### Lenovo Global Technology

**ThinkSystem SR570**  
(2.40 GHz, Intel Xeon Silver 4210R)

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<th>SPECrate®2017_int_peak</th>
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<td>557.xz_r</td>
<td>40</td>
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**Hardware**

- **CPU Name:** Intel Xeon Silver 4210R  
- **Max MHz:** 3200  
- **Nominal:** 2400  
- **Enabled:** 20 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:** 13.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 15 SP1 (x86_64)  
  Kernel 4.12.14-195-default  
- **Compiler:** C/C++: Version 19.0.5.281 of Intel C/C++  
  Compiler for Linux;  
  Fortran: Version 19.0.5.281 of Intel Fortran  
  Compiler for Linux  
- **Parallel:** No  
- **Firmware:** Lenovo BIOS Version TEE152L 2.51 released Feb-2020  
  tested as TEE151L 2.51 Jan-2020  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
Lenovo Global Technology

ThinkSystem SR570
(2.40 GHz, Intel Xeon Silver 4210R)

SPECrates®2017_int_base = 118
SPECrates®2017_int_peak = Not Run

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

Test Date: Mar-2020
Hardware Availability: Mar-2020
Software Availability: Sep-2019

Results Table

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</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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
"/home/cpu2017-1.1.0-ic19.0u5/lib/intel64:/home/cpu2017-1.1.0-ic19.0u5/lib/ia32:/home/cpu2017-1.1.0-ic19.0u5/je5.0.1-32"

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:
sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

(Continued on next page)
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| CPU2017 License: 9017                     | Test Date: Mar-2020 |
| Test Sponsor: Lenovo Global Technology   | Hardware Availability: Mar-2020 |
| Tested by: Lenovo Global Technology      | Software Availability: Sep-2019 |

General Notes (Continued)

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.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
MONITOR/MWAIT set to Enable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u5/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7eb1e6e6a485a0011
running on linux-mazt Tue Mar 24 21:29:59 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) Silver 4210R CPU @ 2.40GHz
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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12

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): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(2.40 GHz, Intel Xeon Silver 4210R)

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

**SPEC CPU®2017 Integer Rate Result**

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**Software Availability:** Sep-2019

**Hardware Availability:** Mar-2020

**Test Date:** Mar-2020

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

**Platform Notes (Continued)**

- **NUMA node(s):** 2
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Silver 4210R CPU @ 2.40GHz
- **Stepping:** 7
- **CPU MHz:** 2400.000
- **CPU max MHz:** 3200.000
- **CPU min MHz:** 1000.000
- **BogoMIPS:** 4800.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 14080K
- **NUMA node0 CPU(s):** 0-9,20-29
- **NUMA node1 CPU(s):** 10-19,30-39

**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 rdtscl
- pm constant_tsc 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_c13
- invpcid_single intel_pmm ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
- flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
- cmx mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
- avx512bw avx512v1 xsaveopt xsavec xsavec xgetbv1 xsaves cmx_llc cmx_occput_llc cmx_mb_total
- cmx_mb_local dtherm ida arat pln pts pkup ospke avx512_vnni md_clear flush_lld
- arch_capabilities

/proc/cpuinfo cache data
- cache size : 14080 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 20 21 22 23 24 25 26 27 28 29
- node 0 size: 96058 MB
- node 0 free: 95334 MB
- node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
- node 1 size: 96763 MB
- node 1 free: 96462 MB
- node distances:
  - node 0 1
  - 0: 10 21
  - 1: 21 10

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(2.40 GHz, Intel Xeon Silver 4210R)

SPECrater®2017_int_base = 118
SPECrater®2017_int_peak = Not Run

Platform Notes (Continued)

From /proc/meminfo
MemTotal: 197449404 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
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-mazt 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 Mar 24 21:26
SPEC is set to: /home/cpu2017-1.1.0-ic19.0u5
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 892G 56G 837G 7% /

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE151L-2.51]- 01/13/2020
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

(Continued on next page)
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Test Date: Mar-2020
Hardware Availability: Mar-2020
Software Availability: Sep-2019

Platform Notes (Continued)
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

C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
| 525.x264_r(base) 557.xz_r(base)

Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.0.5
NextGen Technology Build 20190729
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++ | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
| 541.leela_r(base)

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 19.0.5
NextGen Technology Build 20190729
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran | 548.exchange2_r(base)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort
### Lenovo Global Technology

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#### 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`
- 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:**  
- `-m64`  
- `-std=c11`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-Ofast`  
- `-flto`  
- `-mfpmath=sse`  
- `-funroll-loops`  
- `-qnextgen`  
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin`  
- `-lqkmalloc`

**C++ benchmarks:**  
- `-m64`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-Ofast`  
- `-flto`  
- `-mfpmath=sse`  
- `-funroll-loops`  
- `-qnextgen`  
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin`  
- `-lqkmalloc`

**Fortran benchmarks:**  
- `-m64`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-O3`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs`  
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin`  
- `-lqkmalloc`

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-F.html](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.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-F.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.xml)
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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 2020-03-24 09:29:58-0400.
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