**Lenovo Global Technology**  
ThinkSystem SD530  
(2.20 GHz, Intel Xeon Silver 4114)  

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tr>
<td>603.bwaves_s 20</td>
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<td>84.5</td>
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<tr>
<td>607.cactuBSSN_s 20</td>
<td>33.3</td>
<td>33.6</td>
</tr>
<tr>
<td>619.lbm_s 20</td>
<td>52.3</td>
<td>52.5</td>
</tr>
<tr>
<td>621.wrf_s 20</td>
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<tr>
<td>627.cam4_s 20</td>
<td>35.4</td>
<td>95.8</td>
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<td>628.pop2_s 20</td>
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<tr>
<td>644.nab_s 20</td>
<td>62.0</td>
<td>69.1</td>
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<tr>
<td>649.fotonik3d_s 20</td>
<td>62.4</td>
<td></td>
</tr>
<tr>
<td>654.roms_s 20</td>
<td>74.2</td>
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**CPU2017 License:** 9017  
**Test Date:** May-2018  
**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Aug-2017  
**Tested by:** Lenovo Global Technology  
**Software Availability:** Feb-2018  

**Hardware**  
**CPU Name:** Intel Xeon Silver 4114  
**Max MHz.:** 3000  
**Nominal:** 2200  
**Enabled:** 20 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:** 13.75 MB I+D on chip per core  
**Other:** None  
**Memory:** 384 GB (12 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:** 4.4.114-92.64-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 TEE119R 1.22 released Feb-2018  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** None
Lenovo Global Technology
ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4114)

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

Results Table

<table>
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<th>Base</th>
<th>Threads</th>
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<td>628.pop2_s</td>
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</tbody>
</table>

SPECspeed2017_fp_base = 67.9
SPECspeed2017_fp_peak = 68.8

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
Filesystem page cache synced and cleared with:
  sync; echo 3>>/proc/sys/vm/drop_caches
Yes: 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.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Hyper-Threading set to Disable

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

**Lenovo Global Technology**
ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4114)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base = 67.9</th>
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<tbody>
<tr>
<td>Lenovo Global Technology</td>
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<tr>
<td>CPU2017 License: 9017</td>
<td>Test Date: May-2018</td>
</tr>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Aug-2017</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Feb-2018</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

- DCU Streamer Prefetcher set to Disable
- MONITOR/MWAIT set to Enable
- Trusted Execution Technology set to Enable
- DCA set to Enable
- Stale AtoS set to Enable
- LLC dead line alloc set to Disable
- Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
  - Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc09ic0f
  - running on linux-r37g Mon May 14 19:28:56 2018

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 4114 CPU @ 2.20GHz
  - 2 "physical id"s (chips)
  - 20 "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: 10
  - siblings: 10
    - physical 0: cores 0 1 2 3 4 8 9 10 11 12
    - physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 20
- On-line CPU(s) list: 0-19
- Thread(s) per core: 1
- Core(s) per socket: 10
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz
- Stepping: 4
- CPU MHz: 2194.846
- BogoMIPS: 4389.69
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 14080K

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4114)

SPECspeed2017_fp_base = 67.9
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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CPU2017 License: 9017
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Tested by: Lenovo Global Technology

Platform Notes (Continued)

NUMA node0 CPU(s):     0-9
NUMA node1 CPU(s):     10-19
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 art arch_perfmon pebs bts rep_good nopl 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 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 mca cmov

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
   node 0 size:   193110 MB
   node 0 free:   192218 MB
   node 1 cpus:  10 11 12 13 14 15 16 17 18 19
   node 1 size:   193504 MB
   node 1 free:   192802 MB
   node distances:
   node   0   1
   0:  10  21
   1:  21  10

From /proc/meminfo
MemTotal:       395893696 kB
HugePages_Total:       0
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"

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4114)

SPECspeed2017_fp_base = 67.9
SPECspeed2017_fp_peak = 68.8

ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
    Linux linux-r37g 4.4.114-92.64-default #1 SMP Thu Feb 1 19:18:19 UTC 2018 (c6ce5db)
    x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 14 13:00

SPEC is set to: /home/cpu2017.1.0.2.ic18.0

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      xfs   744G   18G  727G   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 -[TEE119R-1.22]- 02/06/2018
    Memory: 4x NO DIMM NO DIMM
    12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, 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.
------------------------------------------------------------------------------

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4114)

SPECspeed2017_fp_base = 67.9
SPECspeed2017_fp_peak = 68.8

Compiler Version Notes (Continued)

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.

FM 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)

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.

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.

(Continued on next page)
## Base Compiler Invocation

C benchmarks:
```bash
icc
```

Fortran benchmarks:
```bash
ifort
```

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

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

Fortran benchmarks:
```bash
-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
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4114)

**SPECspeed2017_fp_base = 67.9**
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**CPU2017 License:** 9017
**Test Sponsor:** Lenovo Global Technology
**Tested by:** Lenovo Global Technology
**Test Date:** May-2018
**Hardware Availability:** Aug-2017
**Software Availability:** Feb-2018

---

**Base Optimization Flags (Continued)**

Benchmarks using both Fortran and C:
- `-xCORE-AVX512 -ipo -O3 -no-prec-div -gopt-prefetch`
- `-ffinite-math-only -gopt-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 -gopt-prefetch`
- `-ffinite-math-only -gopt-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`

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

Benchmarks using Fortran, C, and C++:
- `icpc icc ifort`
SPEC CPU2017 Floating Point Speed Result

Lenovo Global Technology
ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4114)

| SPECspeed2017_fp_base = 67.9 | SPECspeed2017_fp_peak = 68.8 |

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: May-2018
Hardware Availability: Aug-2017
Tested by: Lenovo Global Technology
Software Availability: Feb-2018

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
-nostandard-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 -nostandard-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 -nostandard-realloc-lhs -align array32byte

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 -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs
-align array32byte
Lenovo Global Technology
ThinkSystem SD530
(2.20 GHz, Intel Xeon Silver 4114)

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

TEST DATA

SPECspeed2017_fp_base = 67.9
SPECspeed2017_fp_peak = 68.8

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
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-G.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-G.xml

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

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