Lenovo Global Technology

ThinkSystem SR850P
(2.30 GHz, Intel Xeon Gold 6252N)

SPECspeak®2017_fp_base = 217
SPECspeak®2017_fp_peak = Not Run

### Hardware

- **CPU Name:** Intel Xeon Gold 6252N
- **Max MHz:** 3600
- **Nominal:** 2300
- **Enabled:** 96 cores, 4 chips
- **Orderable:** 4 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 35.75 MB I+D on chip per chip
- **Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

### 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 Intel Fortran
  Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Lenovo BIOS Version TEE164L 2.80 released Oct-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
# SPEC CPU®2017 Floating Point Speed Result

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<table>
<thead>
<tr>
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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>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>96</td>
<td>67.0</td>
<td>880</td>
<td>67.3</td>
<td>876</td>
<td>68.1</td>
<td>866</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>96</td>
<td>77.1</td>
<td>216</td>
<td>77.1</td>
<td>216</td>
<td>77.4</td>
<td>215</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>96</td>
<td>29.4</td>
<td>178</td>
<td>29.2</td>
<td>179</td>
<td>29.4</td>
<td>178</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>96</td>
<td>94.0</td>
<td>141</td>
<td>94.2</td>
<td>140</td>
<td>93.8</td>
<td>141</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>96</td>
<td>54.5</td>
<td>163</td>
<td>54.2</td>
<td>164</td>
<td>53.8</td>
<td>165</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>96</td>
<td>175</td>
<td>67.7</td>
<td>177</td>
<td>67.1</td>
<td>175</td>
<td>67.7</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>96</td>
<td>63.8</td>
<td>226</td>
<td>65.3</td>
<td>221</td>
<td>64.1</td>
<td>225</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>96</td>
<td>42.1</td>
<td>415</td>
<td>42.1</td>
<td>415</td>
<td>42.1</td>
<td>415</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>96</td>
<td>79.5</td>
<td>115</td>
<td>80.4</td>
<td>113</td>
<td>79.7</td>
<td>114</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>96</td>
<td>39.0</td>
<td>404</td>
<td>39.2</td>
<td>401</td>
<td>39.0</td>
<td>404</td>
</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"

### 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-ic19.0u5-2/lib/intel64"
- OMP_STACKSIZE = "192M"

### General Notes

Binaries compiled on a system with 1x Intel Core i9-9900K 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.
Lenovo Global Technology
ThinkSystem SR850P
(2.30 GHz, Intel Xeon Gold 6252N)

SPECspeed®2017_fp_base = 217
SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Feb-2021
Tested by: Lenovo Global Technology
Hardware Availability: Jan-2020
Software Availability: Sep-2019

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
MONITOR/MWAIT set to Enable
Hyper-Thread set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u5-2/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on linux-z1c1 Tue Feb 2 19:33:51 2021

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 6252N CPU @ 2.30GHz
 4 "physical id"s (chips)
 96 "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 : 24
siblings : 24
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
physical 2: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29

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): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6252N CPU @ 2.30GHz
Stepping: 7
CPU MHz: 2300.000
CPU max MHz: 3600.0000
CPU min MHz: 1000.0000
BogoMIPS: 6400.00
Virtualization: VT-x

(Continued on next page)
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Test Date: Feb-2021  
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Platform Notes (Continued)

| L1d cache:   | 32K |
| L1i cache:   | 32K |
| L2 cache:    | 1024K |
| L3 cache:    | 36608K |
| NUMA node0 CPU(s): | 0-23 |
| NUMA node1 CPU(s): | 24-47 |
| NUMA node2 CPU(s): | 48-71 |
| NUMA node3 CPU(s): | 72-95 |

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 
aperfmon perf pni pclmulqdq dtes64 monitor ds cpl vmx smx est tm2 ssse3 sdbg fma cx16 
xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave 
avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3 
invpcid_single intel_puin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnumi 
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm 
cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd 
avx512bw avx512vl xsaves xsaveopt xsavec xgetbv1 xsave support cpqm llc cpqm_local 
cqm_mbm_total cpqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d 
arch_capabilities

/proc/cpuinfo cache data

cache size : 36608 KB

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 22 23
node 0 size: 386682 MB
node 0 free: 386291 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 387037 MB
node 1 free: 386798 MB
node 2 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
node 2 size: 387067 MB
node 2 free: 386328 MB
node 3 cpus: 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
node 3 size: 387065 MB
node 3 free: 386810 MB

node distances:

node 0 1 2 3
0: 10 21 21 21
1: 21 10 21 21
2: 21 21 10 21
3: 21 21 21 10

From /proc/meminfo

(Continued on next page)
Platform Notes (Continued)

MemTotal: 1585001992 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
 os-release:
  NAME="SLES"
  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-z1c1 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

run-level 3 Feb 2 19:32

SPEC is set to: /home/cpu2017-1.1.0-ic19.0u5-2
 Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb3 xfs 892G 30G 862G 4% /

From /sys/devices/virtual/dmi/id
 BIOS: Lenovo -[TEE164L-2.80]- 10/23/2020
 Vendor: Lenovo
 Product: ThinkSystem SR850P -[7D2HCTO1WW]-
 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.
Lenovo Global Technology  
ThinkSystem SR850P  
(2.30 GHz, Intel Xeon Gold 6252N)  

Platform Notes (Continued)

Memory:
48x Samsung M393A4K40CB2-CVF 32 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 19.0.5.281 Build 20190815
  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 19.0.5.281 Build 20190815
  Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
  Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
    Version 19.0.5.281 Build 20190815
  Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
  Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
    64, Version 19.0.5.281 Build 20190815
  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 19.0.5.281 Build 20190815
  Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
  Fortran, C  | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
==============================================================================
  Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
    64, Version 19.0.5.281 Build 20190815
  Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
  Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:
icc

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.cactusBSSN_s: -DSPEC_LP64
619.ibm_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

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**Base Optimization Flags (Continued)**

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`
- `-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-I.html](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.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-I.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.xml)