Lenovo Global Technology
ThinkSystem SR550
(2.10 GHz, Intel Xeon Gold 5218R)

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

Threads

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>124</th>
</tr>
</thead>
</table>

LENovo Global Technology

Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 5218R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>4000</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2100</td>
</tr>
<tr>
<td>Enabled:</td>
<td>40 cores, 2 chips</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1,2 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>27.5 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Memory:</td>
<td>384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

Software

| OS:        | SUSE Linux Enterprise Server 15 SP1 (x86_64) |
|           | Kernel 4.12.14-195-default             |
| Compiler: | C/C++: Version 19.0.5.281 of Intel |
|           | C+/C++                                 |
|           | Compiler for Linux;                   |
|           | Fortran: Version 19.0.5.281 of智力 |
|           | Intel Fortran                          |
|           | Compiler for Linux                    |
| Parallel: | Yes                                    |
| Firmware: | Lenovo BIOS Version TEE152L 2.51 released Feb-2020 |
|           | tested as TEE151L 2.51 Jan-2020       |
| File System: | xfs                       |
| System State: | Run level 3 (multi-user)         |
| Base Pointers: | 64-bit                         |
| Peak Pointers: | Not Applicable                 |
| Other:    | None                                  |
| Power Management: | BIOS set to prefer performance at the cost of additional power usage |

SPECSpeed®2017_fp_base = 124
SPECSpeed®2017_fp_peak = Not Run
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>454</td>
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<td>453</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>119</td>
<td>140</td>
<td>118</td>
<td>142</td>
<td>119</td>
<td>140</td>
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<td>58.2</td>
<td>89.9</td>
<td>56.5</td>
<td>92.6</td>
<td>58.2</td>
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<td>126</td>
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<td>125</td>
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<tr>
<td>627.cam4_s</td>
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<td>89.5</td>
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<td>89.4</td>
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<td>628.pop2_s</td>
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<td>63.2</td>
<td>186</td>
<td>63.8</td>
<td>188</td>
<td>63.1</td>
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<tr>
<td>638.imagick_s</td>
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<td>115</td>
<td>126</td>
<td>115</td>
<td>126</td>
<td>115</td>
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<tr>
<td>644.nab_s</td>
<td>40</td>
<td>82.3</td>
<td>212</td>
<td>82.3</td>
<td>212</td>
<td>82.2</td>
<td>213</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>40</td>
<td>115</td>
<td>79.4</td>
<td>112</td>
<td>81.3</td>
<td>115</td>
<td>79.3</td>
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<tr>
<td>654.roms_s</td>
<td>40</td>
<td>142</td>
<td>111</td>
<td>141</td>
<td>112</td>
<td>142</td>
<td>111</td>
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</tbody>
</table>

SPECspeed®2017_fp_base = 124
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-ic19.0u5/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes
Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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.
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)
(Continued on next page)
General Notes (Continued)

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
MONITOR/MWAIT set to Enable
Hyper-Threading set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u5/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011
running on linux-h3af Sun Mar 22 20:59:03 2020

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 5218R CPU @ 2.10GHz
  2 "physical id"s (chips)
  40 "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 : 20
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 1
Core(s) per socket: 20
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5218R CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000
CPU max MHz: 4000.0000

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR550
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Platform Notes (Continued)

CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-19
NUMA node1 CPU(s): 20-39

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
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
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_pmm ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vnmi flexpriority
ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdonic
m xsave avx512f avx512dq avx512bv mv512vl xsaveopt xsavevc xgetbv1 xsavec

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
  node 0 size: 193121 MB
  node 0 free: 192296 MB
  node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
  node 1 size: 193531 MB
  node 1 free: 193346 MB

From /proc/meminfo
  MemTotal: 395931876 kB
  HugePages_Total: 0
  Hugepagesize: 4096 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR550
(2.10 GHz, Intel Xeon Gold 5218R)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>124</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

```
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"
```

```
uname -a:
Linux linux-h3af 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- CVE-2018-3620 (L1 Terminal Fault): Not affected
- Microarchitectural Data Sampling: Not affected
- 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: Enhanced IBRS, IBPB: conditional, RSB filling

```
rpm -q epel
```

```
run-level: 3
```

```
SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux
```

```
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      xfs   743G   30G  714G   4% /
```

```
From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE151L-2.51]- 01/13/2020
Vendor: Lenovo
Product: ThinkSystem SR550 -[7X03RCZ000]-
Product Family: ThinkSystem
Serial: 1234567890
```

```
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:
12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933
```

(End of data from sysinfo program)
Lenovo Global Technology
ThinkSystem SR550
(2.10 GHz, Intel Xeon Gold 5218R)

SPECspeed®2017_fp_base = 124
SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Hardware Availability: Mar-2020
Test Date: Mar-2020
Software Availability: Sep-2019

Compiler Version Notes

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<th>C</th>
<th>619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)</th>
</tr>
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<tbody>
<tr>
<td>Intel(R) C</td>
<td>Intel(R) 64 Compiler for applications running on Intel(R) 64,</td>
</tr>
<tr>
<td></td>
<td>Version 19.0.5.281 Build 20190815</td>
</tr>
<tr>
<td>Copyright (C)</td>
<td>1985-2019 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------</td>
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</tbody>
</table>
==============================================================================

C++, C, Fortran | 607.cactuBSSN_s(base)

==============================================================================
<table>
<thead>
<tr>
<th>C++, C, Fortran</th>
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</thead>
<tbody>
<tr>
<td>Intel(R) C++</td>
<td>Intel(R) 64 Compiler for applications running on Intel(R) 64,</td>
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==============================================================================

Fortran | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)

==============================================================================
<table>
<thead>
<tr>
<th>Fortran</th>
<th>603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)</th>
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<td>Intel(R) Fortran</td>
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Fortran, C | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)

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==============================================================================

Base Compiler Invocation

C benchmarks:
icc

(Continued on next page)
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SPECSpeed®2017_fp_base = 124
SPECSpeed®2017_fp_peak = Not Run

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

Test Date: Mar-2020
Hardware Availability: Mar-2020
Software Availability: Sep-2019

Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

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:
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-m64 -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:
-m64 -std=c11 -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++:
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

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

**Lenovo Global Technology**  
**ThinkSystem SR550**  
(2.10 GHz, Intel Xeon Gold 5218R)  
**SPECspeed®2017_fp_base = 124**  
**SPECspeed®2017_fp_peak = Not Run**

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<td>Sep-2019</td>
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### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- `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](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](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.xml)