## SPEC® CPU2017 Integer Rate Result

### Supermicro
SuperWorkstation 5039C-T (X11SCA, Intel Core i5-9600K)

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<tr>
<th>SPECrate2017_int_base</th>
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**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Tested by:** Supermicro  
**Hardware Availability:** Oct-2018  
**Software Availability:** Mar-2018  
**Test Date:** Jan-2019

### 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:  
- **Parallel:** No  
- **Firmware:** Version 1.0a released Sep-2018  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 32/64-bit  
- **Other:** jemalloc memory allocator library V5.0.1

### Hardware
- **CPU Name:** Intel Core i5-9600K  
- **Max MHz.:** 4600  
- **Nominal:** 3700  
- **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:** 9 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)  
- **Storage:** 1 x 200 GB SATA III SSD  
- **Other:** None

### Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
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<tbody>
<tr>
<td>perlbench_r</td>
<td>6</td>
<td>33.1</td>
<td>38.8</td>
</tr>
<tr>
<td>gcc_r</td>
<td>6</td>
<td>31.8</td>
<td>40.0</td>
</tr>
<tr>
<td>mcf_r</td>
<td>6</td>
<td>17.7</td>
<td>39.0</td>
</tr>
<tr>
<td>omnetpp_r</td>
<td>6</td>
<td>33.1</td>
<td>41.5</td>
</tr>
<tr>
<td>xalancbmk_r</td>
<td>6</td>
<td>34.9</td>
<td>83.6</td>
</tr>
<tr>
<td>x264_r</td>
<td>6</td>
<td>28.9</td>
<td>88.6</td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td>6</td>
<td>29.0</td>
<td>82.5</td>
</tr>
<tr>
<td>leela_r</td>
<td>6</td>
<td>20.7</td>
<td></td>
</tr>
<tr>
<td>exchange2_r</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xz_r</td>
<td>6</td>
<td></td>
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**SPECrate2017_int_base (35.8)**  
**SPECrate2017_int_peak (38.3)**
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SPECr2017_int_base = 35.8
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CPU2017 License: 001176
Test Sponsor: Supermicro
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#### Results Table

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<tr>
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<tbody>
<tr>
<td>500.perlbench_r</td>
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<td>33.0</td>
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<td>502.gcc_r</td>
<td>6</td>
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<td>268</td>
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<td>505.mcfr</td>
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<td>246</td>
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<td>249</td>
<td>39.0</td>
<td>258</td>
<td>37.6</td>
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<tr>
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<tr>
<td>523.xalanbmk_r</td>
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<td>525.x264_r</td>
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<td>531.deepsjeng_r</td>
<td>6</td>
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<td>34.8</td>
<td>197</td>
<td>34.9</td>
<td>197</td>
<td>34.9</td>
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<td>541.leela_r</td>
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<td>548.exchange2_r</td>
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<td>82.5</td>
<td>190</td>
<td>82.6</td>
<td>194</td>
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<td>557.xz_r</td>
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<td>20.7</td>
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<td>20.7</td>
<td>318</td>
<td>20.4</td>
</tr>
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SPECr2017_int_base = 35.8
SPECr2017_int_peak = 38.3

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

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#### 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) 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.

(Continued on next page)
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Tested by: Supermicro

General Notes (Continued)
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-65nv Tue Jan  8 11:50:48 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) Core(TM) i5-9600K CPU @ 3.70GHz
  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) Core(TM) i5-9600K CPU @ 3.70GHz
Stepping:          12
CPU MHz:           4517.885
CPU max MHz:       4600.0000
CPU min MHz:       800.0000
BogoMIPS:          7391.98
Virtualization:    VT-x
L1d cache:         32K
L1i cache:         32K

(Continued on next page)
**SPEC CPU2017 Integer Rate Result**

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**SPECrate2017_int_base = 35.8**

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**Platform Notes (Continued)**

L2 cache: 256K
L3 cache: 9216K
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 movzx popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtherm hwp_notify hwp_act_window hwp_epp intel_pt rsb_ctxsav 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: 9216 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: 64284 MB
node 0 free: 63788 MB
node distances:
node 0
0: 10
```

From /proc/meminfo

```
MemTotal: 65827372 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)
Platform Notes (Continued)

uname -a:
    Linux linux-65nv 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309f9b)
    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 Jan 8 11:35

SPEC is set to: /home/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3 xfs 145G 4.1G 141G 3% /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  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)
      557.xz_r(base)
==============================================================================

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

==============================================================================
 CC  500.perlbench_r(peak) 502.gcc_r(peak) 505.mcf_r(peak) 525.x264_r(peak)
      557.xz_r(peak)
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icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
 CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)

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#### Compiler Version Notes (Continued)

541.leela_r(base)

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

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

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FC  548.exchange2_r(base)

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

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FC  548.exchange2_r(peak)

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

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### Base Compiler Invocation

**C benchmarks:**
icc -m64 -std=c11

**C++ benchmarks:**
icpc -m64

**Fortran benchmarks:**
ifort -m64

---

### Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64

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## Base Portability Flags (Continued)

- `505.mcf_r`: `-DSPEC_LP64`
- `520.omnetpp_r`: `-DSPEC_LP64`
- `523.xalancbmk_r`: `-DSPEC_LP64 -DSPEC_LINUX`
- `525.x264_r`: `-DSPEC_LP64`
- `531.deepsjeng_r`: `-DSPEC_LP64`
- `541.leela_r`: `-DSPEC_LP64`
- `548.exchange2_r`: `-DSPEC_LP64`
- `557.xz_r`: `-DSPEC_LP64`

## Base Optimization Flags

### C benchmarks:
- `-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc`

### C++ benchmarks:
- `-Wl,-z,muldefs -xCORE-AVX2 -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-AVX2 -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 (except as noted below):
- `icc -m64 -std=c11`
- `502.gcc_r: icc -m32 -std=c11 -L/home/prasad/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin`

### C++ benchmarks (except as noted below):
- `icpc -m64`
- `523.xalancbmk_r: icpc -m32 -L/home/prasad/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin`

### Fortran benchmarks:
- `ifort -m64`
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Peak Portability Flags

500.perlbench_r: -DSPEC_LP64  -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -D_FILE_OFFSET_BITS=64  -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

500.perlbench_r: -Wl,-z,muldefs  -prof-gen(pass 1)  -prof-use(pass 2)  -ipo
-xCORE-AVX2 -O3  -no-prec-div  -qopt-mem-layout-trans=3
-fno-strict-overflow  -L/usr/local/je5.0.1-64/lib
-ljemalloc

502.gcc_r: -Wl,-z,muldefs  -prof-gen(pass 1)  -prof-use(pass 2)  -ipo
-xCORE-AVX2 -O3  -no-prec-div  -qopt-mem-layout-trans=3
-ipo

505.mcf_r: basepeak = yes

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: -Wl,-z,muldefs  -prof-gen(pass 1)  -prof-use(pass 2)  -ipo
-xCORE-AVX2 -O3  -no-prec-div  -qopt-mem-layout-trans=3
-ipo

525.x264_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: -Wl,-z,muldefs  -prof-gen(pass 1)  -prof-use(pass 2)  -ipo
-xCORE-AVX2 -O3  -no-prec-div  -qopt-mem-layout-trans=3

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#### Peak Optimization Flags (Continued)

541.leela_r (continued):
- `-L/usr/local/je5.0.1-64/lib -ljemalloc`

Fortran benchmarks:

548.exchange2_r: 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:

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

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