# Lenovo Global Technology

## ThinkSystem SR530
**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Test Date:** May-2019

**Hardware Availability:** Apr-2019

**Tested by:** Lenovo Global Technology

**Software Availability:** Dec-2018

---

### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong></td>
<td>Intel Xeon Silver 4208</td>
</tr>
<tr>
<td><strong>Max MHz.:</strong></td>
<td>3200</td>
</tr>
<tr>
<td><strong>Nominal:</strong></td>
<td>2100</td>
</tr>
<tr>
<td><strong>Enabled:</strong></td>
<td>16 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td><strong>Orderable:</strong></td>
<td>1.2 chips</td>
</tr>
<tr>
<td><strong>Cache L1:</strong></td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td><strong>L2:</strong></td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td><strong>L3:</strong></td>
<td>11 MB I+D on chip per chip</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Memory:</strong></td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)</td>
</tr>
<tr>
<td><strong>Storage:</strong></td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>None</td>
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</tbody>
</table>

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### Software

<table>
<thead>
<tr>
<th>Component</th>
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<tbody>
<tr>
<td><strong>OS:</strong></td>
<td>SUSE Linux Enterprise Server 12 SP4 (x86_64)</td>
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<tr>
<td><strong>Kernel:</strong></td>
<td>4.12.14-94.41-default</td>
</tr>
<tr>
<td><strong>Compiler:</strong></td>
<td>C/C++: Version 19.0.1.144 of Intel C/C++</td>
</tr>
<tr>
<td><strong>Compiler Build:</strong></td>
<td>20181018 for Linux;</td>
</tr>
<tr>
<td><strong>Firmware:</strong></td>
<td>Lenovo BIOS Version TEE135L 2.10 released Jan-2019</td>
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<tr>
<td><strong>File System:</strong></td>
<td>xfs</td>
</tr>
<tr>
<td><strong>System State:</strong></td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td><strong>Base Pointers:</strong></td>
<td>64-bit</td>
</tr>
<tr>
<td><strong>Peak Pointers:</strong></td>
<td>Not Applicable</td>
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<tr>
<td><strong>Other:</strong></td>
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### SPECrate2017_fp_base = 92.2

### SPECrate2017_fp_peak = Not Run
Lenovo Global Technology
ThinkSystem SR530
(2.10 GHz, Intel Xeon Silver 4208)

SPECrate2017_fp_base = 92.2
SPECrate2017_fp_peak = Not Run

Results Table

<table>
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<tr>
<th>Benchmark</th>
<th>Copies</th>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>32</td>
<td>1045</td>
<td>307</td>
<td>1049</td>
<td>306</td>
<td>1053</td>
<td>305</td>
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<td>507.cactuBSSN_r</td>
<td>32</td>
<td>605</td>
<td>67.0</td>
<td>604</td>
<td>67.1</td>
<td>604</td>
<td>67.1</td>
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<tr>
<td>508.namd_r</td>
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<td>507</td>
<td>59.9</td>
<td>506</td>
<td>60.1</td>
<td>507</td>
<td>60.0</td>
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<tr>
<td>510.parest_r</td>
<td>32</td>
<td>1420</td>
<td>58.9</td>
<td>1428</td>
<td>58.6</td>
<td>1432</td>
<td>58.5</td>
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<td>511.povray_r</td>
<td>32</td>
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<td>93.0</td>
<td>804</td>
<td>93.0</td>
<td>808</td>
<td>92.5</td>
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<tr>
<td>519.lbm_r</td>
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<td>495</td>
<td>68.2</td>
<td>496</td>
<td>68.1</td>
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<td>68.0</td>
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<td>521.wrf_r</td>
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<td>646</td>
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<td>526.blender_r</td>
<td>32</td>
<td>665</td>
<td>73.3</td>
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<td>527.cam4_r</td>
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<td>538.imagick_r</td>
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<td>182</td>
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<td>544.nab_r</td>
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<td>127</td>
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<td>127</td>
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<td>549.fotonik3d_r</td>
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<td>1291</td>
<td>96.6</td>
<td>1285</td>
<td>97.1</td>
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<td>554.roms_r</td>
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<td>53.3</td>
<td>957</td>
<td>53.1</td>
<td>957</td>
<td>53.1</td>
</tr>
</tbody>
</table>

SPECrate2017_fp_base = 92.2
SPECrate2017_fp_peak = Not Run

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.: crus
   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.

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR530**  
(2.10 GHz, Intel Xeon Silver 4208)

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<td>Hardware Availability: Apr-2019</td>
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<td>Software Availability: Dec-2018</td>
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### General Notes (Continued)

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
- Choose Operating Mode set to Custom Mode
- MONITOR/MWAIT set to Enable
- LLC dead line alloc set to Disable
- Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
  - Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
  - running on linux-yjm3 Sun May 5 23:44:07 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

(Continued on next page)
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Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4208 CPU @ 2.10GHz
Stepping: 6
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 clflush dts efs ts dir pd iogap va lgdt dflush

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.

From /proc/cpuinfo cache data
cache size : 11264 KB

MemTotal: 197704228 kB
HugePages_Total: 0

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Lenovo Global Technology

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<table>
<thead>
<tr>
<th>SPEC CPU2017 Floating Point Rate Result</th>
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**Compilers and Compiler Version Notes**

<table>
<thead>
<tr>
<th>Compiler</th>
<th>Version Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>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.</td>
</tr>
<tr>
<td>C++</td>
<td>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.</td>
</tr>
<tr>
<td>Fortran</td>
<td>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.</td>
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**SPEC CPU2017 Floating Point Rate Result**

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base =</th>
<th>92.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

---

**Compiler Version Notes (Continued)**

---

```
CC  521.wrf_r(base) 527.cam4_r(base)
```

---

**Base Compiler Invocation**

C benchmarks:
```
icc -m64 -std=c11
```

C++ benchmarks:
```
icpc -m64
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using both C and C++:
```
icpc -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:
```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

---

**Base Portability Flags**

```
503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
```

(Continued on next page)
# SPEC CPU2017 Floating Point Rate Result

**Lenovo Global Technology**  
ThinkSystem SR530  
(2.10 GHz, Intel Xeon Silver 4208)

<table>
<thead>
<tr>
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</table>

**SPECrate2017_fp_peak** = Not Run  
**SPECrate2017_fp_base** = 92.2

## Base Portability Flags (Continued)

527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG  
538.imagick_r: -DSPEC_LP64  
544.nab_r: -DSPEC_LP64  
549.fotonik3d_r: -DSPEC_LP64  
554.roms_r: -DSPEC_LP64

## Base Optimization Flags

**C benchmarks:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4

**C++ benchmarks:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4

**Fortran benchmarks:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -auto  
-nostandard-realloc-lhs -align array32byte

**Benchmarks using both Fortran and C:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -auto  
-nostandard-realloc-lhs -align array32byte

**Benchmarks using both C and C++:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4

**Benchmarks using Fortran, C, and C++:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -auto  
-nostandard-realloc-lhs -align array32byte

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:
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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.