# SPEC® CPU2017 Integer Speed Result

## Supermicro
SuperStorage 5049P-E1CR45H (X11SPL-F, Intel Xeon Silver 4109T)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.66</td>
<td>6.85</td>
</tr>
</tbody>
</table>

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

### Threads

<table>
<thead>
<tr>
<th>Test Program</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>8</td>
<td>4.89</td>
<td>5.73</td>
</tr>
<tr>
<td>gcc_s</td>
<td>8</td>
<td>7.34</td>
<td>9.41</td>
</tr>
<tr>
<td>mcf_s</td>
<td>8</td>
<td>7.53</td>
<td>9.43</td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>8</td>
<td>4.53</td>
<td></td>
</tr>
<tr>
<td>xalanchmk_s</td>
<td>8</td>
<td>7.61</td>
<td>9.18</td>
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<tr>
<td>x264_s</td>
<td>8</td>
<td>8.01</td>
<td></td>
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<tr>
<td>deepsjeng_s</td>
<td>8</td>
<td>9.18</td>
<td></td>
</tr>
<tr>
<td>leela_s</td>
<td>8</td>
<td>10.6</td>
<td>10.8</td>
</tr>
<tr>
<td>xz_s</td>
<td>8</td>
<td>10.0</td>
<td>10.3</td>
</tr>
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</table>

### Hardware

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong></td>
<td>Intel Xeon Silver 4109T</td>
</tr>
<tr>
<td>Max MHz.:</td>
<td>3000</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2000</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>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>11 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>192 GB (6 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 200 GB SATA III SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
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</table>

### Software

<table>
<thead>
<tr>
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<th>Specification/Details</th>
</tr>
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<tbody>
<tr>
<td><strong>OS:</strong></td>
<td>SUSE Linux Enterprise Server 12 SP3 (x86_64)</td>
</tr>
<tr>
<td><strong>Kernel:</strong></td>
<td>4.4.114-94.11-default</td>
</tr>
<tr>
<td><strong>Compiler:</strong></td>
<td>C++: Version 18.0.2.199 of Intel C++</td>
</tr>
<tr>
<td><strong>Compiler for Linux:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Fortran:</strong></td>
<td>Version 18.0.2.199 of Intel Fortran</td>
</tr>
<tr>
<td><strong>File System:</strong></td>
<td>xfs</td>
</tr>
<tr>
<td><strong>System State:</strong></td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td><strong>Base Pointers:</strong></td>
<td>64-bit</td>
</tr>
<tr>
<td><strong>Peak Pointers:</strong></td>
<td>32/64-bit</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>jemalloc memory allocator library V5.0.1</td>
</tr>
</tbody>
</table>
SPEC CPU2017 Integer Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

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SPECspeed2017_int_peak = 6.85

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Tested by: Supermicro
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Hardware Availability: Jul-2017
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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>Base</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Seconds</th>
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<th>Base</th>
<th>Seconds</th>
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<tbody>
<tr>
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<td>4.89</td>
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<td>620.omnetpp_s</td>
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<td>359</td>
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<td>648.exchange2_s</td>
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<tr>
<td>657.xz_s</td>
<td>8</td>
<td>614</td>
<td>10.1</td>
<td>617</td>
<td>10.0</td>
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<td>598</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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,scatter"
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

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.
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SPECspeed2017_int_base = 6.66
SPECspeed2017_int_peak = 6.85

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Platform Notes

BIOS Settings:
Hyper-Threading [ALL] = Disable
LLC dead line alloc = Disable
Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-52ma Thu Sep 27 15:26:33 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) Silver 4109T CPU @ 2.00GHz
  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 lscpu:
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: 85
Model name: Intel(R) Xeon(R) Silver 4109T CPU @ 2.00GHz
Stepping: 4
CPU MHz: 900.000
CPU max MHz: 2001.0000
CPU min MHz: 800.0000
BogoMIPS: 4000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7

(Continued on next page)
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<td>Supermicro</td>
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<td>Tested by:</td>
<td>Supermicro</td>
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<td>Hardware Availability:</td>
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</tr>
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</tbody>
</table>

### Platform Notes (Continued)

Flags: fpu vme de pse sse mcr 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 rdtsdp rdldtl 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 xtrm 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_ctxs w spec_ctrl retoline kaiser tpr_shadow vsni flexpriority ept vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc pku ospke

```
/platform/cpuinfo cache data
  cache size: 11264 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
node 0 size: 192079 MB
node 0 free: 191409 MB
node distances:
  node 0
    0: 10
```

From `/proc/meminfo`

```
MemTotal:       196688920 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-52ma 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
```

(Continued on next page)
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Platform Notes (Continued)

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 Sep 27 15:24

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 145G 46G 99G 32% /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. 2.1 06/15/2018
Memory:
2x NO DIMM NO DIMM
6x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
 CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base, peak) 657.xz_s(base)
==============================================================================

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

==============================================================================
 CC  600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)
==============================================================================

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

==============================================================================
 CXXC 620.omnetpp_s(base) 623.xalanckmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)
==============================================================================

(Continued on next page)
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**Compiler Version Notes (Continued)**

icpc (ICC) 18.0.2 20180210  
Copyright (C) 1985–2018 Intel Corporation. All rights reserved.

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CXXC 620.omnetpp_s(peak) 623.xalancbmk_s(peak) 631.deepsjeng_s(peak) 641.leela_s(peak)

---

icpc (ICC) 18.0.2 20180210  
Copyright (C) 1985–2018 Intel Corporation. All rights reserved.

---

FC 648.exchange2_s(base, peak)

---

ifort (IFORT) 18.0.2 20180210  
Copyright (C) 1985–2018 Intel Corporation. All rights reserved.

---

### Base Compiler Invocation

**C benchmarks:**

```sh
icc -m64 -std=c11
```

**C++ benchmarks:**

```sh
icpc -m64
```

**Fortran benchmarks:**

```sh
ifort -m64
```

### Base Portability Flags

```sh
600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64  
602.gcc_s: -DSPEC_LP64  
605.mcf_s: -DSPEC_LP64  
620.omnetpp_s: -DSPEC_LP64  
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX  
625.x264_s: -DSPEC_LP64  
631.deepsjeng_s: -DSPEC_LP64  
641.leela_s: -DSPEC_LP64  
648.exchange2_s: -DSPEC_LP64  
657.xz_s: -DSPEC_LP64
```
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Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks (except as noted below):
icpc -m64

623.xalancbmk_s: icpc -m32 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

Peak Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64
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<td>Test Sponsor:</td>
<td>Supermicro</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Supermicro</td>
</tr>
</tbody>
</table>

**SPECspeed2017_int_base = 6.66**

**SPECspeed2017_int_peak = 6.85**

---

**Peak Optimization Flags**

C benchmarks:

- 600.perlbench_s: -Wl, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-prefetch -ipo -O3
-qopt-mem-layout-trans=3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib
-ljemalloc

- 602.gcc_s: -Wl, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-prefetch -ipo -O3
-qopt-mem-layout-trans=3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

- 605.mcf_s: -Wl, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

- 625.x264_s: basepeak = yes

- 657.xz_s: Same as 602.gcc_s

C++ benchmarks:

- 620.omnetpp_s: basepeak = yes

- 623.xalancbmk_s: -Wl, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-32/lib -ljemalloc

- 631.deepsjeng_s: basepeak = yes

- 641.leela_s: basepeak = yes

Fortran benchmarks:

- -Wl, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-L/usr/local/je5.0.1-64/lib -ljemalloc

The flags files that were used to format this result can be browsed at


**SPEC CPU2017 Integer Speed Result**

Supermicro

SuperStorage 5049P-E1CR45H (X11SPL-F, Intel Xeon Silver 4109T)

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

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 2018-09-27 03:26:32-0400.  
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