## SPEC CPU2017 Floating Point Rate Result

**Supermicro**  
SuperWorkstation 5039C-T (X11SCA , Intel Xeon E-2126G)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>37.4</td>
<td>38.0</td>
</tr>
</tbody>
</table>

### Hardware
- **CPU Name:** Intel Xeon E-2126G  
- **Max MHz.:** 4500  
- **Nominal:** 3300  
- **Enabled:** 6 cores, 1 chip  
- **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:** 12 MB I+D on chip per chip  
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)  
- **Storage:** 1 x 200 GB SATA III SSD  
- **Other:** None

### Software
- **OS:** SUSE Linux Enterprise Server 12 SP3 (x86_64)  
- **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  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None  

### Test Details
- **CPU2017 License:** 001176  
- **Test Sponsor:** Supermicro  
- **Test Date:** Nov-2018  
- **Hardware Availability:** Jul-2018  
- **Tested by:** Supermicro  
- **Software Availability:** Mar-2018

The table below shows the results for various applications:

<table>
<thead>
<tr>
<th>Application</th>
<th>Copies</th>
<th>SPECrate2017_fp_base</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>6</td>
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<td>73.4</td>
</tr>
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<td>507.cactuBSSN_r</td>
<td>6</td>
<td>35.2</td>
<td>78.8</td>
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<tr>
<td>508.namd_r</td>
<td>6</td>
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<tr>
<td>510.parest_r</td>
<td>6</td>
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<td>22.5</td>
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<tr>
<td>511.povray_r</td>
<td>6</td>
<td>49.4</td>
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<td>519.lmb_r</td>
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<td>544.nab_r</td>
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<td>549.fotonik3d_r</td>
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Results Table

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<td>604.0</td>
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<td>593.0</td>
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</tr>
</tbody>
</table>

**Submit Notes**

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset commands to bind each copy to a specific processor. For details, please see the config file.

**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/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
```

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)
General Notes (Continued)

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

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-65nv Fri Nov 23 18:11:30 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) E-2126G CPU @ 3.30GHz
  1 "physical id"s (chips)
  6 "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 : 6
siblings : 6
physical 0: cores 0 1 2 3 4 5

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 6
On-line CPU(s) list: 0-5
Thread(s) per core: 1
Core(s) per socket: 6
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2126G CPU @ 3.30GHz
Stepping: 10
CPU MHz: 4450.267
CPU max MHz: 4500.0000
CPU min MHz: 800.0000
BogoMIPS: 6623.69
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K

(Continued on next page)
Supermicro
SuperWorkstation 5039C-T (X11SCA, Intel Xeon E-2126G)

SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECrate2017_fp_base = 37.4
SPECrate2017_fp_peak = 38.0

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

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

Platform Notes (Continued)

L2 cache: 256K
L3 cache: 12288K
NUMA node0 CPU(s): 0-5
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
lm constant_tsc art 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 pcid sse4_1 sse4_2 x2apic movsz pxrsvts dtes64_64bit tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epbi invpcid_single pln pts
dtherm hwp_notify hwp_act_window hwp_epp intel_pt rsb_ctxsw spec_ctrl retropoline
kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep
bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1

/proc/cpuinfo cache data
  cache size: 12288 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
  node 0 size: 64283 MB
  node 0 free: 53449 MB
  node distances:
    node 0
      0: 10

From /proc/meminfo
  MemTotal: 65826152 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"

(Continued on next page)
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CPU2017 License: 001176
Test Sponsor: Supermicro
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Platform Notes (Continued)

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:
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 23 11:33
SPEC is set to: /home/cpu2017

Filesystem     Type  Size  Used  Avail  Use% Mounted on
/dev/sda3      xfs   145G   35G  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 2667

(End of data from sysinfo program)

Compiler Version Notes

                           ---------------------------------------------------------------
    CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base, peak)
                           ---------------------------------------------------------------
    icc (ICC) 18.0.2 20180210
    Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
                           ---------------------------------------------------------------
    CC  519.lbm_r(peak)
                           ---------------------------------------------------------------
    icc (ICC) 18.0.2 20180210
    Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
                           ---------------------------------------------------------------
    CXXC 508.namd_r(base) 510.parest_r(base, peak)
                           ---------------------------------------------------------------
    icpc (ICC) 18.0.2 20180210
                           ---------------------------------------------------------------
(Continued on next page)
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CXXC 508.namd_r(peak)
icpc (ICC) 18.0.2 20180210
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CC 511.povray_r(base) 526.blender_r(base, peak)
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985–2018 Intel Corporation. All rights reserved.
```

```
FC 507.cactuBSSN_r(base, peak)
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985–2018 Intel Corporation. All rights reserved.
```

```
FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985–2018 Intel Corporation. All rights reserved.
```

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Compiler Version Notes (Continued)

```
FC  554.roms_r(peak)
------------------
ifort (IFORT) 18.0.2 20180210
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==============================================================================
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==============================================================================
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------------------
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.
```

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64
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### Base Portability Flags

- 503.bwaves_r: -DSPEC_LP64  
- 507.cactuBSSN_r: -DSPEC_LP64  
- 508.namd_r: -DSPEC_LP64  
- 510.parest_r: -DSPEC_LP64  
- 511.povray_r: -DSPEC_LP64  
- 519.lbm_r: -DSPEC_LP64  
- 521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
- 526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char  
- 527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG  
- 538.imagick_r: -DSPEC_LP64  
- 544.nab_r: -DSPEC_LP64  
- 549.fotonik3d_r: -DSPEC_LP64  
- 554.roms_r: -DSPEC_LP64

### Base Optimization Flags

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

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

**Fortran benchmarks:**
```bash
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

**Benchmarks using both Fortran and C:**
```bash
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

**Benchmarks using both C and C++:**
```bash
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
```

**Benchmarks using Fortran, C, and C++:**
```bash
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```
SPEC CPU2017 Floating Point Rate Result

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

Test Date: Nov-2018
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Software Availability: Mar-2018

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

Benchmarks using both C and C++:
icpc -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:
519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
538.imagick_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
544.nab_r: Same as 538.imagick_r

C++ benchmarks:
508.namd_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3

(Continued on next page)
**Peak Optimization Flags (Continued)**

510.parest_r: -xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: -xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -auto
-nostandard-realloc-lhs

554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -03
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

527.cam4_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -03
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:

511.povray_r: -prof-use(pass 2) -ipo -xCORE-AVX2 -03
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

526.blender_r: -xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:

-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -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:

http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-SKL-rev0.xml
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<td>SuperWorkstation 5039C-T (X11SCA, Intel Xeon E-2126G)</td>
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| Test Sponsor: Supermicro | Hardware Availability: Jul-2018 |
| Tested by: Supermicro | Software Availability: Mar-2018 |

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