## Supermicro SuperStorage 5049P-E1CR45H (X11SPL-F, Intel Xeon Platinum 8176)

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

### SPECspeed2017_fp_base = 73.7  
**SPECspeed2017_fp_peak = 73.8**

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tr>
<td>603.bwaves_s</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<tr>
<td>619.lbm_s</td>
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<td>621.wrf_s</td>
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</tr>
<tr>
<td>627.cam4_s</td>
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</tr>
<tr>
<td>628.pop2_s</td>
<td>28</td>
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</tr>
<tr>
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<td>28</td>
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<tr>
<td>644.nab_s</td>
<td>28</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>28</td>
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</tr>
<tr>
<td>654.roms_s</td>
<td>28</td>
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</tr>
</tbody>
</table>

### Hardware
- **CPU Name:** Intel Xeon Platinum 8176  
- **Max MHz.:** 3800  
- **Nominal:** 2100  
- **Enabled:** 28 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:** 38.5 MB I+D on chip per chip  
- **Memory:** 192 GB (6 x 32 GB 2Rx4 PC4-2666V-R)  
- **Storage:** 1 x 2 TB SATA III, 7200 RPM  
- **Other:** None

### Software
- **OS:** SUSE Linux Enterprise Server 12 SP3  
- **Compiler:** C/C++: Version 18.0.2.199 of Intel C/C++  
- **Compiler for Linux:** Fortran: Version 18.0.2.199 of Intel Fortran  
- **Parallel:** Yes  
- **Firmware:** Supermicro BIOS version 2.0b released Feb-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
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>54.9</td>
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<td>220</td>
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<tr>
<td>644.nab_s</td>
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<tr>
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<td>62.6</td>
<td>253</td>
<td>62.2</td>
<td>252</td>
<td>62.5</td>
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</tbody>
</table>

SPECspeed2017_fp_base = 73.7
SPECspeed2017_fp_peak = 73.8

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/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/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

jemalloc: jemalloc, a general purpose malloc implementation;
jemalloc: built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5;

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 Platinum 8176)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_peak</th>
<th>SPECspeed2017_fp_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>73.8</td>
<td>73.7</td>
</tr>
</tbody>
</table>

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

**Platform Notes**

BIOS Settings:
- Hyper-Threading = Disable
- LLC prefetch = Enable
- Power Technology = Custom
- Power Performance Tuning = BIOS Controls EPB
- ENERGY_PERF_BIAS_CFG mode = Maximum Performance
- Hardware P-state = Out of Band Mode
- XPT Prefetch = Enable
- Stale AtoS = Enable
- LLC dead line alloc = Disable
- SDDC Plus One = Disable
- ADDDC Sparing = Disable
- Patrol Scrub = Disable
- Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-9m9c Wed Jul 4 08:29:15 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) Platinum 8176 CPU @ 2.10GHz
  - 1 "physical id"s (chips)
  - 28 "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: 28
  - siblings: 28
  - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 28
- On-line CPU(s) list: 0-27
- Thread(s) per core: 1
- Core(s) per socket: 28
- Socket(s): 1
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Platinum 8176 CPU @ 2.10GHz
- Stepping: 4

(Continued on next page)
### SPEC CPU2017 Floating Point Speed Result

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<tr>
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<td>73.8</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

- **CPU MHz:** 2099.986
- **BogoMIPS:** 4199.97
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 39424K
- **NUMA node0 CPU(s):** 0-3,7-9,14-17,21-23
- **NUMA node1 CPU(s):** 4-6,10-13,18-20,24-27
- **Flags:** fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acpi sep mtrr pge mca cmov lm constant_tsc art arch_perfmon pebs bts rep_good ntop nonstop_tsc aperfmperf 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 invlpg ibrs ibrms 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 invlpg ibrs ibrms 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 invlpg ibrs ibrms ds_cpl vmx smx est tm2 ssse3 sdbg
- /proc/cpuinfo cache data
  - cache size : 39424 KB

From numactl --hardware
  - WARNING: a numactl 'node' might or might not correspond to a physical chip.
  - available: 2 nodes (0-1)
  - node 0 cpus: 0 1 2 3 7 8 9 14 15 16 17 21 22 23
  - node 0 size: 95257 MB
  - node 0 free: 91487 MB
  - node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27
  - node 1 size: 96627 MB
  - node 1 free: 92933 MB
  - node distances:
    - node 0 1
      - 0: 10 11
      - 1: 11 10

From /proc/meminfo
  - MemTotal: 196489616 kB
  - HugePages_Total: 0
  - Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
  - SUSE Linux Enterprise Server 12 SP3

From /etc/*release* /etc/*version*
  - SuSE-release:

(Continued on next page)
Supermicro
SuperStorage 5049P-E1CR45H (X11SPL-F, Intel Xeon Platinum 8176)

SPEC CPU2017 Floating Point Speed Result

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

Platform Notes (Continued)

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-9m9c 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 Jul 4 03:14

SPEC is set to: /home/cpu2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda4</td>
<td>xfs</td>
<td>1.8T</td>
<td>53G</td>
<td>1.8T</td>
<td>3%</td>
<td>/home</td>
</tr>
</tbody>
</table>

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. 2.0b 02/26/2018
Memory:
2x NO DIMM NO DIMM
6x Samsung M393A4K40CB2-CTD 32 GB 2 rank 2666

(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)

(Continued on next page)
Supermicro
SuperStorage 5049P-E1CR45H (X11SPL-F, Intel Xeon Platinum 8176)

SPECspeed2017_fp_base = 73.7
SPECspeed2017_fp_peak = 73.8

Compiler Version Notes (Continued)

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

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.

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## SPEC CPU2017 Floating Point Speed Result

### Supermicro

**SuperStorage 5049P-E1CR45H (X11SPL-F, Intel Xeon Platinum 8176)**

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<td>Supermicro</td>
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<td>Tested by:</td>
<td>Supermicro</td>
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<td>Software Availability:</td>
<td>Mar-2018</td>
</tr>
</tbody>
</table>

### 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
```

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:
```
-W1,-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:
```
-W1,-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:
```
-W1,-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
```

(Continued on next page)
Base Optimization Flags (Continued)

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 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

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-AVX512 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3

(Continued on next page)
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SPEC CPU2017 Floating Point Speed Result
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CPU2017 License: 001176
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| Test Date: | Jul-2018 |
| Hardware Availability: | Jul-2017 |
| Software Availability: | Mar-2018 |

Peak Optimization Flags (Continued)

603.bwaves_s (continued):
-qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

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

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:
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-revD.xml

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Tested with SPEC CPU2017 v1.0.2 on 2018-07-04 08:29:15-0400.
Report generated on 2018-10-31 18:45:49 by CPU2017 PDF formatter v6067.