# SPEC CPU®2017 Floating Point Speed Result

**Supermicro**

SuperServer 5019C-WR  
(X11SCW-F, Intel Xeon E-2288G)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base = 35.1</th>
<th>SPECspeed®2017_fp_peak = 36.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>603.bwaves_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>607.cactuBSSN_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>619.lbm_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>621.wrf_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>627.cam4_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>628.pop2_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>638.imagick_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>644.nab_s</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>649.fotonik3d_s</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>654.roms_s</td>
<td></td>
</tr>
</tbody>
</table>

**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Test Date:** Nov-2019  
**Hardware Availability:** May-2019  
**Tested by:** Supermicro  
**Software Availability:** May-2019

## Hardware

- **CPU Name:** Intel Xeon E-2288G  
- **Max MHz:** 5000  
- **Nominal:** 3700  
- **Enabled:** 8 cores, 1 chip, 2 threads/core  
- **Orderable:** 1 chip  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 256 KB I+D on chip per core  
- **L3:** 16 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 128 GB (4 x 32 GB 2Rx8 PC4-2666V-E)  
- **Storage:** 1 x 4 TB SATA III 7200 RPM  
- **Other:** None

## Software

- **OS:** SUSE Linux Enterprise Server 12 SP4 (x86_64)  
- **Kernel:** 4.12.14-94.41-default  
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.4.227 of Intel Fortran Compiler for Linux  
- **Parallel:** Yes  
- **Firmware:** Version 1.2 released Oct-2019  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None  
- **Power Management:** --
Supermicro
SuperServer 5019C-WR (X11SCW-F, Intel Xeon E-2288G)

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

SPECspeed®2017_fp_base = 35.1
SPECspeed®2017_fp_peak = 36.2

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>8</td>
<td>798</td>
<td>73.9</td>
<td>798</td>
<td>74.0</td>
<td>798</td>
<td>74.0</td>
<td>798</td>
<td>73.9</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>8</td>
<td>276</td>
<td>60.4</td>
<td>276</td>
<td>60.4</td>
<td>276</td>
<td>60.4</td>
<td>276</td>
<td>60.4</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>8</td>
<td>346</td>
<td>15.1</td>
<td>346</td>
<td>15.1</td>
<td>346</td>
<td>15.1</td>
<td>346</td>
<td>15.1</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>8</td>
<td>290</td>
<td>45.5</td>
<td>293</td>
<td>45.2</td>
<td>295</td>
<td>44.8</td>
<td>296</td>
<td>49.7</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>8</td>
<td>290</td>
<td>30.6</td>
<td>291</td>
<td>30.5</td>
<td>289</td>
<td>30.6</td>
<td>290</td>
<td>30.6</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>8</td>
<td>324</td>
<td>36.7</td>
<td>324</td>
<td>36.6</td>
<td>324</td>
<td>36.7</td>
<td>324</td>
<td>36.7</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>8</td>
<td>365</td>
<td>39.6</td>
<td>362</td>
<td>39.9</td>
<td>363</td>
<td>39.7</td>
<td>363</td>
<td>39.7</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>8</td>
<td>232</td>
<td>75.2</td>
<td>232</td>
<td>75.3</td>
<td>232</td>
<td>75.2</td>
<td>16</td>
<td>92.6</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>8</td>
<td>561</td>
<td>16.2</td>
<td>553</td>
<td>16.5</td>
<td>553</td>
<td>16.5</td>
<td>553</td>
<td>16.5</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>8</td>
<td>932</td>
<td>16.9</td>
<td>934</td>
<td>16.9</td>
<td>931</td>
<td>16.9</td>
<td>931</td>
<td>16.9</td>
</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 35.1
SPECspeed®2017_fp_peak = 36.2

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"

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes
Binaries compiled on a system with 1x Intel Core i9-7900X 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

NA: 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.
Supermicro
SuperServer 5019C-WR
(X11SCW-F, Intel Xeon E-2288G)

SPECspeed®2017_fp_base = 35.1
SPECspeed®2017_fp_peak = 36.2

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Nov-2019
Hardware Availability: May-2019
Software Availability: May-2019

Platform Notes

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011
running on linux-cq1s Sun Nov 10 08:26:56 2019

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) E-2288G CPU @ 3.70GHz
1 "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: 16
physical 0: cores 0 1 2 3 4 5 6 7

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: 2
Core(s) per socket: 8
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2288G CPU @ 3.70GHz
Stepping: 13
CPU MHz: 3700.000
CPU max MHz: 5000.0000
CPU min MHz: 800.0000
BogoMIPS: 7392.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 16384K
NUMA node0 CPU(s): 0-15
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 rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid

(Continued on next page)
Supermicro
SuperServer 5019C-WR
(X11SCW-F, Intel Xeon E-2288G)

**SPECspeed®2017_fp_base = 35.1**
**SPECspeed®2017_fp_peak = 36.2**

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>001176</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Supermicro</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Supermicro</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Nov-2019</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>May-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>May-2019</td>
</tr>
</tbody>
</table>

---

Platform Notes (Continued)

aperf perf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcpc pcid ssse4_1 ssse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single ssbd ibrs ibpb stibp tpr_shadow vmi flexpriority ept vpid fsqsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt intel_pt xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notif hwp_act_window hwp_epp flush_l1d arch_capabilities

```
/proc/cpuinfo cache data
cache size: 16384 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 1 nodes (0)
ode 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
dnode 0 size: 128298 MB
dnode 0 free: 101743 MB
dnode distances:
dnode 0
  0: 10

From /proc/meminfo
MemTotal: 131377156 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP4

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 4
  # 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-SP4"
    VERSION_ID="12.4"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
```

(Continued on next page)
Platform Notes (Continued)

x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: No status reported
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Nov 8 23:03

SPEC is set to: /home/cpu2017

Memory:
4x Samsung M391A4G43MB1-CTD 32 GB 2 rank 2667

(End of data from sysinfo program)
Supermicro
SuperServer 5019C-WR
(X11SCW-F, Intel Xeon E-2288G)

SPECspeed®2017_fp_base = 35.1
SPECspeed®2017_fp_peak = 36.2

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Nov-2019
Hardware Availability: May-2019
Software Availability: May-2019

Compiler Version Notes (Continued)

C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran, C | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base CompilerInvocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

(Continued on next page)
Supermicro
SuperServer 5019C-WR (X11SCW-F, Intel Xeon E-2288G)

| SPECspeed®2017_fp_base = 35.1 |
| SPECspeed®2017_fp_peak = 36.2 |

**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Tested by:** Supermicro

**Test Date:** Nov-2019  
**Hardware Availability:** May-2019  
**Software Availability:** May-2019

### Base Compiler Invocation (Continued)

Benchmarks using Fortran, C, and C++:

```
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:**

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

**Fortran benchmarks:**

```
-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
```

**Benchmarks using both Fortran and C:**

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs
```

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

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs
```
SPEC CPU®2017 Floating Point Speed Result

Supermicro
SuperServer 5019C-WR
(X11SCW-F, Intel Xeon E-2288G)

SPECspeed®2017_fp_base = 35.1
SPECspeed®2017_fp_peak = 36.2

CPU2017 License: 001176
Test Sponsor: Supermicro
Test Date: Nov-2019
Tested by: Supermicro
Hardware Availability: May-2019
Software Availability: May-2019

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:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

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=4
-qopenmp -nostandard-realloc-lhs
649.fotonik3d_s: basepeak = yes
654.roms_s: -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs

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=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

(Continued on next page)
Supermicro
SuperServer 5019C-WR
(X11SCW-F, Intel Xeon E-2288G)

SPECspeed®2017_fp_base = 35.1
SPECspeed®2017_fp_peak = 36.2

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Nov-2019
Hardware Availability: May-2019
Software Availability: May-2019

Peak Optimization Flags (Continued)

627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

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:

SPEC CPU and SPECspeed are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.0 on 2019-11-09 19:26:56-0500.
Report generated on 2020-01-08 12:06:11 by CPU2017 PDF formatter v6255.
Originally published on 2020-01-07.