# Lenovo Global Technology

## SPEC® CPU2017 Integer Rate Result

**ThinkSystem SR550**  
(2.20 GHz, Intel Xeon Silver 4209T)  

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>82.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

### Hardware

- **CPU Name:** Intel Xeon Silver 4209T  
- **Max MHz.:** 3200  
- **Nominal:** 2200  
- **Enabled:** 16 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:** 11 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (12 x 32 GB 2RX4 PC4-2666V-R, running at 2400)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

### Software

- **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:** No  
- **Firmware:** Lenovo BIOS Version TEE135L 2.10 released Jan-2019  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None

### SPECrate Result

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
<th>Copies</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_r</td>
<td>62.6</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>gcc_r</td>
<td>71.5</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>mcf_r</td>
<td>59.0</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>omnetpp_r</td>
<td>115</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>xalancbmk_r</td>
<td>101</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>x264_r</td>
<td>115</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td>67.6</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>leela_r</td>
<td>61.5</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>exchange2_r</td>
<td>143</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>xz_r</td>
<td>61.5</td>
<td></td>
<td>32</td>
</tr>
</tbody>
</table>
Lenovo Global Technology
ThinkSystem SR550
(2.20 GHz, Intel Xeon Silver 4209T)

SPECrate2017_int_base = 82.8
SPECrate2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>32</td>
<td>814</td>
<td>62.6</td>
<td>814</td>
<td>62.6</td>
<td>816</td>
<td>62.4</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>32</td>
<td>632</td>
<td>71.7</td>
<td>633</td>
<td>71.5</td>
<td>644</td>
<td>70.4</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>32</td>
<td>448</td>
<td>115</td>
<td>451</td>
<td>115</td>
<td>450</td>
<td>115</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>32</td>
<td>712</td>
<td>59.0</td>
<td>710</td>
<td>59.2</td>
<td>714</td>
<td>58.8</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>32</td>
<td>333</td>
<td>102</td>
<td>333</td>
<td>101</td>
<td>334</td>
<td>101</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>32</td>
<td>369</td>
<td>152</td>
<td>371</td>
<td>151</td>
<td>369</td>
<td>152</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>32</td>
<td>543</td>
<td>67.5</td>
<td>543</td>
<td>67.6</td>
<td>543</td>
<td>67.6</td>
</tr>
<tr>
<td>541.leelac_r</td>
<td>32</td>
<td>858</td>
<td>61.8</td>
<td>861</td>
<td>61.5</td>
<td>861</td>
<td>61.5</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>32</td>
<td>588</td>
<td>143</td>
<td>587</td>
<td>143</td>
<td>587</td>
<td>143</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>32</td>
<td>630</td>
<td>54.9</td>
<td>630</td>
<td>54.9</td>
<td>629</td>
<td>55.0</td>
</tr>
</tbody>
</table>

SPECrate2017_int_base = 82.8
SPECrate2017_int_peak = Not Run

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

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-ic19.0u1/lib/intel64"

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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
Yes: 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)
**SPEC CPU2017 Integer Rate Result**

**Lenovo Global Technology**
ThinkSystem SR550  
(2.20 GHz, Intel Xeon Silver 4209T)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>82.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_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:** Apr-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Dec-2018

---

**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  
Memory Power Management set to Automatic  
MONITOR/MWAIT set to Enable

Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on linux-h2e9 Wed Apr 24 12:17:41 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) Silver 4209T CPU @ 2.20GHz  
2 "physical id"s (chips)  
32 "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 : 8  
siblings : 16  
physical 0: cores 0 1 2 3 4 5 6 7  
physical 0: cores 0 1 2 3 4 5 6 7

From lscpu:  
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 32  
On-line CPU(s) list: 0-31  
Thread(s) per core: 2  
Core(s) per socket: 8  
Socket(s): 2  
NUMA node(s): 2  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Silver 4209T CPU @ 2.20GHz

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR550
(2.20 GHz, Intel Xeon Silver 4209T)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
<th>Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Dec-2018</td>
</tr>
</tbody>
</table>

**SPECrate2017_int_base = 82.8**

**SPECrate2017_int_peak = Not Run**

### Platform Notes (Continued)

- Stepping: 6
- CPU MHZ: 2200.000
- CPU max MHZ: 3200.0000
- CPU min MHZ: 1000.0000
- BogoMIPS: 4400.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 11264K
- NUMA node0 CPU(s): 0-7, 16-23
- NUMA node1 CPU(s): 8-15, 24-31

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
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 ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  erms invpcid rtm cqm mpx rdt_a avx512f
avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsaves xsavec xgetbv1 xsavec qm_llc qm_occuc_lrll cqm_mbb_total cqm_mbb_local
dtherm ida arat pin pts pku ospke avx512_vnni flush_l1d arch_capabilities

/proc/cpuinfo cache data

  cache size : 11264 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 16 17 18 19 20 21 22 23
  node 0 size: 193125 MB
  node 0 free: 192523 MB
  node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
  node 1 size: 193480 MB
  node 1 free: 193097 MB

node distances:

  node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo

  MemTotal: 395884940 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release*/ etc/*version*
Platform Notes (Continued)

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

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 -[TEE135L-2.10]- 01/10/2019
Memory:
  12x SK Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666, configured at 2400

Compiler Version Notes

==============================================================================
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR550
(2.20 GHz, Intel Xeon Silver 4209T)

SPECraten2017_int_base = 82.8
SPECraten2017_int_peak = Not Run

CPU2017 License: 9017
Test Date: Apr-2019

Test Sponsor: Lenovo Global Technology
Hardware Availability: Apr-2019

Tested by: Lenovo Global Technology
Software Availability: Dec-2018

Compiler Version Notes (Continued)

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
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR550
(2.20 GHz, Intel Xeon Silver 4209T)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>82.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>9017</th>
</tr>
</thead>
<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>

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Dec-2018</td>
</tr>
</tbody>
</table>

**Base Portability Flags (Continued)**

- 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_2019.1.144/linux/compiler/lib/intel64 -lqkmalloc`

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:

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:


SPEC is a registered trademark 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 CPU2017 v1.0.5 on 2019-04-24 00:17:40-0400.
