## SPEC® CPU2017 Floating Point Rate Result

**Supermicro**  
SuperWorkstation 5039A-i (X11SRA, Intel Xeon W-2155)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>62.8</td>
<td>64.5</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 001176  
**Test Date:** Sep-2018  
**Test Sponsor:** Supermicro  
**Tested by:** Supermicro  
**Hardware Availability:** Jul-2017  
**Software Availability:** Feb-2018

### Hardware

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon W-2155</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>4500</td>
</tr>
<tr>
<td>Nominal</td>
<td>3300</td>
</tr>
<tr>
<td>Enabled</td>
<td>10 cores, 1 chip, 2 threads/core</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>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>13.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Memory</td>
<td>64 GB (4 x 16 GB 2Rx4 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>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 12 SP3 (x86_64)</td>
</tr>
<tr>
<td>Compiler</td>
<td>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</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
</tr>
<tr>
<td>Firmware</td>
<td>Supermicro BIOS version 1.2 released Aug-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>None</td>
</tr>
</tbody>
</table>

---

**Copies**

![Graph showing SPECrate2017_fp_base and SPECrate2017_fp_peak results for various benchmarks.](image)
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>20</td>
<td>1307</td>
<td>153</td>
<td>1309</td>
<td>153</td>
<td>1304</td>
<td>154</td>
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<tr>
<td>507.cactuBSSN_r</td>
<td>20</td>
<td>449</td>
<td>56.4</td>
<td>451</td>
<td>56.2</td>
<td>450</td>
<td>56.2</td>
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<tr>
<td>508.namd_r</td>
<td>20</td>
<td>363</td>
<td>52.3</td>
<td>363</td>
<td>52.3</td>
<td>363</td>
<td>52.3</td>
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<tr>
<td>510.parest_r</td>
<td>20</td>
<td>1404</td>
<td>37.3</td>
<td>1404</td>
<td>37.3</td>
<td>1398</td>
<td>37.4</td>
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<tr>
<td>511.povray_r</td>
<td>20</td>
<td>561</td>
<td>83.2</td>
<td>564</td>
<td>83.3</td>
<td>560</td>
<td>83.4</td>
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<tr>
<td>519.lbm_r</td>
<td>20</td>
<td>610</td>
<td>34.6</td>
<td>610</td>
<td>34.5</td>
<td>605</td>
<td>34.9</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>20</td>
<td>662</td>
<td>67.6</td>
<td>666</td>
<td>67.3</td>
<td>670</td>
<td>66.9</td>
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<tr>
<td>526.blender_r</td>
<td>20</td>
<td>430</td>
<td>70.8</td>
<td>431</td>
<td>70.7</td>
<td>431</td>
<td>70.7</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>20</td>
<td>471</td>
<td>74.2</td>
<td>473</td>
<td>73.9</td>
<td>473</td>
<td>74.0</td>
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<tr>
<td>538.imagick_r</td>
<td>20</td>
<td>448</td>
<td>111</td>
<td>442</td>
<td>113</td>
<td>433</td>
<td>112</td>
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<tr>
<td>544.nab_r</td>
<td>20</td>
<td>351</td>
<td>96.0</td>
<td>347</td>
<td>96.9</td>
<td>348</td>
<td>96.7</td>
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<tr>
<td>549.fotonik3d_r</td>
<td>20</td>
<td>1752</td>
<td>44.5</td>
<td>1751</td>
<td>44.5</td>
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<td>44.7</td>
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<tr>
<td>554.roms_r</td>
<td>20</td>
<td>1110</td>
<td>28.6</td>
<td>1108</td>
<td>28.7</td>
<td>1104</td>
<td>28.8</td>
</tr>
</tbody>
</table>

**Results**

- **SPECrate2017_fp_base** = 62.8
- **SPECrate2017_fp_peak** = 64.5

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### 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"

CPU frequency governor set with:

cpupower -c all frequency-set -g performance

### 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/jes.5.0.1-32/:/home/cpu2017/jes.5.0.1-64"
```

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
```

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
Supermicro
SuperWorkstation 5039A-i (X11SRA , Intel Xeon W-2155)

SPECrate2017_fp_base = 62.8
SPECrate2017_fp_peak = 64.5

General Notes (Continued)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (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.

Platform Notes
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-k7zv Thu Sep  6 01:38:05 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) W-2155 CPU @ 3.30GHz
  1 "physical id"s (chips)
  20 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 20
On-line CPU(s) list: 0-19
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) W-2155 CPU @ 3.30GHz
Stepping: 4
CPU MHz: 1200.000
CPU max MHz: 3301.0000
CPU min MHz: 1200.0000
BogoMIPS: 6623.83
Virtualization: VT-x
Supermicro
SuperWorkstation 5039A-i (X11SRA, Intel Xeon W-2155)

SPECrate2017_fp_base = 62.8
SPECrate2017_fp_peak = 64.5

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

Test Date: Sep-2018
Hardware Availability: Jul-2017
Software Availability: Feb-2018

Platform Notes (Continued)

L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-19
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
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid 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_ctxsw spec_ctrl retpoline kaiser tpr_shadow vnmi flexpriority
epi vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavec xgetbv1 cqm_l1c cqm_occup_l1c

/proc/cpuinfo cache data
    cache size : 14080 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 14 15 16 17 18 19
    node 0 size: 64118 MB
    node 0 free: 49336 MB
    node distances:
    node   0
          0: 10

From /proc/meminfo
    MemTotal:       65657740 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"

(Continued on next page)
Platform Notes (Continued)

ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
Linux linux-k7zv 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

run-level 3 Sep 5 17:10

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 145G 25G 120G 18% /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. 1.2 08/23/2018
Memory:
4x Micron 18ADF2G72AZ-2G6H1R 16 GB 2 rank 2666
4x NO DIMM NO DIMM

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
CC  519.lbm_r(peak) 544.nab_r(peak)
==============================================================================
icc (ICC) 18.0.0 20170811
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==============================================================================

==============================================================================
CXXC 508.namd_r(base) 510.parest_r(base)
==============================================================================
icpc (ICC) 18.0.0 20170811
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(Continued on next page)
**Supermicro**

SuperWorkstation 5039A-i (X11SRA, Intel Xeon W-2155)

<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>
</tbody>
</table>

**Compiler Version Notes (Continued)**

```plaintext
CXXC 508.namd_r(peak) 510.parest_r(peak)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```plaintext
CC 511.povray_r(base) 526.blender_r(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.
```

```plaintext
FC 507.cactuBSSN_r(base, 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.
```

```plaintext
FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```plaintext
FC 554.roms_r(peak)
```

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

Supermicro
SuperWorkstation 5039A-i (X11SRA, Intel Xeon W-2155)

| SPECrate2017_fp_base | 62.8 |
| SPECrate2017_fp_peak  | 64.5 |

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

Test Date: Sep-2018
Hardware Availability: Jul-2017
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Compiler Version Notes (Continued)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

----------------------------------------------------------------------
CC 521.wrf_r(base, peak) 527.cam4_r(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.

----------------------------------------------------------------------
CC 527.cam4_r(peak)
----------------------------------------------------------------------
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.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort
**SPEC CPU2017 Floating Point Rate Result**

Supermicro
SuperWorkstation 5039A-i (X11SRA, Intel Xeon W-2155)

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<tbody>
<tr>
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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.ibm_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:**
- -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
- qopt-mem-layout-trans=3

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

**Fortran benchmarks:**
- -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
- qopt-mem-layout-trans=3 -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 -nostandard-realloc-lhs -align array32byte

**Benchmarks using both C and C++:**
- -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
- qopt-mem-layout-trans=3 -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 -nostandard-realloc-lhs -align array32byte
### SPEC CPU2017 Floating Point Rate Result

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<tr>
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<th>SPECrate2017_fp_base = 62.8</th>
</tr>
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<tbody>
<tr>
<td>SuperWorkstation 5039A-i (X11SRA, Intel Xeon W-2155)</td>
<td>SPECrate2017_fp_peak = 64.5</td>
</tr>
</tbody>
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<td>Test Date</td>
<td>Sep-2018</td>
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<tr>
<td>Hardware Avail.</td>
<td>Jul-2017</td>
</tr>
<tr>
<td>Software Avail.</td>
<td>Feb-2018</td>
</tr>
</tbody>
</table>

#### Base Other Flags

- C benchmarks:
  - `-m64 -std=c11`
- C++ benchmarks:
  - `-m64`
- Fortran benchmarks:
  - `-m64`
- Benchmarks using both Fortran and C:
  - `-m64 -std=c11`
- Benchmarks using both C and C++:
  - `-m64 -std=c11`
- Benchmarks using Fortran, C, and C++:
  - `-m64 -std=c11`

#### Peak Compiler Invocation

- C benchmarks:
  - `icc`
- C++ benchmarks:
  - `icpc`
- Fortran benchmarks:
  - `ifort`
- Benchmarks using both Fortran and C:
  - `ifort icc`
- Benchmarks using both C and C++:
  - `icpc icc`
- Benchmarks using Fortran, C, and C++:
  - `icpc icc ifort`

#### Peak Portability Flags

Same as Base Portability Flags
Supermicro
SuperWorkstation 5039A-i (X11SRA, Intel Xeon W-2155)

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CPU2017 License: 001176
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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 519.lbm_r

C++ benchmarks:

- 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

Fortran benchmarks:

503.bwaves_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3
-nostandard-realloc-lhs -align array32byte

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_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 -nostandard-realloc-lhs
-align array32byte

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 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-align array32byte

Benchmarks using both C and C++:

- 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

Benchmarks using Fortran, C, and C++:

(Continued on next page)
Supermicro
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### Peak Optimization Flags (Continued)

507.cactuBSSN_r: basepeak = yes

### Peak Other Flags

C benchmarks:
- `m64 -std=c11`

C++ benchmarks:
- `m64`

Fortran benchmarks:
- `m64`

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

Benchmarks using both C 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](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/Intel-ic18.0-official-linux64.xml)

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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 v1.0.2 on 2018-09-05 13:38:04-0400.
Report generated on 2018-10-31 19:07:00 by CPU2017 PDF formatter v6067.
Originally published on 2018-10-16.