### Lenovo Global Technology

**ThinkSystem SR850**  
(2.70 GHz, Intel Xeon Platinum 8270)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECspeed\textsuperscript{2017_fp_base} (=)</th>
<th>SPECspeed\textsuperscript{2017_fp_peak} (=)</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>104</td>
<td>Not Run</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>104</td>
<td>218</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>104</td>
<td>161</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>104</td>
<td>143</td>
</tr>
<tr>
<td>627.cam_s</td>
<td>104</td>
<td>169</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>104</td>
<td>66</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>104</td>
<td>258</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>104</td>
<td>403</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>104</td>
<td>122</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>104</td>
<td>336</td>
</tr>
</tbody>
</table>

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

### Hardware

- **CPU Name:** Intel Xeon Platinum 8270  
- **Max MHz:** 4000  
- **Nominal:** 2700  
- **Enabled:** 104 cores, 4 chips  
- **Orderable:** 2,4 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 35.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 768 GB (48 x 16 GB 2Rx8 PC4-2933Y-R)  
- **Storage:** 1 x 800 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 19.0.4.227 of Intel  
- **Firmware:** Yes  
- **Compiler for Linux:** Intel Fortran  
- **Base Pointers:** 64-bit  
- **Other:** None  
- **Power Management:** Disable
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<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>70.9</td>
<td>833</td>
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<td>78.0</td>
<td>214</td>
<td>78.1</td>
<td>214</td>
<td>78.1</td>
<td>213</td>
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<tr>
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<td>169</td>
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<td>170</td>
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<td>67.4</td>
<td>177</td>
<td>66.9</td>
<td>179</td>
<td>66.3</td>
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<tr>
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<td>255</td>
<td>55.9</td>
<td>258</td>
<td>55.9</td>
<td>258</td>
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<tr>
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<td>494</td>
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<td>121</td>
<td>74.8</td>
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<td>75.0</td>
<td>122</td>
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<tr>
<td>654.roms_s</td>
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<td>46.9</td>
<td>336</td>
<td>46.9</td>
<td>336</td>
<td>47.1</td>
<td>334</td>
</tr>
</tbody>
</table>

**Operating System Notes**

Stack size set to unlimited using "ulimit -s unlimited"

**Environment Variables Notes**

**General Notes**

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.
Lenovo Global Technology
ThinkSystem SR850
(2.70 GHz, Intel Xeon Platinum 8270)

Specspeed®2017_fp_base = 218
Specspeed®2017_fp_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-2018-3639 (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
Hyper-Threading set to Disable
Adjacent Cache Prefetch set to Disable
MONITOR/MWAIT set to Enable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u4/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbbe6e46a485a0011
running on linux-hxhl Fri Nov 1 23:14:11 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 8270 CPU @ 2.70GHz
        4 "physical id"s (chips)
        104 "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 : 26
        siblings : 26
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 104
On-line CPU(s) list: 0-103
Thread(s) per core: 1
Core(s) per socket: 26
Socket(s): 4

(Continued on next page)
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(2.70 GHz, Intel Xeon Platinum 8270)

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

NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8270 CPU @ 2.70GHz
Stepping: 6
CPU MHz: 2700.000
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: 36608K
NUMA node0 CPU(s): 0-25
NUMA node1 CPU(s): 26-51
NUMA node2 CPU(s): 52-77
NUMA node3 CPU(s): 78-103
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
aperfmpref 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 abf lms abrdnprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_p6p sbbd mba ibrs ibpb stibp trp_shadow vmmi flexpriority ept
vpid fsbcsbase tsc_adjust bml1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdtd
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
dtherm ida arat pln pts pku ospke avx512_vnni flush_lld arch_capabilities

/proc/cpuinfo cache data
  cache size : 36608 KB

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
    node 0 size: 193128 MB
    node 0 free: 192783 MB
    node 1 cpus: 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
        node 1 size: 193520 MB
        node 1 free: 193266 MB
    node 2 cpus: 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76
        node 2 size: 193491 MB

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SPECspeed®2017_fp_base = 218
SPECspeed®2017_fp_peak = Not Run

Platform Notes (Continued)

node 2 free: 193180 MB
node 3 cpus: 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103
node 3 size: 193518 MB
node 3 free: 192902 MB
node distances:
node 0 1 2 3
 0: 10 21 21 31
 1: 21 10 31 21
 2: 21 31 10 21
 3: 31 21 21 10

From /proc/meminfo
MemTotal:       792226764 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-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: No status reported
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: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

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

Test Date: Nov-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

run-level 3 Nov 1 23:12

SPEC is set to: /home/cpu2017-1.1.0-ic19.0u4
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 744G 60G 684G 9% /home

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE141E-2.30]- 07/02/2019
Vendor: Lenovo
Product: ThinkSystem SR850 -[7X1925Z000]-
Product Family: ThinkSystem
Serial: none

Memory:
48x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
C               | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
C++, C, Fortran | 607.cactuBSSN_s(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
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SPECspeed®2017_fp_base = 218
SPECspeed®2017_fp_peak = Not Run

Compiler Version Notes (Continued)

Fortran, C | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
-------------------------------------------------------------------
Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

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

Base Portability Flags

603.bwaves_s: -D SPEC_LP64
607.cactuBSSN_s: -D SPEC_LP64
619.lbm_s: -D SPEC_LP64
621.wrf_s: -D SPEC_LP64 -D SPEC_CASE_FLAG -convert big_endian
627.cam4_s: -D SPEC_LP64 -D SPEC_CASE_FLAG
628.pop2_s: -D SPEC_LP64 -D SPEC_CASE_FLAG -convert big_endian
-assume byterecl

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SPECspeed®2017_fp_base = 218
SPECspeed®2017_fp_peak = Not Run

Base Portability Flags (Continued)

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

Fortran benchmarks:
-DSPEC_OPENMP -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 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

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

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

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Tested with SPEC CPU®2017 v1.1.0 on 2019-11-01 11:14:11-0400.