## Lenovo Global Technology

**ThinkSystem SR850**  
(1.90 GHz, Intel Xeon Gold 6238T)  

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base =</th>
<th>192</th>
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<tbody>
<tr>
<td>SPECspeed®2017_fp_peak =</td>
<td>Not Run</td>
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</table>

**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

| Threads | 0 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 440 | 480 | 520 | 560 | 600 | 640 | 680 | 720 | 760 | 800 | 840 | 880 | 920 | 960 |
|---------|---|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 603.bwaves_s | 88 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 607.cactuBSSN_s | 88 | 186 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 619.lbm_s | 88 |     | 166 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 621.wrf_s | 88 |     |     | 123 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 627.cam4_s | 88 |     |     |     | 137 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 628.pop2_s | 88 |     |     |     |     | 59.0 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 638.imagick_s | 88 |     |     |     |     |     | 195 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 644.nab_s | 88 |     |     |     |     |     |     | 361 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 649.fotonik3d_s | 88 |     |     |     |     |     |     |     | 124 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 654.roms_s | 88 |     |     |     |     |     |     |     |     | 277 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

### Hardware

**CPU Name:** Intel Xeon Gold 6238T  
**Max MHz:** 3700  
**Nominal:** 1900  
**Enabled:** 88 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:** 30.25 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  
**Compiler for Linux:** Intel Fortran  
**Parallel:** Yes  
**Firmware:** Lenovo BIOS Version TEE142E 2.30 released Aug-2019 tested as TEE141E 2.30 Jul-2019  
**File System:** btrfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Power Management:** Disable
Lenovo Global Technology
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Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>277</td>
<td>57.1</td>
<td>276</td>
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</tbody>
</table>

SPECspeed®2017_fp_base = 192
SPECspeed®2017_fp_peak = Not Run

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

Operating System Notes
Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.0-ic19.0u4/lib/intel64"
OMP_STACKSIZE = "192M"

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)
Lenovo Global Technology
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SPECSpeed®2017_fp_base = 192
SPECSpeed®2017_fp_peak = Not Run

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

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 295195f888a3d7edbf6e6a485a0011
running on linux-hxhl Fri Nov 1 02:57:01 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) Gold 6238T CPU @ 1.90GHz
  4 "physical id"s (chips)
  88 "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 : 22
siblings : 22
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 88
On-line CPU(s) list: 0-87
Thread(s) per core: 1
Core(s) per socket: 22
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
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CPU2017 License: 9017
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Test Date: Nov-2019
Hardware Availability: Apr-2019
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Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Gold 6238T CPU @ 1.90GHz
Stepping: 6
CPU MHz: 1900.000
CPU max MHz: 3700.0000
CPU min MHz: 800.0000
BogoMIPS: 3800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 30976K
NUMA node0 CPU(s): 0-21
NUMA node1 CPU(s): 22-43
NUMA node2 CPU(s): 44-65
NUMA node3 CPU(s): 66-87

Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acp1 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
xtrig pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm ablp lm abm hle avx2 smep bmi2 smem invpcid cdp cpuid_fault epb
cat_l3 cdp_l3
invpcid_single intel_ppin ssbd mba ibrs ibpb tpr_shadow vnni flexpriority ept
vpid fsgsbase tsc_adjust bmul hle avx2 smep bmi2 erms invpcid rtm cmqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsavesopt xsaveopt xgetbv1 xsaves cmqm_llc cmqm_occup_llc cmqm_mbm_total cmqm_mbm_local
dtherm ida arat pln pts 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
node 0 size: 193100 MB
node 0 free: 192670 MB
node 1 cpus: 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
node 1 size: 193521 MB
node 1 free: 192756 MB
node 2 cpus: 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65
node 2 size: 193521 MB
node 2 free: 192498 MB
node 3 cpus: 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87
node 3 size: 193518 MB
node 3 free: 193309 MB
node distances:
node 0 1 2 3

(Continued on next page)
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SPECspeed®2017_fp_base = 192  
SPECspeed®2017_fp_peak = Not Run

Platform Notes (Continued)

0:  10  21  21  31  
1:  21  10  31  21  
2:  21  31  10  21  
3:  31  21  21  10

From /proc/meminfo
MemTotal:       792229772 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 sanitation  
CVE-2017-5715 (Spectre variant 2):       Mitigation: Indirect Branch Restricted  
                                         Speculation, IBPB, IBRS_FW

run-level 3 Nov 1 02:10

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

(Continued on next page)
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Platform Notes (Continued)

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

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.
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.
------------------------------------------------------------------------------

==============================================================================
Fortran         | 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.

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Compiler Version Notes (Continued)

Fortran, C       | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)

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

Tested with SPEC CPU®2017 v1.1.0 on 2019-10-31 14:57:00-0400.