Lenovo Global Technology
ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 5218R)

**CPU2017 License:** 9017
**Test Sponsor:** Lenovo Global Technology
**Tested by:** Lenovo Global Technology
**Test Date:** Jun-2020
**Hardware Availability:** Mar-2020
**Software Availability:** Apr-2020

### Hardware

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 5218R</td>
</tr>
<tr>
<td>Max MHz</td>
<td>4000</td>
</tr>
<tr>
<td>Nominal</td>
<td>2100</td>
</tr>
<tr>
<td>Enabled</td>
<td>40 cores, 2 chips</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>
</tr>
<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>27.5 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 15 SP1 (x86_64)</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 19.1.1.217 of Intel</td>
</tr>
<tr>
<td>Compiler for Linux</td>
<td>Compiler for Linux</td>
</tr>
<tr>
<td>Fortran</td>
<td>Fortran: Version 19.1.1.217 of Intel Fortran</td>
</tr>
<tr>
<td>Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware</td>
<td>Lenovo BIOS Version TEE155L 2.61 released May-2020</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management</td>
<td>BIOS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>
LENNOVO GLOBAL TECHNOLOGY

ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 5218R)

SPECspeed®2017_int_base = 11.3
SPECspeed®2017_int_peak = Not Run

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>40</td>
<td>260</td>
<td>6.84</td>
<td>260</td>
<td>6.84</td>
<td>258</td>
<td>6.88</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>40</td>
<td>383</td>
<td>10.4</td>
<td>382</td>
<td>10.4</td>
<td>381</td>
<td>10.5</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>40</td>
<td>250</td>
<td>18.9</td>
<td>253</td>
<td>18.7</td>
<td>252</td>
<td>18.7</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>40</td>
<td>165</td>
<td>9.88</td>
<td>170</td>
<td>9.58</td>
<td>166</td>
<td>9.83</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>40</td>
<td>101</td>
<td>14.0</td>
<td>102</td>
<td>13.9</td>
<td>102</td>
<td>13.8</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>40</td>
<td>108</td>
<td>16.3</td>
<td>108</td>
<td>16.3</td>
<td>108</td>
<td>16.3</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>40</td>
<td>242</td>
<td>5.92</td>
<td>242</td>
<td>5.92</td>
<td>242</td>
<td>5.93</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>40</td>
<td>348</td>
<td>4.90</td>
<td>348</td>
<td>4.90</td>
<td>347</td>
<td>4.91</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>40</td>
<td>174</td>
<td>16.9</td>
<td>174</td>
<td>16.9</td>
<td>174</td>
<td>16.9</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>40</td>
<td>269</td>
<td>23.0</td>
<td>268</td>
<td>23.0</td>
<td>269</td>
<td>23.0</td>
</tr>
</tbody>
</table>

SPECSPEED®2017_int_base = 11.3
SPECSPEED®2017_int_peak = Not Run

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

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"
MALLOCONF = "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)
SPEC CPU®2017 Integer Speed Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

Lenovo Global Technology
ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 5218R)

SPECspeed®2017_int_base = 11.3
SPECspeed®2017_int_peak = Not Run

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.
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

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
CPU P-state Control set to Cooperative
MONITOR/MWAIT set to Enable
Hyper-Threading set to Disable
Trusted Execution Technology set to Enable
Workload Configuration set to I/O Sensitive
Patrol Scrub set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edblde64e488a0011
running on linux-rn74 Thu Jun 4 09:41:53 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 5218R CPU @ 2.10GHz
  2 "physical id"'s (chips)
  40 "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 : 20
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:

(Continued on next page)
SPEC CPU®2017 Integer Speed Result

Lenovo Global Technology
ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 5218R)

SPECSpeed®2017_int_base = 11.3
SPECSpeed®2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jun-2020
CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jun-2020

CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 1
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 5218R CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000
CPU max MHz: 4000.0000
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
NUMA node1 CPU(s): 20-39

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
xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abal pkd 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcll single intel_p8in ssbd mba ibp sbp stb sbp_enhanced tpr_shadow vmi
flexpriority ipt vpid fsdbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cmmp xdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsavec xgetbv1 xsavec qmm, llc qmm, occu llc qmm, mm total
qmm, mm local dtherm ida plat pts hwp hwp_act_window hwp_epf hwp_pkg_req pku
ospke avx512_vnni md_clear flush lids arch_capabilities

/platforms/cpuinfo/cache/data
Cache size: 28160 KB

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
node 0 size: 96086 MB

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 5218R)

SPECSpeed®2017_int_base = 11.3
SPECSpeed®2017_int_peak = Not Run

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

Platform Notes (Continued)

node 0 free: 95706 MB
node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
node 1 size: 96733 MB
node 1 free: 96111 MB
node distances:
node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
  MemTotal:       197448436 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"
    VERSION="15-SP1"
    VERSION_ID="15.1"
    PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
    ID="sles"
    ID_LIKE="suse"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:15:sp1"

  uname -a:
    Linux linux-rn74 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
    x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Jun 4 09:40

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1
  Filesystem  Type  Size  Used Avail Use% Mounted on
  /dev/sda3    xfs  892G  41G  851G  5% /

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 5218R)

SPECspeed®2017_int_base = 11.3
SPECspeed®2017_int_peak = Not Run

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

Test Date: Jun-2020
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Platform Notes (Continued)

BIOS: Lenovo -[TEE155L-2.61]- 05/20/2020
Vendor: Lenovo
Product: ThinkSystem SR570 -[7Y02RCZ000]-
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

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 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.
### Lenovo Global Technology

**ThinkSystem SR570**  
(2.10 GHz, Intel Xeon Gold 5218R)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>11.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

#### SPEC CPU®2017 Integer Speed Result

- **CPU2017 License:** 9017  
- **Test Sponsor:** Lenovo Global Technology  
- **Test Date:** Jun-2020  
- **Hardware Availability:** Mar-2020  
- **Tested by:** Lenovo Global Technology  
- **Software Availability:** Apr-2020

### Base Compiler Invocation

- C benchmarks:  
  - icc
- C++ benchmarks:  
  - icpc
- Fortran benchmarks:  
  - ifort

### Base Portability Flags

- 600.perlbmk_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 -fipro -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 -fipro -mfpmath=sse  
  - -funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4  
  - -L/usr/local/IntelCompiler19/compilers_and_libaries_2020.1.217/linux/compiler/lib/intel64_lin -ljgkmalloc
- 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

(Continued on next page)
## Lenovo Global Technology

ThinkSystem SR570  
(2.10 GHz, Intel Xeon Gold 5218R)

| SPECspectrum®2017_int_base = 11.3 | Test Date:  Jun-2020 |
| SPECspectrum®2017_int_peak = Not Run | Hardware Availability: Mar-2020 |

| CPU2017 License: 9017 | Tested by: Lenovo Global Technology |
| Test Sponsor: Lenovo Global Technology | Software Availability: Apr-2020 |

**Base Optimization Flags (Continued)**

Fortran benchmarks (continued):
- `-mbranches-within-32B-boundaries`

The flags files that were used to format this result can be browsed at:

You can also download the XML flags sources by saving the following links:
- [http://www.spec.org/cpu2017/flags/Lenoovo-Platform-SPECcpu2017-Flags-V1.2-CLX-H.xml](http://www.spec.org/cpu2017/flags/Lenoovo-Platform-SPECcpu2017-Flags-V1.2-CLX-H.xml)

SPEC CPU and SPECspectrum 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 v1.1.0 on 2020-06-03 21:41:53-0400.  
Originally published on 2020-06-23.