## Lenovo Global Technology

**ThinkSystem SR850**  
(2.70 GHz, Intel Xeon Platinum 8280L)

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

### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name</strong>:</td>
<td>Intel Xeon Platinum 8280L</td>
</tr>
<tr>
<td><strong>Max MHz</strong>:</td>
<td>4000</td>
</tr>
<tr>
<td><strong>Nominal</strong>:</td>
<td>2700</td>
</tr>
<tr>
<td><strong>Enabled</strong>:</td>
<td>112 cores, 4 chips</td>
</tr>
<tr>
<td><strong>Orderable</strong>:</td>
<td>2.4 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>Cache L2</strong>:</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td><strong>Cache L3</strong>:</td>
<td>38.5 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>1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)</td>
</tr>
<tr>
<td><strong>Storage</strong>:</td>
<td>1 x 800 GB SATA SSD</td>
</tr>
<tr>
<td><strong>Other</strong>:</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OS</strong>:</td>
<td>SUSE Linux Enterprise Server 12 SP4 (x86_64)</td>
</tr>
<tr>
<td></td>
<td>Kernel 4.12.14-94.41-default</td>
</tr>
<tr>
<td><strong>Compiler</strong>:</td>
<td>C/C++: Version 19.0.4.227 of Intel</td>
</tr>
<tr>
<td></td>
<td>C/C++ Compiler for Linux;</td>
</tr>
<tr>
<td></td>
<td>Fortran: Version 19.0.4.227 of Intel Fortran</td>
</tr>
<tr>
<td></td>
<td>Compiler for Linux</td>
</tr>
<tr>
<td><strong>Parallel</strong>:</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Firmware</strong>:</td>
<td>Lenovo BIOS Version TEE142E 2.30 released Aug-2019</td>
</tr>
<tr>
<td></td>
<td>tested as TEE141E 2.30 Jul-2019</td>
</tr>
<tr>
<td><strong>File System</strong>:</td>
<td>btrfs</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>
</tr>
<tr>
<td><strong>Other</strong>:</td>
<td>None</td>
</tr>
<tr>
<td><strong>Power Management</strong>:</td>
<td>--</td>
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</table>

### SPECspeed®2017_fp_base = 225

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>112</td>
<td>216</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>112</td>
<td>155</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>112</td>
<td>140</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>112</td>
<td>174</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>112</td>
<td>67.5</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>112</td>
<td>266</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>112</td>
<td>512</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>112</td>
<td>126</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>112</td>
<td>431</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>112</td>
<td></td>
</tr>
</tbody>
</table>

### SPECspeed®2017_fp_peak = Not Run
# SPEC CPU®2017 Floating Point Speed Result

**Lenovo Global Technology**

ThinkSystem SR850 (2.70 GHz, Intel Xeon Platinum 8280L)

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>112</td>
<td>73.7</td>
<td>801</td>
<td>74.4</td>
<td>793</td>
</tr>
<tr>
<td>607.cactusBSSN_s</td>
<td>112</td>
<td>77.3</td>
<td>216</td>
<td>77.3</td>
<td>216</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>112</td>
<td><strong>33.8</strong></td>
<td>155</td>
<td>33.8</td>
<td>155</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>112</td>
<td>93.9</td>
<td>141</td>
<td><strong>94.3</strong></td>
<td>140</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>112</td>
<td>51.2</td>
<td>173</td>
<td><strong>50.9</strong></td>
<td>174</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>112</td>
<td>176</td>
<td>67.6</td>
<td>176</td>
<td><strong>67.5</strong></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>112</td>
<td><strong>54.2</strong></td>
<td>266</td>
<td>54.9</td>
<td>263</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>112</td>
<td>34.1</td>
<td>513</td>
<td><strong>34.1</strong></td>
<td>512</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>112</td>
<td>72.7</td>
<td>125</td>
<td>72.5</td>
<td>126</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>112</td>
<td>36.6</td>
<td>430</td>
<td>36.5</td>
<td>432</td>
</tr>
</tbody>
</table>

**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:
  - KMP_AFFINITY = "granularity=fine,compact"
  - LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u4/lib/intel64"
  - OMP_STACKSIZE = "192M"

- Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM
- memory using Redhat Enterprise Linux 7.5
- Transparent Huge Pages disabled by default
- echo never > /sys/kernel/mm/transparent_hugepage/enabled
- echo never > /sys/kernel/mm/transparent_hugepage/defrag
- Prior to runcpu invocation
- Filesystem page cache synced and cleared with:
  - 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.
Lenovo Global Technology
ThinkSystem SR850
(2.70 GHz, Intel Xeon Platinum 8280L)

SPECspeed®2017_fp_base = 225
SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Sep-2019
Tested by: Lenovo Global Technology
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
Hyper-Threadin set to Disable
Adjacent Cache Prefetch set to Disable
MONITOR/MWAIT set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcd8f2999c33d61f64985e45859ea9
running on linux-9o83 Sat Sep 7 00:36:16 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) Platinum 8280L CPU @ 2.70GHz
  4 "physical id"s (chips)
  112 "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 : 28
  siblings : 28
  physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
  physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
  physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
  physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 1
Core(s) per socket: 28
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280L CPU @ 2.70GHz
Stepping: 6
CPU MHz: 2700.000

(Continued on next page)
# SPEC CPU®2017 Floating Point Speed Result

## Lenovo Global Technology

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

## Platform Notes (Continued)

```
CPU max MHz:           4000.0000  
CPU min MHz:           1000.0000  
BogoMIPS:              5400.00  
Virtualization:        VT-x  
L1d cache:             32K  
L1i cache:             32K  
L2 cache:              1024K  
L3 cache:              39424K  
NUMA node0 CPU(s):     0-27  
NUMA node1 CPU(s):     28-55  
NUMA node2 CPU(s):     56-83  
NUMA node3 CPU(s):     84-111  
Flags:                 fpu vme de pse tsc msr pae mce cx8 sep mtrr pge mca cmov  
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp  
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid  
erfmprefetch pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16  
xtrm pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave  
avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3  
invpcid_single intel_ppn ssbd mba ibrs ibpb tpr_shadow vnumi flexpriority ept  
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  
flags invpcid rtm cmq mpx rdt_a  
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl  
xsavesopt xsaveopt xsvav xgetbv1 xsaves cmq_llc cmq_occup_llc cmq_mbm_total cmq_mbm_local  
dtherm ida arat pln pku ospke avx512_vnni flush_l1d arch_capabilities
```

```
From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a  
physical chip.  
available: 4 nodes (0-3)  
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27  
node 0 size: 386660 MB  
node 0 free: 385585 MB  
node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52  
53 54 55  
node 1 size: 387056 MB  
node 1 free: 386027 MB  
node 2 cpus: 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80  
81 82 83  
node 2 size: 387056 MB  
node 2 free: 386861 MB  
node 3 cpus: 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105  
106 107 108 109 110 111  
node 3 size: 387024 MB  
node 3 free: 386828 MB  
node distances:  
node 0 1 2 3
```

(Continued on next page)
**SPEC CPU®2017 Floating Point Speed Result**

Copyright 2017-2019 Standard Performance Evaluation Corporation

**Lenovo Global Technology**

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**Test Date:** Sep-2019  
**Hardware Availability:** Apr-2019  
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**Platform Notes (Continued)**

<table>
<thead>
<tr>
<th>0:</th>
<th>10</th>
<th>21</th>
<th>21</th>
<th>31</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:</td>
<td>21</td>
<td>10</td>
<td>31</td>
<td>21</td>
</tr>
<tr>
<td>2:</td>
<td>21</td>
<td>31</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>3:</td>
<td>31</td>
<td>21</td>
<td>21</td>
<td>10</td>
</tr>
</tbody>
</table>

From /proc/meminfo
- MemTotal: 1584944892 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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

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

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 Sep 6 23:44

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4

Filesystem     Type   Size  Used Avail Use% Mounted on  
/dev/sda2      btrfs  744G  134G  610G  19% /home

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.
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## Lenovo Global Technology

**ThinkSystem SR850**  
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</tr>
</tbody>
</table>

### Compiler Version Notes (Continued)

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---

### Base Compiler Invocation

C benchmarks:

```bash
icc -m64 -std=c11
```

Fortran benchmarks:

```bash
ifort -m64
```

Benchmarks using both Fortran and C:

```bash
ifort -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:

```bash
icpc -m64 icc -m64 -std=c11 ifort -m64
```

### Base Portability Flags

603.bwaves_s: -DSPEC_LP64  
607.cactuBSSN_s: -DSPEC_LP64  
619.lbm_s: -DSPEC_LP64  
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG  
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian -assume byterecl  
638.imagick_s: -DSPEC_LP64  
644.nab_s: -DSPEC_LP64  
649.fotonik3d_s: -DSPEC_LP64  
654.roms_s: -DSPEC_LP64

### Base Optimization Flags

C benchmarks:

```bash
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

Fortran benchmarks:

```bash
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp  
-nostandard-realloc-lhs
```

(Continued on next page)
Lenovo Global Technology
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SPECspeed®2017_fp_base = 225
SPECspeed®2017_fp_peak = Not Run

Base Optimization Flags (Continued)

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

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

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-D.html

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