## SPEC® CPU2017 Integer Rate Result

**Supermicro**

SuperServer 6029U-TR4 (X11DPU, Intel Xeon Silver 4114)

<table>
<thead>
<tr>
<th>SPECrate2017_int_peak</th>
<th>99.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_base</td>
<td>93.3</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4114
- **Max MHz.:** 3000
- **Nominal:** 2200
- **Enabled:** 20 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 13.75 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
- **Storage:** 1 x 200 GB SATA III SSD
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 12 SP3 (x86_64)
- **Kernel:** 4.4.114-94.11-default
- **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:** Supermicro BIOS version 2.1a released Aug-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

### Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_r</td>
<td>97.4</td>
<td>99.5</td>
</tr>
<tr>
<td>gcc_r</td>
<td>81.0</td>
<td>96.2</td>
</tr>
<tr>
<td>mcf_r</td>
<td>60.0</td>
<td>115</td>
</tr>
<tr>
<td>omnetpp_r</td>
<td>90.6</td>
<td>118</td>
</tr>
<tr>
<td>xalancbmk_r</td>
<td>185</td>
<td>180</td>
</tr>
<tr>
<td>x264_r</td>
<td>118</td>
<td>177</td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td>82.6</td>
<td></td>
</tr>
<tr>
<td>leela_r</td>
<td>75.2</td>
<td>76.3</td>
</tr>
<tr>
<td>exchange2_r</td>
<td>69.2</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base 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>40</td>
<td>892</td>
<td>71.4</td>
<td>895</td>
<td>71.1</td>
<td>890</td>
<td>71.6</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>40</td>
<td>727</td>
<td>77.9</td>
<td>697</td>
<td>81.3</td>
<td>699</td>
<td>81.0</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>40</td>
<td>555</td>
<td>116</td>
<td>560</td>
<td>115</td>
<td>570</td>
<td>114</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>40</td>
<td>909</td>
<td>57.8</td>
<td>875</td>
<td>60.0</td>
<td>871</td>
<td>60.3</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>40</td>
<td>492</td>
<td>85.9</td>
<td>466</td>
<td>90.6</td>
<td>451</td>
<td>93.7</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>40</td>
<td>386</td>
<td>181</td>
<td>389</td>
<td>180</td>
<td>388</td>
<td>180</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>40</td>
<td>556</td>
<td>82.5</td>
<td>555</td>
<td>82.6</td>
<td>555</td>
<td>82.7</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>40</td>
<td>888</td>
<td>74.6</td>
<td>880</td>
<td>75.2</td>
<td>863</td>
<td>76.7</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>40</td>
<td>593</td>
<td>177</td>
<td>593</td>
<td>177</td>
<td>592</td>
<td>177</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>40</td>
<td>628</td>
<td>68.8</td>
<td>623</td>
<td>69.4</td>
<td>624</td>
<td>69.2</td>
</tr>
</tbody>
</table>

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

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

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.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
General Notes (Continued)

is mitigated in the system as tested and documented.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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 Fri Oct 19 11:49:03 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 4114 CPU @ 2.20GHz
  2 "physical id"s (chips)
  40 "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
physical 1: 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):                40
On-line CPU(s) list:   0-39
Thread(s) per core:    2
Core(s) per socket:    10

(Continued on next page)
Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Silver 4114)

SPEC CPU2017 Integer Rate Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECrate2017_int_base = 93.3
SPECrate2017_int_peak = 99.5

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

Platform Notes (Continued)

Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz
Stepping: 4
CPU MHz: 2200.006
BogoMIPS: 4400.01
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39
Flags: fpu vme de pse tsc msr pae 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 aperf perf_counter 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 invpctid_single pln pts dtherm intel_pt rsb_ctxtsw spec_ctrl retpeal kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsave cqm_llc cqm_occup_llc pku ospke

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 4 5 6 7 8 9 20 21 22 23 24 25 26 27 28 29
node 0 size: 193035 MB
node 0 free: 192499 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 1 size: 193516 MB
node 1 free: 193065 MB

From /proc/meminfo
MemTotal: 395829448 kB
HugePages_Total: 0

(Continued on next page)
Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Silver 4114)

| SPECrate2017_int_base | 93.3 |
| SPECrate2017_int_peak | 99.5 |

**Platform Notes (Continued)**

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 19 11:40

SPEC is set to: /home/cpu2017

```
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4       xfs  145G  44G  101G  31% /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)
### 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)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```
Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Silver 4114)

SPECrate2017_int_base = 93.3
SPECrate2017_int_peak = 99.5

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

Test Date: Oct-2018
Hardware Availability: Jul-2017
Software Availability: Mar-2018

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
**SPEC CPU2017 Integer Rate Result**

**Supermicro**
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Silver 4114)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>93.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>99.5</td>
</tr>
</tbody>
</table>

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

---

**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)
Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Silver 4114)

SPECrate2017_int_base = 93.3
SPECrate2017_int_peak = 99.5

Peak Optimization Flags (Continued)

525.x264_r: basepeak = yes
557.xz_r: basepeak = yes

C++ benchmarks:
520.omnetpp_r: basepeak = yes
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: basepeak = yes
541.leela_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

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