Lenovo Global Technology
ThinkSystem SD650
(2.30 GHz, Intel Xeon Gold 6252N)

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

Threads
603.bwaves_s 48
607.cactuBSSN_s 48
619.hmmer_s 48
621.miniconda_s 48
627.cam4_s 48
628.pop2_s 48
638.imagick_s 48
644.nab_s 48
649.fotonik3d_s 48
654.roms_s 48

## Hardware

CPU Name: Intel Xeon Gold 6252N
Max MHz: 3600
Nominal: 2300
Enabled: 48 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: 35.75 MB I+D on chip per chip
Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)
Storage: 1 x 1 TB 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 19.0.1.144 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 GTE141F 2.30 released Aug-2019 tested as GTE141F 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: --

SPECs speed®2017_fp_base = 142
SPECs speed®2017_fp_peak = Not Run
SPECCPU2017 Floating Point Speed Result

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Results Table

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SPECspeed®2017_fp_base = 142
SPECspeed®2017_fp_peak = Not Run

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 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

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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test Date:** Aug-2019  
**Hardware Availability:** Jul-2019

**Tested by:** Lenovo Global Technology  
**Software Availability:** Nov-2018

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### Platform Notes

- BIOS configuration:
  - Choose Operating Mode set to Maximum Performance
  - Choose Operating Mode set to Custom Mode
  - C1 Enhanced Mode set to Enable
  - MONITOR/MWAIT set to Enable
  - Hyper-Threading set to Disable
  - Adjacent Cache Prefetch set to Disable
  - Sysinfo program: `/home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo`
  - Rev: r5974 of 2018-05-19 9bdc68f2999c33d61f64985e45859ea9
  - Running on localhost.localdomain Wed Aug 14 02:37:04 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

- From `/proc/cpuinfo`
  - `model name`: Intel(R) Xeon(R) Gold 6252N CPU @ 2.30GHz
  - `physical id`':s (chips):
    - 2
  - `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 9 10 11 12 13 16 17 18 19 20 21 24 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

- From `lscpu`
  - `Architecture`: x86_64
  - `CPU op-mode(s)`: 32-bit, 64-bit
  - `Byte Order`: Little Endian
  - `CPU(s)`: 48
  - `On-line CPU(s) list`: 0-47
  - `Thread(s) per core`: 1
  - `Core(s) per socket`: 24
  - `Socket(s)`: 2
  - `NUMA node(s)`: 2
  - `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
  - `BogoMIPS`: 4600.00
  - `Virtualization`: VT-x
  - `L1d cache`: 32K
  - `L1i cache`: 32K
  - `L2 cache`: 1024K

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

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CPU2017 License: 9017
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Platform Notes (Continued)

L3 cache: 36608K
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47
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 cpuid nonstop_tsc
aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrar pdcmt pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3nowprefetch epb cat_13 cd1_l3 intel_patin
intel_pt sadb mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmm1 flexpriority 1pvt
fsreserve base tsc_adjust bmi1 hle avx2 smep bmi2 ersedr rtm cqm mpix rdt_a
avx512sf avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavec xgetbv1 cmap lcq_all lcq_occpar llc lcq_mbm_total lcq_mbm_local dtherm ida arat pln
pts pkp ospe avx512_vnni spec_ctrl intel_stibp flush_ltdt 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: 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 18 19 20 21 22 23
  node 0 size: 196280 MB
  node 0 free: 191508 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: 196608 MB
  node 1 free: 191898 MB
  node distances:
  node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
  MemTotal: 395878900 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"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"

(Continued on next page)
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SPECspeed®2017_fp_base = 142
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Platform Notes (Continued)

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 14 02:35

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-root xfs 949G 28G 921G 3% /

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 -[OTE141F-2.30]- 07/02/2019
Memory:
  4x NO DIMM NO DIMM
  12x 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 19.0.1.144 Build 20181018 |
| Copyright (C) 1985-2018 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 19.0.1.144 Build 20181018 |

(Continued on next page)
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**Software Availability:** Nov-2018

### Compiler Version Notes (Continued)

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Intel (R) C Intel (R) 64 Compiler for applications running on Intel (R) 64,  
Version 19.0.1.144 Build 20181018

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Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R) 64,  
Version 19.0.1.144 Build 20181018

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### 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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#### Base Portability Flags

- 603.bwaves_s: -DSPEC_LP64
- 607.cactuBSSN_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:**

-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:

- [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:

- [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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**Notes:**

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

Tested with SPEC CPU®2017 v1.0.5 on 2019-08-14 02:37:03-0400.
Originally published on 2019-09-03.