**SPEC® CPU2017 Integer Rate Result**

**Lenovo Global Technology**
**ThinkSystem ST550**
**(2.10 GHz, Intel Xeon Silver 4208)**

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

**SPECrate2017_int_base** = 82.9

**SPECrate2017_int_peak** = Not Run

---

### Hardware

- **CPU Name:** Intel Xeon Silver 4208  
- **Max MHz.:** 3200  
- **Nominal:** 2100  
- **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:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)  
- **Storage:** 1 x 480 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  
  - **Firmware:** Lenovo BIOS Version O0E135T 2.10 released Mar-2019  
- **Parallel:** No  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None

---

![Graph](image-url)

**SPECrate2017_int_base** (82.9)

<table>
<thead>
<tr>
<th>Copies</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
<th>110</th>
<th>120</th>
<th>130</th>
<th>140</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>63.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>71.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>59.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>32</td>
<td>102</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>32</td>
<td>142</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>525.x264_r</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>68.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>32</td>
<td>146</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>541.leela_r</td>
<td>32</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>61.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>32</td>
<td>55.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Lenovo Global Technology

ThinkSystem ST550  
(2.10 GHz, Intel Xeon Silver 4208)

### SPEC CPU2017 Integer Rate Result

**SPECrate2017_int_base = 82.9**  
**SPECrate2017_int_peak = Not Run**

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

### 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>perfbench_r</td>
<td>32</td>
<td>806</td>
<td><strong>63.2</strong></td>
<td>807</td>
<td>63.2</td>
<td>804</td>
<td>63.4</td>
</tr>
<tr>
<td>gcc_r</td>
<td>32</td>
<td>633</td>
<td>71.6</td>
<td><strong>632</strong></td>
<td><strong>71.7</strong></td>
<td>628</td>
<td>72.1</td>
</tr>
<tr>
<td>mcf_r</td>
<td>32</td>
<td>446</td>
<td>116</td>
<td>447</td>
<td>116</td>
<td><strong>446</strong></td>
<td><strong>116</strong></td>
</tr>
<tr>
<td>omnetpp_r</td>
<td>32</td>
<td>714</td>
<td>58.8</td>
<td>710</td>
<td>59.1</td>
<td><strong>711</strong></td>
<td><strong>59.0</strong></td>
</tr>
<tr>
<td>xalancbmk_r</td>
<td>32</td>
<td>332</td>
<td>102</td>
<td>339</td>
<td>99.7</td>
<td><strong>332</strong></td>
<td><strong>102</strong></td>
</tr>
<tr>
<td>x264_r</td>
<td>32</td>
<td>714</td>
<td>58.8</td>
<td>710</td>
<td>59.1</td>
<td><strong>711</strong></td>
<td><strong>59.0</strong></td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td>32</td>
<td>539</td>
<td><strong>68.1</strong></td>
<td>539</td>
<td>68.0</td>
<td>539</td>
<td>68.1</td>
</tr>
<tr>
<td>leela_r</td>
<td>32</td>
<td>863</td>
<td>61.4</td>
<td><strong>862</strong></td>
<td><strong>61.5</strong></td>
<td>853</td>
<td>62.1</td>
</tr>
<tr>
<td>exchange2_r</td>
<td>32</td>
<td>589</td>
<td><strong>142</strong></td>
<td>590</td>
<td>142</td>
<td>588</td>
<td>143</td>
</tr>
<tr>
<td>xz_r</td>
<td>32</td>
<td>618</td>
<td>55.9</td>
<td><strong>618</strong></td>
<td><strong>55.9</strong></td>
<td>619</td>
<td>55.8</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-ic19.0u1/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  
Filesysten 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)
Lenovo Global Technology
ThinkSystem ST550
(2.10 GHz, Intel Xeon Silver 4208)

SPECrate2017_int_base = 82.9
SPECrate2017_int_peak = Not Run

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
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-0x76 Wed Apr 24 17:37:25 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 4208 CPU @ 2.10GHz
  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 1: 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 4208 CPU @ 2.10GHz
Stepping: 6
### Lenovo Global Technology

ThinkSystem ST550  
(2.10 GHz, Intel Xeon Silver 4208)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>82.9</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

#### Platform Notes (Continued)

- CPU MHz: 2100.000
- CPU max MHz: 3200.0000
- CPU min MHz: 800.0000
- BogoMIPS: 4200.00
- 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
- CPU MHz: 2100.000
- CPU max MHz: 3200.0000
- CPU min MHz: 800.0000
- BogoMIPS: 4200.00
- 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 cclfush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmp erf pni pclmulqdq dtes64 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_13 cdp_13 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 mxp rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

`/proc/cpuinfo`

- 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: 96357 MB
- node 0 free: 95905 MB
- node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
- node 1 size: 96712 MB
- node 1 free: 96167 MB
- node distances:
- node 0 1
  - 0: 10 21
  - 1: 21 10

From `/proc/meminfo`

MemTotal: 197704000 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

SuSE-release:

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST550
(2.10 GHz, Intel Xeon Silver 4208)

**SPEC CPU2017 Integer Rate Result**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>82.9</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

Platform Notes (Continued)

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.

```plaintext
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
```

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 Apr 24 17:36

```
SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb3 xfs 445G 31G 414G 7% /
```

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 -[00E135T-2.10]- 03/21/2019  
Memory: 12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

```
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)
```

(Continued on next page)
Lenovo Global Technology  
ThinkSystem ST550  
(2.10 GHz, Intel Xeon Silver 4208)  

**SPEC CPU2017 Integer Rate Result**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>82.9</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  

---

**Compiler Version Notes (Continued)**

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.

---

CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)  
541.leela_r(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.

---

FC 548.exchange2_r(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:
cc -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  
531.deepsjeng_r: -DSPEC_LP64

---

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST550
(2.10 GHz, Intel Xeon Silver 4208)

SPECrate2017_int_base = 82.9
SPECrate2017_int_peak = Not Run

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

Base Portability Flags (Continued)
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:
-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_2019.1.144/linux/compiler/lib/intel64
-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-A.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-A.xml

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 05:37:24-0400.