# SPEC® CPU2017 Floating Point Rate Result

**Lenovo Global Technology**  
ThinkSystem SR590  
(2.00 GHz, Intel Xeon Platinum 8153)  

<table>
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<tr>
<th>Test Sponsor</th>
<th>Lenovo Global Technology</th>
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<tbody>
<tr>
<td>CPU2017 License</td>
<td>9017</td>
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<td>Tested by</td>
<td>Lenovo Global Technology</td>
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<tr>
<td>Software Availability</td>
<td>Sep-2017</td>
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**Test Date:** Jan-2018

| SPECrate2017_fp_base | 149 |
| SPECrate2017_fp_peak | 152 |

## Hardware

<table>
<thead>
<tr>
<th>CPU Name</th>
<th>Intel Xeon Platinum 8153</th>
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<tbody>
<tr>
<td>Max MHz.</td>
<td>2800</td>
</tr>
<tr>
<td>Nominal</td>
<td>2000</td>
</tr>
<tr>
<td>Enabled</td>
<td>32 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Cache L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>Cache L3</td>
<td>22 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Memory</td>
<td>384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 800 GB SAS SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
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</table>

## Software

| OS | Red Hat Enterprise Linux Server release 7.4 (Maipo) |
| 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 TEE119J 1.20 released Sep-2017 |
| File System | xfs |
| System State | Run level 3 (multi-user) |
| Base Pointers | 64-bit |
| Peak Pointers | 64-bit |
| Other | None |

---

**SPECrate2017_fp_base (149) **

| SPECrate2017_fp_peak (152) **

---

**503.bwaves_r**  
**507.cactuBSSN_r**  
**508.namd_r**  
**510.parest_r**  
**511.povray_r**  
**519.lbm_r**  
**521.wrf_r**  
**526.blender_r**  
**527.cam4_r**  
**538.imagick_r**  
**544.nab_r**  
**549.fotonik3d_r**  
**554.roms_r**
Lenovo Global Technology
ThinkSystem SR590
(2.00 GHz, Intel Xeon Platinum 8153)

Copyright 2017-2018 Standard Performance Evaluation Corporation

Results Table

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<td>83.0</td>
<td>1232</td>
<td>82.5</td>
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</tr>
</tbody>
</table>

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 SR590  
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<table>
<thead>
<tr>
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<th>Value</th>
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<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>152</td>
</tr>
<tr>
<td>SPECrate2017_fp_base</td>
<td>149</td>
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### 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](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 Disable
MONITORMWAIT set to Enable
SNC set to Enable
XPT Prefetcher 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 96c45e4568ad54c135fd618bce091c0f
running on sr590-2 Fri Jan  5 06:14:08 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

From /proc/cpuinfo

```
model name : Intel(R) Xeon(R) Platinum 8153 CPU @ 2.00GHz
  2  "physical id"s (chips)
  64 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

(Continued on next page)
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CPU2017 License: 9017  
Test Date: Jan-2018
Test Sponsor: Lenovo Global Technology
Hardware Availability: Nov-2017
Tested by: Lenovo Global Technology
Software Availability: Sep-2017

Platform Notes (Continued)

physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 64
- On-line CPU(s) list: 0-63
- Thread(s) per core: 2
- Core(s) per socket: 16
- Socket(s): 2
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Platinum 8153 CPU @ 2.00GHz
- Stepping: 4
- CPU MHz: 2000.000
- BogoMIPS: 4000.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 22528K
- NUMA node0 CPU(s): 0-3, 8-11, 32-35, 40-43
- NUMA node1 CPU(s): 4-7, 12-15, 36-39, 44-47
- NUMA node2 CPU(s): 16-19, 24-27, 48-51, 56-59
- NUMA node3 CPU(s): 20-23, 28-31, 52-55, 60-63
- Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
- /proc/cpuinfo cache data
  - cache size: 22528 KB

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 8 9 10 11 32 33 34 35 40 41 42 43
  - node 0 size: 97843 MB

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

Lenovo Global Technology
ThinkSystem SR590
(2.00 GHz, Intel Xeon Platinum 8153)

SPECrate2017_fp_base = 149
SPECrate2017_fp_peak = 152

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

Platform Notes (Continued)

node 0 free: 95169 MB
node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47
node 1 size: 98304 MB
node 1 free: 95698 MB
node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
node 2 size: 98304 MB
node 2 free: 95795 MB
node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63
node 3 size: 98304 MB
node 3 free: 95558 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: 395754444 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.4 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VARIANT="Server"
  VARIANT_ID="server"
  VERSION_ID="7.4"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:
Linux sr590-2 3.10.0-693.el7.x86_64 #1 SMP Thu Jul 6 19:56:57 EDT 2017 x86_64 x86_64 GNU/Linux

run-level 3 Jan 4 18:38

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 690G 51G 639G 8% /home

Additional information from dmidecode follows. WARNING: Use caution when you interpret

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR590
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</tbody>
</table>

**Platform Notes (Continued)**

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 -[TEE119J-1.20]- 09/06/2017**
Memory:
12x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666
4x NO DIMM NO DIMM

(End of data from sysinfo program)

**Compiler Version Notes**

```
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)
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

CXXC 508.namd_r(peak) 510.parest_r(peak)
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

CC  511.povray_r(base) 526.blender_r(base)
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```
### Lenovo Global Technology

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<td>Sep-2017</td>
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#### Compiler Version Notes (Continued)

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---

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

---

**icpc (ICC)** 18.0.0 20170811

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---

**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(base)

---

**icpc (ICC)** 18.0.0 20170811

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---

**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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---

**FC**  
507.cactuBSSN_r(peak)

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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

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---

**FC**  
554.roms_r(peak)

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**ifort (IFORT)** 18.0.0 20170811

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Software Availability: Sep-2017

Compiler Version Notes (Continued)

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

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

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

## 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

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

ThinkSystem SR590
(2.00 GHz, Intel Xeon Platinum 8153)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base = 149</th>
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</tbody>
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### Base Other Flags (Continued)

- 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`

### 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 SR590
(2.00 GHz, Intel Xeon Platinum 8153)

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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Test Date: Jan-2018
Hardware Availability: Nov-2017
Software Availability: Sep-2017

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 SR590
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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.

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