Lenovo Global Technology
ThinkSystem SN550
(1.80 GHz, Intel Xeon Silver 4108)

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

CPU Name: Intel Xeon Silver 4108
Max MHz.: 3000
Nominal: 1800
Enabled: 16 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: 11 MB I+D on chip per chip
Other: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
Storage: 1 x 800 GB SAS SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)
Kernel 4.4.21-69-default
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++
Compiler for Linux:
Fortran: Version 18.0.0.128 of Intel Fortran
Compiler for Linux
Parallel: Yes
Firmware: Lenovo BIOS Version IVE1111 1.01 released Aug-2017
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None

SPECspeed2017_fp_base = 55.6
SPECspeed2017_fp_peak = 56.6
### Lenovo Global Technology

ThinkSystem SN550
(1.80 GHz, Intel Xeon Silver 4108)

**CPU2017 License:** 9017  
**Test Date:** Nov-2017  
**Test Sponsor:** Lenovo Global Technology  
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**Hardware Availability:** Aug-2017  
**Software Availability:** Sep-2017

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### Results Table

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</table>

**SPECspeed2017_fp_base = 55.6**  
**SPECspeed2017_fp_peak = 56.6**

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:

```
LD_LIBRARY_PATH = "/home/cpu2017.1.0.2.ic18.0/lib/ia32:/home/cpu2017.1.0.2.ic18.0/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017.1.0.2.ic18.0/je5.0.1-32:/home/cpu2017.1.0.2.ic18.0/je5.0.1-64"
OMP_STACKSIZE = "192M"
```

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4

Transparent Huge Pages enabled by default

Prior to runcpu invocation

```
sync; echo 3> /proc/sys/vm/drop_caches
```

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

No: 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.

No: 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly

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

Lenovo Global Technology
ThinkSystem SN550
(1.80 GHz, Intel Xeon Silver 4108)

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SPECspeed2017_fp_peak = 56.6

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test Date: Nov-2017
Hardware Availability: Aug-2017
Software Availability: Sep-2017

General Notes (Continued)

generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Hyper-Threading set to Disable
DCU Streamer Prefetcher set to Disable
MONITORM/WAIT set to Enable
XPT Prefetcher set to Enable
DCA set to Enable
Stale AtoS set to Enable
LLC Deadline Alloc set to Disable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f

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) Silver 4108 CPU @ 1.80GHz
  2  "physical id"s (chips)
  16 "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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1

(Continued on next page)
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SPECspeed2017_fp_peak = 56.6

Test Date: Nov-2017
Hardware Availability: Aug-2017
Software Availability: Sep-2017

Platform Notes (Continued)

Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4108 CPU @ 1.80GHz
Stepping: 4
CPU MHz: 1795.781
BogoMIPS: 3591.56
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15

Flags:
  fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf eagerfpu 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 ida arat epb pbs dtsi mcm pts dtherm intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc

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

Warning: a numactl 'node' might or might not correspond to a physical chip.

From numactl --hardware

MemTotal: 792255576 kB
HugePages_Total: 0

(Continued on next page)
Platform Notes (Continued)

Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 2
  # This file is deprecated and will be removed in a future service pack or release.
  # Please check /etc/os-release for details about this release.
os-release:
  NAME="SLES"
  VERSION="12-SP2"
  VERSION_ID="12.2"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
  Linux SN550 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67) x86_64
  x86_64 x86_64 GNU/Linux
run-level 3 Nov 15 14:57

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda4 xfs 687G 105G 583G 16% /home

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 -[IVE1111-1.01]- 08/11/2017
  Memory:
    24x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)</th>
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<tr>
<td>icc (ICC) 18.0.0 20170811</td>
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<tr>
<td>Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
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==============================================================================

(Continued on next page)
Lenovo Global Technology  
ThinkSystem SN550  
(1.80 GHz, Intel Xeon Silver 4108)

SPECspeed2017_fp_base = 55.6  
SPECspeed2017_fp_peak = 56.6

CPU2017 License: 9017  
Test Date: Nov-2017
Test Sponsor: Lenovo Global Technology  
Hardware Availability: Aug-2017
Tested by: Lenovo Global Technology  
Software Availability: Sep-2017

Compiler Version Notes (Continued)

==============================================================================
CC  619.lbm_s(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC  607.cactuBSSN_s(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC  607.cactuBSSN_s(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC  603.bwaves_s(peak) 649.fotonik3d_s(peak) 654.roms_s(peak)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
------------------------------------------------------------------------------
(Continued on next page)
Lenovo Global Technology

ThinkSystem SN550
(1.80 GHz, Intel Xeon Silver 4108)

**SPECspeed2017_fp_base** = 55.6

**SPECspeed2017_fp_peak** = 56.6

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**Compiler Version Notes (Continued)**

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

---

```plaintext
CC 621.wrf_s(peak) 628.pop2_s(peak)
```

---

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

---

**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.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
Lenovo Global Technology  
ThinkSystem SN550  
(1.80 GHz, Intel Xeon Silver 4108)  

| SPECspeed2017_fp_base | 55.6 |
| SPECspeed2017_fp_peak  | 56.6 |

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

**Base Optimization Flags**

- **C benchmarks:**
  - `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
  - `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`

- **Fortran benchmarks:**
  - `-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
  - `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp`
  - `-nostandard-realloc-lhs -align array32byte`

- **Benchmarks using both Fortran and C:**
  - `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
  - `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`
  - `-nostandard-realloc-lhs -align array32byte`

- **Benchmarks using Fortran, C, and C++:**
  - `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
  - `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`
  - `-nostandard-realloc-lhs -align array32byte`

**Base Other Flags**

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

- **Fortran benchmarks:**
  - `-m64`

- **Benchmarks using both Fortran and C:**
  - `-m64 -std=c11`

- **Benchmarks using Fortran, C, and C++:**
  - `-m64 -std=c11`

**Peak Compiler Invocation**

- **C benchmarks:**
  - `icc`

- **Fortran benchmarks:**
  - `ifort`

(Continued on next page)
Lenovo Global Technology
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**SPECspeed2017_fp_base = 55.6**
**SPECspeed2017_fp_peak = 56.6**

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<td>Tested by</td>
<td>Lenovo Global Technology</td>
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<td>Test Date</td>
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<td>Hardware Availability</td>
<td>Aug-2017</td>
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<tr>
<td>Software Availability</td>
<td>Sep-2017</td>
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</table>

# Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
- `ifort icc`

Benchmarks using Fortran, C, and C++:
- `icpc icc ifort`

# Peak Portability Flags

Same as Base Portability Flags

# Peak Optimization Flags

## C benchmarks:

- `619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512`  
- `qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div`  
- `qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp`  
- `DSPEC_OPENMP`

- `638.imagick_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp`  
- `DSPEC_OPENMP`

- `644.nab_s: Same as 638.imagick_s`

## Fortran benchmarks:

- `prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP`  
- `DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3`  
- `ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp`  
- `nstandard-realloc-lhs -align array32byte`

Benchmarks using both Fortran and C:

- `621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512`  
- `qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div`  
- `qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp`  
- `DSPEC_OPENMP -nstandard-realloc-lhs -align array32byte`

- `627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp`  
- `DSPEC_OPENMP -nstandard-realloc-lhs -align array32byte`

(Continued on next page)
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| SPECspeed2017_fp_base | 55.6 |
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**Software Availability:** Sep-2017

**Peak Optimization Flags (Continued)**

```
628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch
-ipo -03 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs
-align array32byte
```

**Peak Other Flags**

C benchmarks:
-`m64 -std=c11`

Fortran benchmarks:
-`m64`

Benchmarks using both Fortran and C:
-`m64 -std=c11`

Benchmarks using Fortran, C, and C++:
-`m64 -std=c11`

The flags files that were used to format this result can be browsed at:

http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-A.xml

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Tested with SPEC CPU2017 v1.0.2 on 2017-11-15 08:27:31-0500.
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