Lenovo Global Technology
ThinkSystem SR950
(3.00 GHz, Intel Xeon Gold 5217)

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

Threads

<table>
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<th>SPECspeed2017_fp_base</th>
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**Hardware**

CPU Name: Intel Xeon Gold 5217
Max MHz.: 3700
Nominal: 3000
Enabled: 32 cores, 4 chips
Orderable: 2,3,4 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 11 MB I+D on chip per chip
Other: None
Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)
Storage: 1 x 800 GB SATA SSD
Other: None

---

**Software**

OS: SUSE Linux Enterprise Server 15 (x86_64)
Compiler: C/C++: Version 19.0.1.144 of Intel C/C++
Compiler Build: 20181018 for Linux;
Fortran: Version 19.0.1.144 of Intel Fortran
Compiler Build: 20181018 for Linux
Parallel: Yes
Firmware: Lenovo BIOS Version PSE122R 1.53 released Aug-2019 tested as PSE121R 1.53 Jul-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
### 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-ic19.0u1/lib/intel64"
- OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

Transparent Huge Pages disabled by default

echo never > /sys/kernel/mm/transparent_hugepage/enabled

echo never > /sys/kernel/mm/transparent_hugepage/defrag

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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SPEC CPU2017 Floating Point Speed Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

Lenovo Global Technology

**SPECspeed2017_fp_base =** 122

**SPECspeed2017_fp_peak =** Not Run

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<td>Apr-2019</td>
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<td>Software Availability:</td>
<td>Nov-2018</td>
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**Platform Notes**

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
CPU P-state Control set to Autonomous
Hyper-Threading set to Disable
Trusted Execution Technology set to Enable
DCU Streamer Prefetcher set to Disable
MONITOR/MWAIT set to Enable

Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f649b85e45859ea9
running on linux-u1b8 Mon Aug 5 15:17:42 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 5217 CPU @ 3.00GHz
4 "physical id"s (chips)
32 "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 : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7
physical 2: cores 0 1 2 3 4 5 6 7
physical 3: cores 0 1 2 3 4 5 6 7

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 4
NUMA node(s) : 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5217 CPU @ 3.00GHz
Stepping: 6
CPU MHz: 3000.000
BogoMIPS: 6000.00
Virtualization: VT-x

(Continued on next page)
## SPEC CPU2017 Floating Point Speed Result

### Lenovo Global Technology

**ThinkSystem SR950**  
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### Platform Notes (Continued)

- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 11264K
- **NUMA node0 CPU(s):** 0-7
- **NUMA node1 CPU(s):** 8-15
- **NUMA node2 CPU(s):** 16-23
- **NUMA node3 CPU(s):** 24-31

**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` `aperf` `mperf` `pni` `pcmluldgq` `dtes64` `monitor` `ds` `cpl` `vmx` `est` `tm2` `ssse3` `sdbg` `fma` `cx16`  
- `xtr` `pdc` `pcid` `dca` `sse4_1` `sse4_2` `x2apic` `movbe` `popcnt` `tsc_deadline_timer` `aes` `xsave` `avx` `f16c` `rdrand` `lahf` `lm` `abm` `3nowprefetch` `cpuid` `fault` `ebp` `cat` `cdp` `l3`  
- `invpcid_single` `ssbd` `mba` `ibrs` `ibpb` `stibp` `tpr_shadow` `vnmi` `flexpriority` `ept` `vpid` `fgsdbase` `tsc_adjust` `bmi1` `hle` `avx2` `smep` `bmi2` `erm` `invpcid` `rtm` `cqmm` `mpx` `rdt_a` `avx512f` `avx512dq` `rdseed` `adx` `smap` `clflushopt` `clwb` `intel_pt` `avx512cd` `avx512bw` `avx512vl`  
- `xsaveopt` `xsavec` `xgetbv1` `xsaves` `cqmm_llc` `cqmm_occup_llc` `cqmm_mbmb_total` `cqmm_mbmb_local`  
- `dtherm` `ida` `arat` `pin` `pts` `hwp` `epp` `pku` `ospke` `avx512_vnni` `flush_l1d` `arch_capabilities`

```
/proc/cpuinfo cache data
  cache size : 11264 KB
```

From `numactl --hardware`:

```plaintext
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
- node 0 size: 193090 MB
- node 0 free: 189643 MB
- node 1 cpus: 8 9 10 11 12 13 14 15
- node 1 size: 193515 MB
- node 1 free: 193116 MB
- node 2 cpus: 16 17 18 19 20 21 22 23
- node 2 size: 193515 MB
- node 2 free: 193235 MB
- node 3 cpus: 24 25 26 27 28 29 30 31
- node 3 size: 193512 MB
- node 3 free: 193279 MB

- `node distances:
  node 0 1 2 3
  0: 10 31 21 21
  1: 31 10 21 21
  2: 21 21 10 31
  3: 21 21 31 10`

From `/proc/meminfo`

```plaintext
MemTotal: 792201124 KB
```

(Continued on next page)
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Hardware Availability: Apr-2019
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Platform Notes (Continued)

HugePages_Total: 0
Hugepagesize: 2048 kB

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

os-release:
NAME="SLES"
VERSION="15"
VERSION_ID="15"
PRETTY_NAME="SUSE Linux Enterprise Server 15"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
Linux linux-u1b8 4.12.14-25.13-default #1 SMP Tue Aug 14 15:07:35 UTC 2018 (947aa51)
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 Aug 5 15:16

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 744G 33G 711G 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 -[PSE121R-1.53]- 07/03/2019
Memory:
48x NO DIMM NO DIMM
48x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)

(Continued on next page)
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**Compiler Version Notes (Continued)**

```
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
FC  607.cactuBSSN_s(base)
```

```
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
FC  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 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
CC  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 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

**Base Compiler Invocation**

C benchmarks:  
```
icc -m64 -std=c11
```

Fortran benchmarks:  
```
ifort -m64
```

(Continued on next page)
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Test Date: Aug-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

Base Compiler Invocation (Continued)

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

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

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Tested with SPEC CPU2017 v1.0.5 on 2019-08-05 03:17:41-0400.  
Report generated on 2019-08-21 12:07:45 by CPU2017 PDF formatter v6067.  
Originally published on 2019-08-20.