<tr>
<th></th>
<th>520.omnetpp_r(base) 523.xalanchmk_r(base) 531.deepsjeng_r(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>541.leela_r(base)</td>
</tr>
</tbody>
</table>

---

**Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416**  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

---

**Fortran benchmarks**

|    | 548.exchange2_r(base)                                       |

---

**Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416**  
Copyright (C) 1985-2019 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

- 500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
- 502.gcc_r: -DSPEC_LP64
- 505.mcf_r: -DSPEC_LP64
- 520.omnetpp_r: -DSPEC_LP64

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST550
(2.10 GHz, Intel Xeon Gold 6230T)

SPECRate®2017_int_base = 214
SPECRate®2017_int_peak = Not Run

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

Base Portability Flags (Continued)
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:
- Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=4
- L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
- lqkmalloca

C++ benchmarks:
- Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=4
- L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
- lqkmalloca

Fortran benchmarks:
- Wl,-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_2019.4.227/linux/compiler/lib/intel64
- lqkmalloca

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

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

SPEC CPU and SPECRate are registered trademarks 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 CPU®2017 v1.0.5 on 2019-09-03 14:23:04-0400.
Originally published on 2019-10-01.