# SPEC® CPU2017 Floating Point Speed Result

**Lenovo Global Technology**

**ThinkSystem SR950**

(2.70 GHz, Intel Xeon Gold 6150)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base = 162</th>
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<tr>
<td>SPECspeed2017_fp_peak = 164</td>
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</table>

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

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
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</table>
| **CPU Name:** Intel Xeon Gold 6150  
**Max MHz.:** 3700  
**Nominal:** 2700  
**Enabled:** 72 cores, 4 chips  
**Orderable:** 2,4 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**L2:** 1 MB I+D on chip per core  
**L3:** 24.75 MB I+D on chip per core  
**Other:** None  
**Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)  
**Storage:** 1 x 800 GB SAS SSD  
**Other:** None  

**OS:** SUSE Linux Enterprise Server 12 SP2 (x86_64)  
**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 PSE105X 1.00 released Aug-2017  
**File System:** btrfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** None

| Threads | 0 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 440 | 480 | 520 | 560 | 600 | 640 | 680 | 720 | 760 | 800 | 840 |
|---------|---|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 603.bwaves_s | 72 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 607.cactuBSSN_s | 72 |     |     |     |     |     |     |     |     |     |     |     | 216 |     |     |     |     |     |     |     |     |     |
| 619.ibm_s | 72 |     |     |     |     |     |     | 79.6 |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 621.wrf_s | 72 |     |     |     |     |     | 77.4 |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 627.cam4_s | 72 |     |     |     |     |     |     |     |     |     |     |     | 147 |     |     |     |     |     |     |     |
| 628.pop2_s | 72 |     |     |     |     |     |     |     |     |     |     |     | 57.1 |     |     |     |     |     |     |
| 638.imagick_s | 72 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 644.nab_s | 72 |     |     |     |     |     |     |     |     |     |     |     | 108 |     |     |     |     |     |     |
| 649.fotonik3d_s | 72 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 654.roms_s | 72 |     |     |     |     |     |     |     |     |     |     |     | 180 |     |     |     |     |     |

**Software Availability:** Sep-2017  
**Hardware Availability:** Sep-2017  
**Test Date:** Oct-2017  
**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Sep-2017  
**Tested by:** Lenovo Global Technology  
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Results Table

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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>603.bwaves_s</td>
<td>72</td>
<td>70.6</td>
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<td>75.6</td>
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<td>65.7</td>
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</table>

SPECspeed2017_fp_base = 162
SPECspeed2017_fp_peak = 164

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:
KMP_AFFINITY = "granularity=fine,compact"
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

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Hyper-Threading set to Disable
MONITORMWAIT set to Enable
DCU Streamer Prefetcher set to Disable
XPT Prefetcher set to Enable
Stale AtoS set to Enable
DCA set to Enable
Trusted Execution Technology set to Enable

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**Platform Notes (Continued)**

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 Proton4S-SUSE12SP2 Thu Oct 26 01:56:02 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) Gold 6150 CPU @ 2.70GHz
  4 "physical id"s (chips)
  72 "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 : 18
siblings : 18
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 1
Core(s) per socket: 18
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6150 CPU @ 2.70GHz
Stepping: 4
CPU MHz: 2693.679
BogoMIPS: 5387.35
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-17
NUMA node1 CPU(s): 18-35
NUMA node2 CPU(s): 36-53

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Platform Notes (Continued)

NUMA node3 CPU(s): 54-71
Flags: fpu vme de pse tsc mtrr 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 rdrtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl x87nop mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdrtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl x87nop mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdrtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl x87nop mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdrtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl x87nop mtrr pge mca cmov

/proc/cpuinfo 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 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
node 0 size: 386500 MB
node 0 free: 385234 MB
node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
node 1 size: 387042 MB
node 1 free: 385753 MB
node 2 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
node 2 size: 387042 MB
node 2 free: 385549 MB
node 3 cpus: 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
node 3 size: 387038 MB
node 3 free: 385838 MB
node distances:
node 0 1 2 3
0: 10 21 21 21
1: 21 10 21 21
2: 21 21 10 21
3: 21 21 21 10

From /proc/meminfo
MemTotal: 1584766852 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.

(Continued on next page)
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**SPECs**

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- **Software Availability:** Sep-2017

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**Platform Notes (Continued)**

```
# 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 Proton4S-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 Oct 25 19:33

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
Filesystem     Type   Size  Used Avail Use% Mounted on
/dev/sda3      btrfs  743G  177G  566G  24% /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 -(PSE105X-1.00)- 08/17/2017
  Memory:
  48x NO DIMM NO DIMM
  48x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)
```

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**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.
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**Compiler Version Notes (Continued)**

```plaintext
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
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.
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  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)
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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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Compiler Version Notes (Continued)

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

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### Base Optimization Flags (Continued)

**Fortran benchmarks:**
- DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
- ffinitie-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

**Benchmarks using both Fortran and C:**
- ifort icc

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR950
(2.70 GHz, Intel Xeon Gold 6150)

SPECspeed2017_fp_base = 162
SPECspeed2017_fp_peak = 164

CPU2017 License: 9017
Test Date: Oct-2017
Test Sponsor: Lenovo Global Technology
Hardware Availability: Sep-2017
Tested by: Lenovo Global Technology
Software Availability: Sep-2017

Peak Compiler Invocation (Continued)

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

628.pop2_s: Same as 621.wrf_s

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR950
(2.70 GHz, Intel Xeon Gold 6150)

SPECspeed2017_fp_base = 162
SPECspeed2017_fp_peak = 164

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

Test Date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Peak Optimization Flags (Continued)

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

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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