## SPEC® CPU2017 Floating Point Speed Result

### Supermicro

**SuperWorkstation 5039C-T (X11SCA, Intel Core i9-9900K)**

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>33.2</td>
<td>33.5</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Core i9-9900K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz.:</td>
<td>5000</td>
</tr>
<tr>
<td>Nominal:</td>
<td>3600</td>
</tr>
<tr>
<td>Enabled:</td>
<td>8 cores, 1 chip</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1 chip</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>256 KB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>16 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 200 GB SATA III SSD</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>SUSE Linux Enterprise Server 12 SP3 (x86_64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 18.0.2.199 of Intel C/C++</td>
</tr>
<tr>
<td>Compiler for Linux:</td>
<td>Fortran: Version 18.0.2.199 of Intel Fortran</td>
</tr>
<tr>
<td>Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 1.0a released Sep-2018</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>jemalloc memory allocator library V5.0.1</td>
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</tbody>
</table>

### Test Details

| Test Date: | Dec-2018 |
| Hardware Availability: | Oct-2018 |
| Software Availability: | Mar-2018 |

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base (33.2)</th>
<th>SPECspeed2017_fp_peak (33.5)</th>
</tr>
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<tbody>
<tr>
<td>8</td>
<td>77.8</td>
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<tr>
<td>8</td>
<td>66.3</td>
<td>47.7</td>
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<tr>
<td>8</td>
<td>47.1</td>
<td>32.6</td>
</tr>
<tr>
<td>8</td>
<td>37.0</td>
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<td>8</td>
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<tr>
<td>8</td>
<td>87.8</td>
<td>27.1</td>
</tr>
</tbody>
</table>

---

603.bwaves_s
607.cactuBSSN_s
619.lbm_s
621.wrf_s
627.cam4_s
628.pop2_s
638.imagick_s
644.nab_s
649.fotonik3d_s
654.roms_s

---

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**SPEC CPU2017 Floating Point Speed Result**

Supermicro
SuperWorkstation 5039C-T (X11SCA, Intel Core i9-9900K)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
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<td>77.8</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>66.3</td>
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<tr>
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<tr>
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<tr>
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<td>17.6</td>
<td>895</td>
<td>17.6</td>
<td>893</td>
<td>17.6</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 33.2
SPECspeed2017_fp_peak = 33.5

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/lib/intel64:/home/cpu2017/je5.0.1-64"
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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
SPEC CPU2017 Floating Point Speed Result

Supermicro
SuperWorkstation 5039C-T (X11SCA , Intel Core i9-9900K)

SPECspeed2017_fp_base = 33.2
SPECspeed2017_fp_peak = 33.5

BIOS Settings:
Hyper-Threading = Disable
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-65nv Fri Dec 28 14:46:42 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) Core(TM) i9-9900K CPU @ 3.60GHz
  1 "physical id"s (chips)
  8 "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 1 2 3 4 5 6 7

From /proc/cmdinfo:

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                8
On-line CPU(s) list:   0-7
Thread(s) per core:    1
Core(s) per socket:    8
Socket(s):             1
NUMA node(s):          1
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 158
Model name:            Intel(R) Core(TM) i9-9900K CPU @ 3.60GHz
Stepping:              12
CPU MHz:               4987.340
CPU max MHz:           5000.000
CPU min MHz:           800.000
BogoMIPS:              7199.96
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              256K
L3 cache:              16384K
NUMA node0 CPU(s):     0-7
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 pdpe1gb rdtscp

(Continued on next page)
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**Supermicro**  
SuperWorkstation 5039C-T (X11SCA , Intel Core i9-9900K)

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<tbody>
<tr>
<td>33.2</td>
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</tr>
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</table>

**CPU2017 License: 001176**  
**Test Sponsor: Supermicro**  
**Test Date: Dec-2018**  
**Hardware Availability: Oct-2018**  
**Tested by: Supermicro**  
**Software Availability: Mar-2018**

**Platform Notes (Continued)**

```
lm constant_tsc art arch_perfmon pebs bts rep_good nop1 xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrr pdcm pcid 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 hwp hwp_notify hwp_act_window hwp_epp intel_pt rsb_cxsw spec_ctrl retpoline
kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep
bm12 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1
```

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
node 0 size: 64283 MB
node 0 free: 56907 MB
node distances:
node 0
0: 10
```

From `/proc/meminfo`

- MemTotal: 65826020 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-65nv 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
```

**Kernel self-reported vulnerability status:**

(Continued on next page)
Supermicro

SuperWorkstation 5039C-T (X11SCA, Intel Core i9-9900K)

SPEC CPU2017 Floating Point Speed Result

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SPECspeed2017_fp_base = 33.2
SPECspeed2017_fp_peak = 33.5

CPU2017 License: 001176
Test Sponsor: Supermicro
Test Date: Dec-2018
Tested by: Supermicro
Hardware Availability: Oct-2018
Software Availability: Mar-2018

Platform Notes (Continued)

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 Dec 28 10:27
SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 145G 34G 111G 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 American Megatrends Inc. 1.0a 09/27/2018
Memory:
4x Micron 18ADF2G72AZ-2G6H1R 16 GB 2 rank 1667

(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) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CC 619.lbm_s(peak)
==============================================================================
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC 607.cactuBSSN_s(base, peak)
==============================================================================
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
(Continued on next page)
Compiler Version Notes (Continued)

------------------------------------------------------------------------------
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
  ifort (IFORT) 18.0.2 20180210
  Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
FC  603.bwaves_s(peak) 649.fotonik3d_s(peak)
  ifort (IFORT) 18.0.2 20180210
  Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
  ifort (IFORT) 18.0.2 20180210
  Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
  icc (ICC) 18.0.2 20180210
  Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
CC  621.wrf_s(peak) 628.pop2_s(peak)
  ifort (IFORT) 18.0.2 20180210
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  icc (ICC) 18.0.2 20180210
  Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
  icc -m64 -std=c11

Fortran benchmarks:
  ifort -m64

Benchmarks using both Fortran and C:
  ifort -m64 icc -m64 -std=c11
## SPEC CPU2017 Floating Point Speed Result

<table>
<thead>
<tr>
<th>Supermicro</th>
<th>SPECspeed2017_fp_base = 33.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SuperWorkstation 5039C-T (X11SCA, Intel Core i9-9900K)</td>
<td>SPECspeed2017_fp_peak = 33.5</td>
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</tbody>
</table>

**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Test Date:** Dec-2018  
**Hardware Availability:** Oct-2018  
**Tested by:** Supermicro  
**Software Availability:** Mar-2018

### Base Compiler Invocation (Continued)

Benchmarks using Fortran, C, and C++:

```bash
icpc -m64 icc -m64 -std=c11 ifort -m64
```

### 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

### Base Optimization Flags

#### C benchmarks:

```bash
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

#### Fortran benchmarks:

```bash
-W1,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp  
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

#### Benchmarks using both Fortran and C:

```bash
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP  
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

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

```bash
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP  
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```
Supermicro
SuperWorkstation 5039C-T (X11SCA, Intel Core i9-9900K)  

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CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro
Test Date: Dec-2018
Hardware Availability: Oct-2018
Software Availability: Mar-2018

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: basepeak = yes
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-AVX2 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

Benchmarks using both Fortran and C:

(Continued on next page)
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**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Tested by:** Supermicro  
**Test Date:** Dec-2018  
**Hardware Availability:** Oct-2018  
**Software Availability:** Mar-2018

---

**Peak Optimization Flags (Continued)**

```plaintext
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

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

628.pop2_s: Same as 621.wrf_s

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 2018-12-28 01:46:42-0500.
Originally published on 2019-01-22.