# SPEC CPU 2017 Floating Point Rate Result

**Lenovo Global Technology**  
ThinkSystem SR630 V3  
(2.00 GHz, Intel Xeon Gold 5418Y)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Jan-2023</td>
</tr>
<tr>
<td>Hardware Avail.:</td>
<td>Feb-2023</td>
</tr>
<tr>
<td>Software Avail.:</td>
<td>Jun-2022</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Copies</th>
<th>503.bwaves_r</th>
<th>507.cactuBSSN_r</th>
<th>508.namd_r</th>
<th>510.parest_r</th>
<th>511.povray_r</th>
<th>519.lbm_r</th>
<th>521.wrf_r</th>
<th>526.blender_r</th>
<th>527.cam4_r</th>
<th>538.imagick_r</th>
<th>544.nab_r</th>
<th>549.fotonik3d_r</th>
<th>554.roms_r</th>
<th>SPECrate_2017_fp_base</th>
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<td>1240</td>
<td>774</td>
<td>1240</td>
<td>221</td>
<td>512</td>
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</tbody>
</table>

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**Software**

- OS: SUSE Linux Enterprise Server 15 SP4 (x86_64)  
  Kernel 5.14.21-150400.22-default
- Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;  
  Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
- Parallel: No
- Firmware: Lenovo BIOS Version ESE109L 1.10 released Jan-2023
- File System: xfs
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: Not Applicable
- Other: jemalloc memory allocator V5.0.1
- Power Management: BIOS and OS set to prefer performance at the cost of additional power usage

**Hardware**

- CPU Name: Intel Xeon Gold 5418Y
- Max MHz: 3800
- Nominal: 2000
- Enabled: 48 cores, 2 chips, 2 threads/core
- Orderable: 1,2 chips
- Cache L1: 32 KB I + 48 KB D on chip per core
- L2: 2 MB I+D on chip per core
- L3: 45 MB I+D on chip per core
- Other: None
- Memory: 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R, running at 4400)
- Storage: 1 x 960 GB SATA SSD
- Other: None

**SPECrate\_2017\_fp\_peak:** Not Run

**SPECrate\_2017\_fp\_base:** 512
## Lenovo Global Technology

ThinkSystem SR630 V3  
(2.00 GHz, Intel Xeon Gold 5418Y)

### Results Table

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

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## 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:

```
LD_LIBRARY_PATH = 
"/home/cpu2017-1.1.8-ic2022.1/lib/intel64:/home/cpu2017-1.1.8-ic2022.1/j
e5.0.1-64"
MALLOCONF = "retain:true"
```

## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4  
Transparent Huge Pages enabled by default

(Continued on next page)
<table>
<thead>
<tr>
<th>General Notes (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to runcpu invocation</td>
</tr>
<tr>
<td>Filesystem page cache synced and cleared with:</td>
</tr>
<tr>
<td>sync; echo 3&gt; /proc/sys/vm/drop_caches</td>
</tr>
<tr>
<td>runcpu command invoked through numactl i.e.:</td>
</tr>
<tr>
<td>numactl --interleave=all runcpu &lt;etc&gt;</td>
</tr>
<tr>
<td>NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Platform Notes</th>
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<tbody>
<tr>
<td>BIOS configuration:</td>
</tr>
<tr>
<td>Choose Operating Mode set to Maximum Performance and then set it to Custom Mode</td>
</tr>
<tr>
<td>SNC set to SNC2</td>
</tr>
<tr>
<td>LLC Prefetch set to Disabled</td>
</tr>
</tbody>
</table>

Sysinfo program /home/cpu2017-1.1.8-ic2022.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca664d
running on test1 Fri Jan 20 17:36:30 2023

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 5418Y
  - 2 "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 : 48
  - physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
  - physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

From lscpu from util-linux 2.37.2:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Address sizes: 46 bits physical, 57 bits virtual
- Byte Order: Little Endian

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

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

SPECraten®2017_fp_base = 512
SPECraten®2017_fp_peak = Not Run

Platform Notes (Continued)

CPU(s): 96
On-line CPU(s) list: 0-95
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Gold 5418Y
CPU family: 6
Model: 143
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
Stepping: 8
BogoMIPS: 4000.00
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 pdelgb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq 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 cat_l2 cdp_l3 invpcid_single intel_pppin cdp_l2 ssbd mba ibrs ibst ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid ept_ad fsgrsbase tsc_adjust bmi hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 xsaves cmqm_llc cmqm_occur_llc cmqm_mbm_total cmqm_mbm_local split_lock Detect avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts avx512vbmi umip pku ospke waitpkg avx512_vmbi2 gfnl vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_bvpopcntdq 1a57 rdpid bus_lock_detect cldemote movdiri movdir64b engcmd fsrn md_clear serialize txslptrk pconfig arch_lbr avx512_fp16 amx_tile flush_l1d arch_capabilities
Virtualization: VT-x
L1d cache: 2.3 MiB (48 instances)
L1i cache: 1.5 MiB (48 instances)
L2 cache: 96 MiB (48 instances)
L3 cache: 90 MiB (2 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-11,48-59
NUMA node1 CPU(s): 12-23,60-71
NUMA node2 CPU(s): 24-35,72-83
NUMA node3 CPU(s): 36-47,84-95
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630 V3
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SPECrate®2017_fp_base = 512
SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jan-2023
Tested by: Lenovo Global Technology
Hardware Availability: Feb-2023
Software Availability: Jun-2022

Platform Notes (Continued)

Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected

From lscpu --cache:
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d 48K 2.3M 12 Data 1 64 1 64
L1i 32K 1.5M 8 Instruction 1 64 1 64
L2 2M 96M 16 Unified 2 2048 1 64
L3 45M 90M 15 Unified 3 49152 1 64

/proc/cpuinfo cache data
cache size: 46080 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 48 49 50 51 52 53 54 55 56 57 58 59
node 0 size: 128681 MB
node 0 free: 127920 MB
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 60 61 62 63 64 65 66 67 68 69 70 71
node 1 size: 129017 MB
node 1 free: 128540 MB
node 2 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 72 73 74 75 76 77 78 79 80 81 82 83
node 2 size: 128983 MB
node 2 free: 128658 MB
node 3 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 84 85 86 87 88 89 90 91 92 93 94 95
node 3 size: 128989 MB
node 3 free: 128671 MB
node distances:
node 0 1 2 3
0: 10 12 21 21
1: 12 10 21 21
2: 21 21 10 12
3: 21 21 12 10

From /proc/meminfo
MemTotal: 528048088 KB
HugePages_Total: 0
Hugepagesize: 2048 KB

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15-SP4"
VERSION_ID="15.4"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
ID="sles"
Lenovo Global Technology
ThinkSystem SR630 V3
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Platform Notes (Continued)

ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp4"

uname -a:
Linux test1 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222) x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):
Not affected
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: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):
Mitigation: Enhanced IBRS, IBPB:
conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling):
Not affected
CVE-2019-11135 (TSX Asynchronous Abort):
Not affected

run-level 3 Jan 20 17:33

SPEC is set to: /home/cpu2017-1.1.8-ic2022.1

From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SR630 V3
Product Family: ThinkSystem
Serial: 1234567890

Additional information from dmidecode 3.2 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:
1x Samsung M321R4GA3BB0-CQKEG 32 GB 2 rank 4800, configured at 4400
5x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800, configured at 4400
10x Samsung M321R4GA3BB0-CQKV3 32 GB 2 rank 4800, configured at 4400

BIOS:

(Continued on next page)
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SPECrater®2017_fp_base = 512
SPECrater®2017_fp_peak = Not Run

Platform Notes (Continued)

BIOS Vendor: Lenovo
BIOS Version: ESE109L-1.10
BIOS Date: 01/07/2023
BIOS Revision: 1.10
Firmware Revision: 1.0

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++             | 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++, C          | 511.povray_r(base) 526.blender_r(base)
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Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
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==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base)
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Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Jan-2023
Hardware Availability: Feb-2023
Software Availability: Jun-2022

Compiler Version Notes (Continued)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Fortran         | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Fortran, C      | 521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx
Lenovo Global Technology
ThinkSystem SR630 V3
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**Software Availability:** Jun-2022

### Base Portability Flags

- 503.bwaves_r: -DSPEC_LP64
- 507.cactuBSSN_r: -DSPEC_LP64
- 508.namd_r: -DSPEC_LP64
- 510.parest_r: -DSPEC_LP64
- 511.povray_r: -DSPEC_LP64
- 519.lbm_r: -DSPEC_LP64
- 521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
- 526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
- 527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
- 538.imagick_r: -DSPEC_LP64
- 544.nab_r: -DSPEC_LP64
- 549.fotonik3d_r: -DSPEC_LP64
- 554.roms_r: -DSPEC_LP64

### Base Optimization Flags

#### C benchmarks:

- `-w` `-std=c11` `-m64` `-Wl,-z,-muldefs -xCORE-AVX512 -Ofast -ffast-math`  
- `-flto` `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

#### C++ benchmarks:

- `-w` `-m64` `-Wl,-z,-muldeps -xCORE-AVX512 -Ofast -ffast-math `-flto`  
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

#### Fortran benchmarks:

- `-w` `-m64` `-Wl,-z,-muldefss -xCORE-AVX512 -Ofast -ffast-math `-flto`  
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs -align array32byte -auto -ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

#### Benchmarks using both Fortran and C:

- `-w` `-m64` `-std=c11` `-Wl,-z,-muldefss -xCORE-AVX512 -Ofast -ffast-math`  
- `-flto` `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs -align array32byte -auto -ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

#### Benchmarks using both C and C++:

- `-w` `-m64` `-std=c11` `-Wl,-z,-muldefss -xCORE-AVX512 -Ofast -ffast-math`  
- `-flto` `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`  
- `-ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

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-Eaglestream-N.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-Eaglestream-N.xml