Lenovo Global Technology  
ThinkSystem SR550  
(1.90 GHz, Intel Xeon Gold 5119T)

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Hardware

CPU Name: Intel Xeon Gold 5119T  
Max MHz.: 3200  
Nominal: 1900  
Enabled: 28 cores, 2 chips, 2 threads/core  
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 chip  
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 4.4.21-69-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 TEE119Q 1.21 released Dec-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 SR550
(1.90 GHz, Intel Xeon Gold 5119T)

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

Results Table

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SPECrate2017_fp_base = 125
SPECrate2017_fp_peak = 128

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)
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
DCU Streamer Prefetcher set to Enable
MONITORM/WAIT set to Enable
SNC set to Enable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bdc091c0f
running on linux-yyst Wed Jan 10 17:53:29 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 5119T CPU @ 1.90GHz
  2 "physical id"s (chips)
  56 "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 : 28
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:

(Continued on next page)
Platform Notes (Continued)

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 2
Core(s) per socket: 14
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5119T CPU @ 1.90GHz
Stepping: 4
CPU MHz: 1895.547
BogoMIPS: 3791.09
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K
NUMA node0 CPU(s): 0-3, 7-9, 28-31, 35-37
NUMA node1 CPU(s): 4-6, 10-13, 32-34, 38-41
NUMA node2 CPU(s): 14-17, 21-23, 42-45, 49-51
NUMA node3 CPU(s): 18-20, 24-27, 46-48, 52-55
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 pdpocr bdtr scpl
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerpfs pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrm 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 vmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
ermv invpcid rtm cmpx eax512f eax512d rdseed adx smap clflushopt clwb eax512cd
eax512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 7 8 9 28 29 30 31 35 36 37
node 0 size: 96357 MB
node 0 free: 95971 MB
node 1 cpus: 4 5 6 10 11 12 13 32 33 34 38 39 40 41
node 1 size: 96753 MB
node 1 free: 96394 MB

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR550
(1.90 GHz, Intel Xeon Gold 5119T)

### SPEC CPU2017 Floating Point Rate Result

#### Lenovo Global Technology

---

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

**SPECrate2017_fp_base =** 125
**SPECrate2017_fp_peak =** 128
**Test Date:** Jan-2018
**Hardware Availability:** Aug-2017
**Software Availability:** Sep-2017

---

#### Platform Notes (Continued)

```
node 2 cpus: 14 15 16 17 21 22 23 42 43 44 45 49 50 51
node 2 size: 96753 MB
node 2 free: 96321 MB
node 3 cpus: 18 19 20 24 25 26 27 46 47 48 52 53 54 55
node 3 size: 96750 MB
node 3 free: 96272 MB
node distances:
node 0 1 2 3
0: 10 11 21 21
1: 11 10 21 21
2: 21 21 10 11
3: 21 21 11 10
```

---

From /proc/meminfo
```
MemTotal:       395893228 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 linux-yyst 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)
x86_64 x86_64 x86_64 GNU/Linux
```

---

```
runit-level 3 Jan 10 17:46
SPEC is set to: /home/cpu2017.1.0.2.ic18.0
```

---

```
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 744G 19G 726G 3% /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

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

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS Lenovo -[TEE119Q-1.21]- 12/12/2017
Memory:
12x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

**Compiler Version Notes**

<table>
<thead>
<tr>
<th>Compilation</th>
<th>Notes</th>
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<tbody>
<tr>
<td>CC 519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)</td>
<td>icc (ICC) 18.0.0 20170811 Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
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<td>CXXC 508.namd_r(base) 510.parest_r(base)</td>
<td>icpc (ICC) 18.0.0 20170811 Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
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(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR550**  
(1.90 GHz, Intel Xeon Gold 5119T)

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<th>SPECrate2017_fp_base</th>
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<td>SPECrate2017_fp_peak</td>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Jan-2018  
**Hardware Availability:** Aug-2017  
**Software Availability:** Sep-2017

### Compiler Version Notes (Continued)

- **CC** 511.povray_r(peak) 526.blender_r(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.

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

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

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR550**  
(1.90 GHz, Intel Xeon Gold 5119T)

<table>
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### SPECrate2017_fp_base = 125

### SPECrate2017_fp_peak = 128

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## Compiler Version Notes (Continued)

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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

- **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

---

## 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

(Continued on next page)
**Base Portability Flags (Continued)**

- 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

**Base Optimization Flags**

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -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:
-xCORE-AVX2 -ipo -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++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -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
Lenovo Global Technology
ThinkSystem SR550
(1.90 GHz, Intel Xeon Gold 5119T)

SPECrater2017_fp_base = 125
SPECrater2017_fp_peak = 128

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

Test Date: Jan-2018
Hardware Availability: Aug-2017
Software Availability: Sep-2017

Base Other Flags (Continued)

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

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
Lenovo Global Technology
ThinkSystem SR550
(1.90 GHz, Intel Xeon Gold 5119T)

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:

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
Lenovo Global Technology
ThinkSystem SR550
(1.90 GHz, Intel Xeon Gold 5119T)

SPECrate2017_fp_base = 125
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CPU2017 License: 9017
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Hardware Availability: Aug-2017
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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

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

Tested with SPEC CPU2017 v1.0.2 on 2018-01-10 04:53:28-0500.
Originally published on 2018-03-06.