## Lenovo Global Technology

**ThinkSystem SR570**

(2.70 GHz, Intel Xeon Gold 5220S)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base =</th>
<th>118</th>
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<tbody>
<tr>
<td>SPECspeed®2017_fp_peak =</td>
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</table>

### CPU2017 License:
9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Threads**

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base (118)</th>
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<tbody>
<tr>
<td>073.bwaves_s 36</td>
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<tr>
<td>607.cactuBSSN_s 36</td>
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<tr>
<td>619.lbm_s 36</td>
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<tr>
<td>621.wrf_s 36</td>
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<tr>
<td>627.cam4_s 36</td>
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<tr>
<td>628.pop2_s 36</td>
</tr>
<tr>
<td>638.imagick_s 36</td>
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<tr>
<td>644.nab_s 36</td>
</tr>
<tr>
<td>649.fotonik3d_s 36</td>
</tr>
<tr>
<td>654.roms_s 36</td>
</tr>
</tbody>
</table>

### Hardware

**CPU Name:** Intel Xeon Gold 5220S

**Max MHz:** 3900

**Nominal:** 2700

**Enabled:** 36 cores, 2 chips

**Orderable:** 1,2 chips

**Cache L1:** 32 KB I + 32 KB D on chip per core

**L2:** 1 MB I+D on chip per core

**L3:** 24.75 MB I+D on chip per chip

**Other:** None

**Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)

**Storage:** 1 x 960 GB SATA SSD

**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 C/C++

Compiler for Linux;

Fortran: Version 19.0.4.227 of Intel Fortran

Compiler for Linux

**Parallel:** Yes

**Firmware:**
Lenovo BIOS Version TEE142E 2.30 released Aug-2019 tested as TEE141E 2.30 Jul-2019

**File System:** xfs

**System State:** Run level 3 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** Not Applicable

**Other:** None

**Power Management:** --
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(2.70 GHz, Intel Xeon Gold 5220S)

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Results Table

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

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"

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 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) is mitigated in the system as tested and documented.
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(2.70 GHz, Intel Xeon Gold 5220S)

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

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
CPU P-state Control set to Automatic
MONITOR/MWAIT set to Enable
Hyper-Threading set to Disable
Adjacent Cache Prefetch set to Disable

Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-dl3d Sat Oct 12 16:23:26 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 5220S CPU @ 2.70GHz
  2 "physical id"s (chips)
  36 "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 : 18
  siblings : 18
  physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 36
On-line CPU(s) list: 0-35
Thread(s) per core: 1
Core(s) per socket: 18
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5220S CPU @ 2.70GHz
Stepping: 7
CPU MHz: 2700.000
BogoMIPS: 5400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K

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

Lenovo Global Technology
ThinkSystem SR570
(2.70 GHz, Intel Xeon Gold 5220S)

**SPECspeed®2017_fp_base = 118**

**SPECspeed®2017_fp_peak = Not Run**

---

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

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Software Availability</th>
<th>Hardware Availability</th>
</tr>
</thead>
</table>

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**Platform Notes (Continued)**

```
NUMA node0 CPU(s):     0-17
NUMA node1 CPU(s):     18-35
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
                        xtrpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
                        avx f16c rdrand lahf_lm abtm mpx cbp cpw 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

/proc/cpuinfo cache data
cache size : 25344 KB
```

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
node 0 size: 96058 MB
node 0 free: 95531 MB
node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
node 1 size: 96712 MB
node 1 free: 96219 MB
node distances:
node 0  1
0:  10  21
1:  21  10
```

From /proc/meminfo

```
MemTotal:       197397912 kB
MemFree:         933158 kB
Buffers:          315884 kB
Cached:          2062397 kB
SwapCached:       172960 kB
SwapTotal:       819232 kB
SwapFree:        816820 kB
```

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

SuSE-release:
```
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 4
```

os-release:
```
NAME="SLES"
VERSION="12-SP4"
VERSION_ID="12.4"
```

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CPU2017 License: 9017
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Tested by: Lenovo Global Technology

SPECspeed®2017_fp_base = 118
SPECspeed®2017_fp_peak = Not Run

Test Date: Oct-2019
Hardware Availability: Jul-2019
Software Availability: May-2019

Platform Notes (Continued)

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 Oct 12 16:21

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4
   Filesystem  Type Size Used Avail Use% Mounted on
   /dev/sda3    xfs  892G   43G  850G   5% /

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 -[TEE141E-2.30]- 07/02/2019
Memory:
    4x NO DIMM NO DIMM
    12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2666

(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)
==============================================================================

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(2.70 GHz, Intel Xeon Gold 5220S)

SPECSpeed®2017_fp_base = 118
SPECSpeed®2017_fp_peak = Not Run

Compiler Version Notes (Continued)

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.

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
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SPECspeed®2017_fp_base = 118
SPECspeed®2017_fp_peak = Not Run

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

Test Date: Oct-2019
Hardware Availability: Jul-2019
Software Availability: May-2019

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.tbm_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 byte reclaim
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
-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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Software Availability: May-2019

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

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