## SPEC® CPU2017 Floating Point Speed Result

**Lenovo Global Technology**  
ThinkSystem SR630  
(2.00 GHz, Intel Xeon Gold 5117)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>77.5</td>
<td>78.8</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>77.5</td>
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</tr>
<tr>
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</tr>
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<tr>
<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>78.8</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>77.5</td>
<td>78.8</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 5117  
- **Max MHz.:** 2800  
- **Nominal:** 2000  
- **Enabled:** 28 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:** 19.25 MB I+D on chip per core  
- **Other:** None  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 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 IVE113W 1.12 released Feb-2018  
- **File System:** btrfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>628.pop2_s</td>
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</tbody>
</table>

SPECspeed2017_fp_base = 77.5
SPECspeed2017_fp_peak = 78.8

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:

```bash
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)
Platform Notes (Continued)

MONITORMWAIT set to Enable
Adjacent Cache Prefetch set to Disable
Stale AtoS set to Enable
DCA set to Enable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on Cable-SPECcpu2017-SUSE12SP2 Sat Apr 7 11:10:09 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) Gold 5117 CPU @ 2.00GHz
  2 "physical id"'s (chips)
  28 "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 : 14
  siblings : 14
  physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

From lscpu:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                28
On-line CPU(s) list:   0-27
Thread(s) per core:    1
Core(s) per socket:    14
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 5117 CPU @ 2.00GHz
Stepping:              4
CPU MHz:               1995.317
BogoMIPS:              3990.63
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              19712K
NUMA node0 CPU(s):     0-13
NUMA node1 CPU(s):     14-27

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630
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SPEC CPU2017 Floating Point Speed Result

SPECspeed2017_fp_base = 77.5
SPECspeed2017_fp_peak = 78.8

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

Platform Notes (Continued)

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 rdtsdp
lm constant_tsc art 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 xtpre 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 invpcid_single lpni pt
dtherm intel_pt rsb ctrsw spec_ctrl retpoline kaiser tpr_shadow vmx flexpriority
epa vpid fsgsbase tsc_adjust b mobi 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

/proc/cpuinfo cache data
  cache size : 19712 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
  node 0 size: 193110 MB
  node 0 free: 192154 MB
  node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27
  node 1 size: 193504 MB
  node 1 free: 192590 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
MemTotal: 395893308 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"
  ID="sles"
  ANSI_COLOR="0;32"

(Continued on next page)
## Platform Notes (Continued)

uname -a:

```
Linux Cable-SPECcpu2017-SUSE12SP2 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 Apr 7 04:30

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

Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb2 btrfs 744G 218G 527G 30% /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 -[IVE113W-1.12]- 02/06/2018

Memory:

- 24x Samsung M393A2K43BB1-CTD 16 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.
```

```
== 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
```

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### Lenovo Global Technology

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<tr>
<td>SPECspeed2017_fp_peak</td>
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<tr>
<th>CPU2017 License:</th>
<th>9017</th>
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<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>Apr-2018</td>
</tr>
<tr>
<td>Hardware Availability:</td>
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</tr>
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</table>

**Compiler Version Notes (Continued)**

*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.
sicc (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)
-----------------------------
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.
-----------------------------
```

```
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CC  621.wrf_s(peak) 628.pop2_s(peak)
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</table>

### 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

```bash
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:

```bash
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
```

Fortran benchmarks:

```bash
-DSPEC_OPENMP -xCORE-AVX2 -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:

```bash
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte
```

(Continued on next page)
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**SPECspeed2017_fp_base = 77.5**

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</table>

## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
- -xCORE-AVX2
- -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

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-AVX2
-ipo -O3 -ffinite-math-only -no-prec-div
-DSPEC_SUPPRESS_OPENMP -qopenmp

638.imagick_s: -xCORE-AVX2 -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

Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nstandard-realloc-lhs -align array32byte

627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nstandard-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-AVX2 -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

Peak Other Flags

C benchmarks:

-m64 -std=c11
## Lenovo Global Technology

**ThinkSystem SR630**  
(2.00 GHz, Intel Xeon Gold 5117)

### SPEC CPU2017 Floating Point Speed Result

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<th>SPEC Speed 2017 Floating Point Speed Result</th>
<th>Peak Other Flags (Continued)</th>
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<td>Fortran benchmarks: -m64</td>
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<td>Benchmarks using both Fortran and C: -m64 -std=c11</td>
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<tr>
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<td>Benchmarks using Fortran, C, and C++: -m64 -std=c11</td>
</tr>
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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/Intel-ic18.0-official-linux64.html)
- [http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECCpu2017-Flags-V1.2-SKL-C.html](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECCpu2017-Flags-V1.2-SKL-C.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/Intel-ic18.0-official-linux64.xml)
- [http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECCpu2017-Flags-V1.2-SKL-C.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECCpu2017-Flags-V1.2-SKL-C.xml)