Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Silver 4112)

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

**Test Sponsor:** Supermicro
**Hardware Availability:** Jul-2017

**Test Date:** Oct-2018
**Software Availability:** Mar-2018

---

**Hardware**

<table>
<thead>
<tr>
<th>CPU Name</th>
<th>Intel Xeon Silver 4112</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz.</td>
<td>3000</td>
</tr>
<tr>
<td>Nominal</td>
<td>2600</td>
</tr>
<tr>
<td>Enabled</td>
<td>8 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</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>8.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>384 GB (12 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>
</tr>
</tbody>
</table>

---

**Software**

<table>
<thead>
<tr>
<th>OS</th>
<th>SUSE Linux Enterprise Server 12 SP3 (x86_64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler</td>
<td>C/C++: Version 18.0.2.199 of Intel C/C++</td>
</tr>
<tr>
<td>Compiler for Linux:</td>
<td>Fortran: Version 18.0.2.199 of Intel Fortran</td>
</tr>
<tr>
<td>Firmware</td>
<td>Supermicro BIOS version 2.1a 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>32/64-bit</td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc memory allocator library V5.0.1</td>
</tr>
</tbody>
</table>

---

**SPECrate2017_int_base = 43.5**

**SPECrate2017_int_peak = 46.2**
**Supermicro**

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---

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---

### 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>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>16</td>
<td><strong>785</strong></td>
<td><strong>32.5</strong></td>
<td>778</td>
<td><strong>32.3</strong></td>
<td>776</td>
<td><strong>32.8</strong></td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>16</td>
<td><strong>602</strong></td>
<td><strong>37.6</strong></td>
<td>602</td>
<td><strong>37.6</strong></td>
<td>601</td>
<td><strong>37.7</strong></td>
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<tr>
<td>505.mcf_r</td>
<td>16</td>
<td><strong>468</strong></td>
<td><strong>55.2</strong></td>
<td>475</td>
<td><strong>54.5</strong></td>
<td>466</td>
<td><strong>55.5</strong></td>
</tr>
<tr>
<td>520.omenpp_r</td>
<td>16</td>
<td>779</td>
<td>26.9</td>
<td><strong>777</strong></td>
<td><strong>27.0</strong></td>
<td>770</td>
<td><strong>27.3</strong></td>
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<tr>
<td>523.xalancbmk_r</td>
<td>16</td>
<td>367</td>
<td>46.0</td>
<td>366</td>
<td>46.1</td>
<td><strong>367</strong></td>
<td><strong>46.0</strong></td>
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<tr>
<td>525.x264_r</td>
<td>16</td>
<td>338</td>
<td>83.0</td>
<td><strong>334</strong></td>
<td><strong>83.9</strong></td>
<td>334</td>
<td><strong>83.9</strong></td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>16</td>
<td><strong>482</strong></td>
<td><strong>38.0</strong></td>
<td>482</td>
<td>38.0</td>
<td>483</td>
<td>38.0</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>16</td>
<td>757</td>
<td>35.0</td>
<td><strong>761</strong></td>
<td><strong>34.8</strong></td>
<td>762</td>
<td><strong>34.8</strong></td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>16</td>
<td>510</td>
<td>82.2</td>
<td><strong>510</strong></td>
<td><strong>82.2</strong></td>
<td>509</td>
<td><strong>82.3</strong></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>16</td>
<td><strong>552</strong></td>
<td><strong>31.3</strong></td>
<td>553</td>
<td>31.3</td>
<td>551</td>
<td>31.3</td>
</tr>
</tbody>
</table>

**SPECrate2017_int_base = 43.5**  
**SPECrate2017_int_peak = 46.2**

---

**Submit Notes**

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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/jes5.0.1-32:/home/cpu2017/jes5.0.1-64"
```

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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
```

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.

(Continued on next page)
SPEC CPU2017 Integer Rate Result

Supermicro
SuperServer 6029U-TR4 (X11DPU , Intel Xeon Silver 4112)

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Hardware Availability: Jul-2017
Software Availability: Mar-2018

General Notes (Continued)

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

BIOS Settings:
LLC prefetch = Enable
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Extreme 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: r5974 of 2018-05-19 9bcd8f2999c33d61f64985e45859ea9 running on linux-ima8 Mon Oct 8 15:21:04 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 4112 CPU @ 2.60GHz
  2 "physical id"s (chips)
  16 "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 : 4
siblings : 8
physical 0: cores 1 2 4 5
physical 1: cores 0 2 3 4

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 2

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Core(s) per socket:</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socket(s):</td>
<td>2</td>
</tr>
<tr>
<td>NUMA node(s):</td>
<td>2</td>
</tr>
<tr>
<td>Vendor ID:</td>
<td>GenuineIntel</td>
</tr>
<tr>
<td>CPU family:</td>
<td>6</td>
</tr>
<tr>
<td>Model:</td>
<td>85</td>
</tr>
<tr>
<td>Model name:</td>
<td>Intel(R) Xeon(R) Silver 4112 CPU @ 2.60GHz</td>
</tr>
<tr>
<td>Stepping:</td>
<td>4</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>2600.001</td>
</tr>
<tr>
<td>BogoMIPS:</td>
<td>5200.00</td>
</tr>
<tr>
<td>Virtualization:</td>
<td>VT-x</td>
</tr>
<tr>
<td>L1d cache:</td>
<td>32K</td>
</tr>
<tr>
<td>L1i cache:</td>
<td>32K</td>
</tr>
<tr>
<td>L2 cache:</td>
<td>1024K</td>
</tr>
<tr>
<td>L3 cache:</td>
<td>8448K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s):</td>
<td>0-3,8-11</td>
</tr>
<tr>
<td>NUMA nodel CPU(s):</td>
<td>4-7,12-15</td>
</tr>
<tr>
<td>Flags:</td>
<td>fpu vmx de pse tsc msr mcr mxa mxr msa msd msr xsa xsx xcx xdp xp efer mfer nfer cfef ts ef ip fp mep ccg ce cdc gpg tge sbsa xsm eperm gs rht</td>
</tr>
<tr>
<td>/proc/cpuinfo cache data</td>
<td></td>
</tr>
<tr>
<td>cache size:</td>
<td>8448 KB</td>
</tr>
</tbody>
</table>

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 8 9 10 11 |
| node 0 size:       | 193039 MB |
| node 0 free:       | 192664 MB |
| node 1 cpus:       | 4 5 6 7 12 13 14 15 |
| node 1 size:       | 193517 MB |
| node 1 free:       | 193195 MB |
| node distances:    | |
| node 0 1           | |
|                       | 0: 10 21 |
|                       | 1: 21 10 |

From /proc/meminfo
MemTotal: 395835116 kB
Platform Notes (Continued)

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-ima8 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 Oct 8 15:16

SPEC is set to: /home/cpu2017
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda4      xfs  145G  42G  103G  30% /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. 2.1a 08/23/2018
  Memory:
    12x NO DIMM NO DIMM
    12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Silver 4112)

SPEC CPU2017 Integer Rate Result
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Test Date: Oct-2018
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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)
------------------------------------------------------------------------------
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)
     541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)
     541.leela_r(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

FC  548.exchange2_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

FC  548.exchange2_r(peak)
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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
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:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-W1,-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:
-W1,-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
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Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m64 -std=c11

502.gcc_r: icc -m32 -std=c11 -L/home/prasadj/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/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

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-AVX512 -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-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -ljemalloc

505.mcf_r: basepeak = yes

(Continued on next page)
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---

### Peak Optimization Flags (Continued)

525.x264_r: basepeak = yes

557.xz_r: basepeak = yes

**C++ benchmarks:**

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

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

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

### 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:

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

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