# SPEC CPU®2017 Floating Point Speed Result

## Lenovo Global Technology

**ThinkSystem SD530**  
*(2.10 GHz, Intel Xeon Gold 6238L)*

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

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECs speed®2017_fp_base</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>44</td>
<td>152</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>44</td>
<td>95.9</td>
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<tr>
<td>619.lbm_s</td>
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<td>95.7</td>
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<td>621.wrf_s</td>
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<td>121</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>44</td>
<td>63.2</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>44</td>
<td>126</td>
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<tr>
<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
<td>44</td>
<td>226</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>44</td>
<td>82.9</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>44</td>
<td>128</td>
</tr>
</tbody>
</table>

### Hardware

**CPU Name:** Intel Xeon Gold 6238L  
**Max MHz:** 3700  
**Nominal:** 2100  
**Enabled:** 44 cores, 2 chips, 2 threads/core  
**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:** 30.25 MB I+D on chip per chip  
**Other:** None  
**Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)  
**Storage:** 1 x 800 GB SATA SSD  
**Other:** None

### Software

**OS:** Red Hat Enterprise Linux Server release 7.6 (Maipo)  
**Kernel:** 3.10.0-957.el7.x86_64  
**Compiler:**  
- C/C++: Version 19.0.4.227 of Intel C/C++  
- 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:** --
## Lenovo Global Technology

ThinkSystem SD530  
(2.10 GHz, Intel Xeon Gold 6238L)

### SPECspeed®2017_fp_base = 132

### SPECspeed®2017_fp_peak = Not Run

<table>
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<tr>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>129</td>
<td>123</td>
<td>128</td>
<td>123</td>
<td>128</td>
</tr>
</tbody>
</table>

**Results 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,1,0"
- `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.
Lenovo Global Technology
ThinkSystem SD530
(2.10 GHz, Intel Xeon Gold 6238L)

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

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
C-States set to Legacy
C1 Enhanced Mode set to Enable
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 localhost.localdomain Fri Aug 23 10:24:34 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 6238L CPU @ 2.10GHz
 2 "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 : 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

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: 2
Core(s) per socket: 22
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6238L CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 30976K

(Continued on next page)
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| SPECspeed®2017_fp_base = 132 |
| SPECspeed®2017_fp_peak = Not Run |

**CPU2017 License:** 9017  
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**Software Availability:** May-2019

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### Platform Notes (Continued)

NUMA node0 CPU(s): 0-21, 44-65  
NUMA node1 CPU(s): 22-43, 66-87  
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 aperfmperf eagerfpu nmi pmlsz dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pciid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahfp_lahf_lm abm 3nowprefetch epb cat_l3 cdpl_l3 intel_pinn intel_pt sabb mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves vec xgetbv1 cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts puck ospke avx512_vnni spec_ctrl intel_stibp flush_l1d arch_capabilities

```
/install/cpuinfo.cache data
  cache size : 30976 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: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 |
| node 0 size: 97966 MB |
| node 0 free: 94959 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 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 |
| node 1 size: 98304 MB |
| node 1 free: 95698 MB |
| node distances: |
| node 0 1 |
| 0: 10 21 |
| 1: 21 10 |

From `/proc/meminfo`

```
MemTotal: 197688516 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

From `/etc/*release*`/`/etc/*version*`/os-release:
```
NAME="Red Hat Enterprise Linux Server"  
VERSION="7.6 (Maipo)"  
ID="rhel"  
ID_LIKE="fedora"  
VARIANT="Server"  
VARIANT_ID="server"  
VERSION_ID="7.6"
```

(Continued on next page)
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SPECspeed®2017_fp_base = 132
SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9017
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Platform Notes (Continued)

PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)

uname -a:
    Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018
    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: Load fences, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

run-level 3 Aug 23 10:23

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sdc3 xfs 693G 66G 628G 10% /

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 SMI BIOS" standard.
    BIOS Lenovo -[TEE141E-2.30]- 07/02/2019
    Memory:
        4x NO DIMM NO DIMM
        12x 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,
Lenovo Global Technology
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Hardware Availability: Jul-2019
Software Availability: May-2019

Compiler Version Notes (Continued)

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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Test Sponsor: Lenovo Global Technology
Hardware Availability: Jul-2019
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### 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
- 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-D.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-D.xml
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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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