## Lenono Global Technology

*ThinkSystem SR630 (1.80 GHz, Intel Xeon Silver 4108)*

** SPECrate2017_fp_base = 77.3**  
** SPECrate2017_fp_peak = 79.7**

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<tr>
<td>554.roms_r</td>
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</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4108  
- **Max MHz.:** 3000  
- **Nominal:** 1800  
- **Enabled:** 16 cores, 2 chips, 2 threads/core  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 11 MB I+D on chip per chip  
- **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:** 4.4.21-69-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:** No  
- **Firmware:** Lenovo BIOS Version IVE113K 1.10 released Sep-2017  
- **File System:** btrfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None
Lenovo Global Technology
ThinkSystem SR630
(1.80 GHz, Intel Xeon Silver 4108)

SPEC CPU2017 Floating Point Rate Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPECrate2017_fp_base = 77.3
SPECrate2017_fp_peak = 79.7

Results Table

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</tbody>
</table>

SPECrate2017_fp_base = 77.3
SPECrate2017_fp_peak = 79.7

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes
The numactl mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate numactl commands to bind each copy to a specific processor.
For details, please see the config file.

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"
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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR630 (1.80 GHz, Intel Xeon Silver 4108)

SPECrated2017_fp_base = 77.3
SPECrated2017_fp_peak = 79.7

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

General Notes (Continued)

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 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
MONITORWAIT set to Enable
Execute Disable Bit set to Disable
Trusted Execution Technology 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
running on Cable-SPECcpu2006-SUSE12SP2 Wed Dec 27 12:34:07 2017

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)
  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 : 16
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630
(1.80 GHz, Intel Xeon Silver 4108)

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

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

Platform Notes (Continued)

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: 2
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: 1795.792
BogoMIPS: 3591.58
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7,16-23
NUMA node1 CPU(s): 8-15,24-31
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrunc 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 pln pts dtherm intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ersed ms invpcid rtm cmp cmx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec x mech v1 cqm_llc cqm_occup_llc

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 16 17 18 19 20 21 22 23
node 0 size: 193110 MB
node 0 free: 191813 MB
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
node 1 size: 193504 MB
node 1 free: 192326 MB

(Continued on next page)
### Lenovo Global Technology

**ThinkSystem SR630**  
(1.80 GHz, Intel Xeon Silver 4108)

<table>
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<td>Tested by:</td>
<td>Lenovo Global Technology</td>
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</table>

#### Platform Notes (Continued)

```plaintext
node distances:
node  0  1
  0:  10 21
  1:  21 10

From /proc/meminfo

MemTotal:       395893876 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"
  CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
  Linux Cable-SPECcpu2006-SUSE12SP2 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 Dec 27 00:12

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
  Filesystem  Type  Size  Used  Avail  Use%  Mounted on
  /dev/sda2   btrfs  744G  191G  552G  26%  /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 -[IVE113K-1.10]- 09/06/2017
  Memory:
    24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400
```

(End of data from sysinfo program)
## Lenovo Global Technology

ThinkSystem SR630
(1.80 GHz, Intel Xeon Silver 4108)

**SPEC CPU2017 Floating Point Rate Result**

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**Test Date:** Dec-2017

**Hardware Availability:** Aug-2017

**Software Availability:** Sep-2017

## Compiler Version Notes

```plaintext
==============================================================================
CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC  519.lbm_r(peak) 544.nab_r(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CXXC 508.namd_r(base) 510.parest_r(base)
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Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
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CXXC 508.namd_r(peak) 510.parest_r(peak)
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------------------------------------------------------------------------------
```

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR630
(1.80 GHz, Intel Xeon Silver 4108)

SPECrates

SPECrates2017_fp_base = 77.3
SPECrates2017_fp_peak = 79.7

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

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

Compiler Version Notes (Continued)

FC 507.cactuBSSN_r(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 507.cactuBSSN_r(peak)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
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ifort (IFORT) 18.0.0 20170811
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FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)

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

FC 554.roms_r(peak)

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Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

CC 521.wrf_r(base) 527.cam4_r(base)

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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 521.wrf_r(peak) 527.cam4_r(peak)

(Continued on next page)
## Lenovo Global Technology

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### CPU2017 License
9017

### Test Date
Dec-2017

### Test Sponsor
Lenovo Global Technology

### Tested by
Lenovo Global Technology

### Hardware Availability
Aug-2017

### Software Availability
Sep-2017

### 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.

---

### Base Compiler Invocation

C benchmarks:

```shell
icc
```

C++ benchmarks:

```shell
icpc
```

Fortran benchmarks:

```shell
ifort
```

Benchmarks using both Fortran and C:

```shell
ifort icc
```

Benchmarks using both C and C++:

```shell
icpc icc
```

Benchmarks using Fortran, C, and C++:

```shell
icpc icc ifort
```

### Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64
SPEC CPU2017 Floating Point Rate Result

**Lenovo Global Technology**

ThinkSystem SR630  
(1.80 GHz, Intel Xeon Silver 4108)  

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
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<td>77.3</td>
<td>79.7</td>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Dec-2017  
**Hardware Availability:** Aug-2017  
**Software Availability:** Sep-2017

### Base Optimization Flags

**C benchmarks:**  
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

**C++ benchmarks:**  
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

**Fortran benchmarks:**  
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3  
-nostandard-realloc-lhs -align array32byte

**Benchmarks using both Fortran and C:**  
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3  
-nostandard-realloc-lhs -align array32byte

**Benchmarks using both C and C++:**  
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

**Benchmarks using Fortran, C, and C++:**  
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3  
-nostandard-realloc-lhs -align array32byte

### Base Other Flags

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

**C++ benchmarks:**  
-m64

**Fortran benchmarks:**  
-m64

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

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

**Benchmarks using Fortran, C, and C++:**  
-m64 -std=c11
Lenovo Global Technology
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Peak Compiler Invocation

C benchmarks:
icc
C++ benchmarks:
icpc
Fortran benchmarks:
ifort
Benchmarks using both Fortran and C:
ifort icc
Benchmarks using both C and C++:
icpc icc
Benchmarks using Fortran, C, and C++:
icpc icc ifort

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
538.imagick_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
544.nab_r: Same as 519.lbm_r

C++ benchmarks:
- prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3

Fortran benchmarks:

(Continued on next page)
Peak Optimization Flags (Continued)

503.bwaves_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
    -ffinite-math-only -qopt-mem-layout-trans=3
    -nostandard-realloc-lhs -align array32byte

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
    -no-prec-div -qopt-prefetch -ffinite-math-only
    -qopt-mem-layout-trans=3 -nostandard-realloc-lhs
    -align array32byte

Benchmarks using both Fortran and C:
    -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
    -no-prec-div -qopt-prefetch -ffinite-math-only
    -qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
    -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
    -no-prec-div -qopt-prefetch -ffinite-math-only
    -qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
    -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
    -no-prec-div -qopt-prefetch -ffinite-math-only
    -qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Peak Other Flags

C benchmarks:
    -m64 -std=c11

C++ benchmarks:
    -m64

Fortran benchmarks:
    -m64

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

Benchmarks using both C and C++:
    -m64 -std=c11
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**Peak Other Flags (Continued)**

Benchmarks using Fortran, C, and C++:

\[-m64 \quad -\text{std}=\text{c11}\]

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/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/Intel-ic18.0-official-linux64.xml)