## SPEC® CPU2017 Floating Point Speed Result

**Supermicro**
SuperStorage 5049P-E1CR45H (X11SPL-F, Intel Xeon Gold 5120)

| SPECspeed2017_fp_base = 53.4 |
| SPECspeed2017_fp_peak = 53.7 |

### Hardware

- **CPU Name:** Intel Xeon Gold 5120
- **Max MHz.:** 3200
- **Nominal:** 2200
- **Enabled:** 14 cores, 1 chip
- **Orderable:** 1 chip
- **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
- **Memory:** 192 GB (6 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
- **Storage:** 1 x 200 GB SATA III SSD
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 12 SP3 (x86_64)
- **Kernel:** 4.4.114-94.11-default
- **Compiler:** C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Supermicro BIOS version 2.1 released Jun-2018
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc memory allocator library V5.0.1
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**CPU2017 License:** 001176  
**Test Date:** Nov-2018  
**Test Sponsor:** Supermicro  
**Hardware Availability:** Jul-2017  
**Tested by:** Supermicro  
**Software Availability:** Mar-2018

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### Results Table

<table>
<thead>
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<th>Threads</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
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<th>Seconds</th>
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</table>

**SPECspeed2017_fp_base = 53.4**

**SPECspeed2017_fp_peak = 53.7**

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"
- OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM  
memory using Redhat Enterprise Linux 7.5  
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.  
**SPEC CPU2017 Floating Point Speed Result**

**Supermicro**
SuperStorage 5049P-E1CR45H (X11SPL-F, Intel Xeon Gold 5120)

<table>
<thead>
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<tbody>
<tr>
<td>53.7</td>
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**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Tested by:** Supermicro

**Test Date:** Nov-2018  
**Hardware Availability:** Jul-2017  
**Software Availability:** Mar-2018

**Platform Notes**

BIOS Settings:
Hyper-Threadinig [ALL] = Disable  
LLC dead line alloc = Disable  
Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-52ma Wed Nov 14 00:30:17 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 5120 CPU @ 2.20GHz
  1 "physical id"s (chips)
  14 "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: 14
  physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 14
On-line CPU(s) list: 0-13
Thread(s) per core: 1
Core(s) per socket: 14
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5120 CPU @ 2.20GHz
Stepping: 4
CPU MHz: 1000.000
CPU max MHz: 2201.0000
CPU min MHz: 1000.0000
BogoMIPS: 4399.97
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K
NUMA node0 CPU(s): 0-13
```

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

Flags: fpu vme de pse 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 aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcpd dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts dtherm intel_pt rsb_ctxtsw spec_ctrl retpolicy kaiser tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erva invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaveopt xgetbv1 cqm_llc cqm_occup_llc pku ospke

/proc/cpuinfo cache data
- cache size: 19712 KB

From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a physical chip.
- available: 1 nodes (0)
- node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13
- node 0 size: 192078 MB
- node 0 free: 184505 MB
- node distances:
  - node 0
    - 0: 10

From /proc/meminfo
- MemTotal: 196688384 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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 linux-52ma 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)

(Continued on next page)
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Platform Notes (Continued)

x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI  
CVE-2017-5753 (Spectre variant 1): Mitigation: Barriers  
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Nov 13 17:55

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 145G 50G 95G 35% /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 American Megatrends Inc. 2.1 06/15/2018  
   Memory: 2x NO DIMM NO DIMM  
   6x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

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<table>
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<tr>
<th>CC 619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)</th>
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</thead>
<tbody>
<tr>
<td>icc (ICC) 18.0.2 20180210</td>
</tr>
<tr>
<td>Copyright (C) 1985-2018 Intel Corporation. All rights reserved.</td>
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<tr>
<td>----------------------------------------------------------------------------</td>
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<table>
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<th>FC 607.cactuBSSN_s(base, peak)</th>
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<td>icpc (ICC) 18.0.2 20180210</td>
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<tr>
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(Continued on next page)
**Base Compiler Invocation**

C benchmarks:
```
icc -m64 -std=c11
```

Fortran benchmarks:
```
ifort -m64
```
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### Base Compiler Invocation (Continued)

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

- Benchmarks using Fortran, C, and C++:
  ```
  icpc -m64 icc -m64 -std=c11 ifort -m64
  ```

### 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:**

- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
- `-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP`
- `-L/usr/local/je5.0.1-64/lib -ljemalloc`

**Fortran benchmarks:**

- `-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
- `-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc`

**Benchmarks using both Fortran and C:**

- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
- `-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc`

**Benchmarks using Fortran, C, and C++:**

- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
- `-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc`
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#### Peak Compiler Invocation

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

**Fortran benchmarks:**  
`ifort -m64`

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

**Benchmarks using Fortran, C, and C++:**  
`icpc -m64 icc -m64 -std=c11 ifort -m64`

---

#### Peak Portability Flags

Same as Base Portability Flags

---

#### Peak Optimization Flags

**C benchmarks:**

619.lbm_s: basepeak = yes

638.imagick_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

644.nab_s: basepeak = yes

**Fortran benchmarks:**

603.bwaves_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: basepeak = yes

654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -nostandard-realloc-lhs

(Continued on next page)
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**SPECspeed2017_fp_base = 53.4**

**SPECspeed2017_fp_peak = 53.7**

---

### Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

621.wrf_s: `basepeak = yes`

627.cam4_s: `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-1hs`

628.pop2_s: `-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-1hs`

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: `basepeak = yes`

---

The flags files that were used to format this result can be browsed at:


You can also download the XML flags sources by saving the following links:


---

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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 v1.0.5 on 2018-11-13 11:30:16-0500.
Report generated on 2018-12-11 14:59:12 by CPU2017 PDF formatter v6067.
Originally published on 2018-12-11.