# SPEC® CPU2017 Floating Point Speed Result

## Lenovo Global Technology

**ThinkSystem SR590**  
(3.20 GHz, Intel Xeon Gold 6134)

<table>
<thead>
<tr>
<th>Software Availability</th>
<th>Test Sponsor</th>
<th>Hardware Availability</th>
<th>Test Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb-2018</td>
<td>Lenovo Global Technology</td>
<td>Nov-2017</td>
<td>Apr-2018</td>
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### Hardware

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>92.3</td>
<td>414</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>94.7</td>
<td></td>
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<tr>
<td>619.lbm_s</td>
<td>39.0</td>
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<tr>
<td>621.wrf_s</td>
<td>75.3</td>
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<tr>
<td>627.cam4_s</td>
<td>52.0</td>
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<tr>
<td>628.pop2_s</td>
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<td></td>
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<tr>
<td>638.imagick_s</td>
<td>63.2</td>
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<tr>
<td>644.nab_s</td>
<td>72.9</td>
<td></td>
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<tr>
<td>649.fotonik3d_s</td>
<td>71.6</td>
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<tr>
<td>654.roms_s</td>
<td>98.1</td>
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### CPU Name: Intel Xeon Gold 6134

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<tr>
<th>Max MHz.</th>
<th>Nominal</th>
<th>Enabled</th>
<th>Orderable</th>
<th>Cache L1</th>
<th>Cache L2</th>
<th>Cache L3</th>
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<tbody>
<tr>
<td>3700</td>
<td>3200</td>
<td>16 cores, 2 chips</td>
<td>1,2 chips</td>
<td>32 KB I + 32 KB D on chip per core</td>
<td>1 MB I+D on chip per core</td>
<td>24.75 MB I+D on chip per chip</td>
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### Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)

### Storage: 1 x 800 GB SAS SSD

### Software

<table>
<thead>
<tr>
<th>OS: SUSE Linux Enterprise Server 12 SP3 (x86_64)</th>
<th>Compiler: C/C++: Version 18.0.0.128 of Intel C/C++</th>
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<tbody>
<tr>
<td>Kernel 4.4.114-94.11-default</td>
<td>Compiler for Linux:</td>
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<tr>
<td></td>
<td>Fortran: Version 18.0.0.128 of Intel Fortran</td>
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<tr>
<td></td>
<td>Compiler for Linux:</td>
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<tr>
<td></td>
<td>Firmware: Lenovo BIOS Version TEE119R 1.22 released Feb-2018</td>
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<tr>
<td></td>
<td>File System: btrfs</td>
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<tr>
<td></td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td></td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td></td>
<td>Peak Pointers: 64-bit</td>
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<tr>
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<td>Other: None</td>
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Results Table

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<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>162</td>
<td>97.4</td>
<td>161</td>
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<td>16</td>
<td>152</td>
<td>104</td>
<td>153</td>
<td>103</td>
<td>153</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 84.5
SPECspeed2017_fp_peak = 85.8

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)
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ThinkSystem SR590
(3.20 GHz, Intel Xeon Gold 6134)

SPECspeed2017_fp_base = 84.5
SPECspeed2017_fp_peak = 85.8

Platform Notes (Continued)

Adjacent Cache Prefetch set to Disable
DCA set to Enable
Uncore Frequency Scaling set to Disable
MONITORMWAIT set to Enable
Per Core P-state set to Disable
LLC dead line alloc set to Disable
Patrol Scrub set to Disable
SNC set to Enable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bccc901c0f
running on SR590-3 Thu Apr 5 19:44:10 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 6134 CPU @ 3.20GHz
2 "physical id"s (chips)
16 "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 : 8
physical 0: cores 0 2 3 9 16 19 26 27
physical 1: cores 0 2 3 9 16 19 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6134 CPU @ 3.20GHz
Stepping: 4
CPU MHz: 3192.514
BogoMIPS: 6385.02
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K

(Continued on next page)
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SPECspeed2017_fp_base = 84.5
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Platform Notes (Continued)

L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0,1,3,4
NUMA node1 CPU(s): 2,5-7
NUMA node2 CPU(s): 8,9,11,12
NUMA node3 CPU(s): 10,13-15
Flags: fpu vme de pse tec msr mce cx8 apic sep mtrr pge mca cmov
pat pse36 c1flush 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 xtopology nonstop_tsc
aperfmon perf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdtsc latf lm abm 3dnowprefetch ia arat epb invpcid_single pln pts
dtherm intel_pt rsb_vctxsw spec_ctrl retopline kaiser tpr_shadow vmni flexpriority
ept vpid fsqsb tsc_adjust bmi hle avx2 smep bmi2 erms invpcid rtm cqm mpx
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cm avx512bw avx512vl xsaveopt
xsaveopt xgetbv1 cqm_l1c cqm_occup_l1c pkt ospe

/cache_data

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 3 4
    node 0 size: 96066 MB
    node 0 free: 95120 MB
    node 1 cpus: 2 5 6 7
    node 1 size: 96760 MB
    node 1 free: 96490 MB
    node 2 cpus: 8 9 11 12
    node 2 size: 96760 MB
    node 2 free: 96639 MB
    node 3 cpus: 10 13 14 15
    node 3 size: 96757 MB
    node 3 free: 95753 MB
    node distances:
    node 0 1 2 3
    0: 10 11 21 21
    1: 11 10 21 21
    2: 21 10 11 11
    3: 21 21 11 10

From /proc/meminfo
    MemTotal: 395616468 kB
    HugePages_Total: 0
    Hugepagesize: 2048 kB

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SPECspeed2017_fp_base = 84.5
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Platform Notes (Continued)
From /etc/*release* /etc/*version*
SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 3
    # 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-SP3"
    VERSION_ID="12.3"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
    Linux SR590-3 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
x86_64 x86_64 x86_64 GNU/Linux
unlevel 3 Apr 5 13:54

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
Filesystem   Type     Size  Used Avail Use% Mounted on
/dev/sdb2     btrfs    744G   43G  701G   6% /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 -[TEE119R-1.22]- 02/06/2018
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  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.
(Continued on next page)
Lenovo Global Technology

ThinkSystem SR590
(3.20 GHz, Intel Xeon Gold 6134)

<table>
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<tr>
<th>CPU2017 License:</th>
<th>Lenovo Global Technology</th>
<th>Test Date:</th>
<th>Apr-2018</th>
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<tr>
<td>Lenovo Global Technology</td>
<td>Test Sponsor:</td>
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**SPEC CPU2017 Floating Point Speed Result**

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<td>SPECspeed2017_fp_peak</td>
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**Compiler Version Notes (Continued)**

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SPECspeed2017_fp_base = 84.5
SPECspeed2017_fp_peak = 85.8

Copyright 2017-2018 Standard Performance Evaluation Corporation

Compiler Version Notes (Continued)
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)
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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

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
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
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64
## Lenovo Global Technology

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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test Date:** Apr-2018  
**Tested by:** Lenovo Global Technology

**Hardware Availability:** Nov-2017  
**Software Availability:** Feb-2018

### Base Optimization Flags

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

**Fortran benchmarks:**
- `-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:**
- `-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`

**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`

(Continued on next page)
Peak Compiler Invocation (Continued)

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 
-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-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 
-DSPEC.OpenMP -O2 -xCORE-AVX2 -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-AVX2 
-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-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)
**Lenovo Global Technology**

ThinkSystem SR590
(3.20 GHz, Intel Xeon Gold 6134)

<table>
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**Test Date:** Apr-2018

**Test Sponsor:** Lenovo Global Technology
**Hardware Availability:** Nov-2017
**Tested by:** Lenovo Global Technology
**Software Availability:** Feb-2018

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**Peak Optimization Flags (Continued)**

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

---

**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/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)

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