## Lenovo Global Technology

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

**SPECspeed2017_fp_base** = 180  
**SPECspeed2017_fp_peak** = Not Run  

| 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;  
Fortran: Version 19.0.1.144 of Intel Fortran  
Compiler Build 20181018 for Linux  
Parallel: Yes  
Firmware: Lenovo BIOS Version TEE135T 2.10 released Mar-2019  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: Not Applicable  
Other: None |
|-----------|------------------------------------------------|

| Hardware | CPU Name: Intel Xeon Gold 6238T  
Max MHz.: 3700  
Nominal: 1900  
Enabled: 88 cores, 4 chips, 2 threads/core  
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: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)  
Storage: 800 GB tmpfs  
Other: None |
|-----------|------------------------------------------------|

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base (180)</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>88</td>
<td>187</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>88</td>
<td>159</td>
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<tr>
<td>619.lbm_s</td>
<td>88</td>
<td>119</td>
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<tr>
<td>621.wrf_s</td>
<td>88</td>
<td>136</td>
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<tr>
<td>627.cam4_s</td>
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<td>50.6</td>
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<tr>
<td>628.pop2_s</td>
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<td>206</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>88</td>
<td>347</td>
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<tr>
<td>644.nab_s</td>
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<td>127</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
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<td>169</td>
</tr>
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https://www.spec.org/
Lenovo Global Technology
ThinkSystem SR850
(1.90 GHz, Intel Xeon Gold 6238T)

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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</tbody>
</table>

SPECspeed2017_fp_base = 180
SPECspeed2017_fp_peak = Not Run

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Tmpfs filesystem can be set with:
mount -t tmpfs -o size=800g tmpfs /home
Process tuning setting:
echo 50000 > /proc/sys/kernel/sched_cfs_bandwidth_slice_us
echo 240000000 > /proc/sys/kernel/sched_latency_ns
echo 5000000 > /proc/sys/kernel/sched_migration_cost_ns
echo 100000000 > /proc/sys/kernel/sched_min_granularity_ns
echo 150000000 > /proc/sys/kernel/sched_wakeup_granularity_ns

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u1/lib/intel64"
OMP_STACKSIZE = "192M"

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
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.
Lenovo Global Technology
ThinkSystem SR850
(1.90 GHz, Intel Xeon Gold 6238T)

SPECspeed2017_fp_base = 180
SPECspeed2017_fp_peak = Not Run

General Notes (Continued)
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
C-states set to Legacy
Trusted Execution Technology set to Enable

Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-9o83 Fri May 24 21:24:24 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)
  176 "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 : 44
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): 176
On-line CPU(s) list: 0-175
Thread(s) per core: 2
Core(s) per socket: 22
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel

(Continued on next page)
### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<td>CPU family:</td>
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<tr>
<td>Model:</td>
<td>85</td>
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<tr>
<td>Model name:</td>
<td>Intel(R) Xeon(R) Gold 6238T CPU @ 1.90GHz</td>
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<tr>
<td>Stepping:</td>
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<tr>
<td>CPU MHz:</td>
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<td>L2 cache:</td>
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<td>L3 cache:</td>
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<td>NUMA node0 CPU(s):</td>
<td>0-21,88-109</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
<td>22-43,110-131</td>
</tr>
<tr>
<td>NUMA node2 CPU(s):</td>
<td>44-65,132-153</td>
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<td>NUMA node3 CPU(s):</td>
<td>66-87,154-175</td>
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<tr>
<td>Flags:</td>
<td>fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl x87nop mce lmsr pae mce cx8 apic sep mtrr pge mca cmov aperfmperf 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 f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mbs ibs ibbp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnow invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves xsavec xsavec_1lc xsavecq_1lc xsavecq_1qc xsavecq_1qc_local xsavecq_1qc_local dtherm ida arat pid pku ospke avx512_vnni flush_l1d arch_capabilities</td>
</tr>
</tbody>
</table>

From numactl --hardware

<table>
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<tr>
<th>Physical Node</th>
<th>CPUs</th>
<th>Size (MB)</th>
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<tbody>
<tr>
<td>node 0</td>
<td>21</td>
<td>386657</td>
</tr>
<tr>
<td>node 1</td>
<td>22</td>
<td>373375</td>
</tr>
<tr>
<td>node 2</td>
<td>44</td>
<td>387053</td>
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<tr>
<td>node 3</td>
<td>45</td>
<td>386735</td>
</tr>
<tr>
<td>node 4</td>
<td>46</td>
<td>387024</td>
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<tr>
<td>node 5</td>
<td>47</td>
<td>386797</td>
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</table>

(Continued on next page)
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ThinkSystem SR850
(1.90 GHz, Intel Xeon Gold 6238T)

SPECspeed2017_fp_base = 180
SPECspeed2017_fp_peak = Not Run

Platform Notes (Continued)

node 3 cpus: 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 154 155
156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
node 3 size: 387050 MB
node 3 free: 386817 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: 1584933156 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 May 24 18:52

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

Filesystem Type Size Used Avail Use% Mounted on

(Continued on next page)
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**SPEC CPU2017 Floating Point Speed Result**

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<table>
<thead>
<tr>
<th>Lenovo Global Technology</th>
<th>SPECspeed2017_fp_base =</th>
<th>180</th>
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<tbody>
<tr>
<td>Lenovo Global Technology</td>
<td>SPECspeed2017_fp_peak =</td>
<td>Not Run</td>
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**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** May-2019

**Hardware Availability:** Apr-2019

**Software Availability:** Dec-2018

---

**Platform Notes (Continued)**

```
tmpfs       tmpfs  800G  8.3G  792G   2% /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.

BIOS Lenovo -[TEE135T-2.10]- 03/21/2019

Memory:
48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

---

**Compiler Version Notes**

```
CC  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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

---

```
FC  607.cactuBSSN_s(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.
```

---

```
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.
```

---

```
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.
```

---

```
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
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CC  621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
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Compiler Version Notes (Continued)

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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.

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

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch

(Continued on next page)
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</table>

**Base Optimization Flags (Continued)**

C benchmarks (continued):
-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

Benmarks 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

Benmarks 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-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

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