## SPEC CPU®2017 Integer Speed Result

### Supermicro

SuperServer 6029U-TR4
(X11DPU, Intel Xeon Gold 6248R)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU2017 License:</strong></td>
<td>001176</td>
</tr>
<tr>
<td><strong>Test Sponsor:</strong></td>
<td>Supermicro</td>
</tr>
<tr>
<td><strong>Test Date:</strong></td>
<td>May-2020</td>
</tr>
<tr>
<td><strong>Hardware Availability:</strong></td>
<td>Feb-2020</td>
</tr>
<tr>
<td><strong>Software Availability:</strong></td>
<td>Nov-2019</td>
</tr>
</tbody>
</table>

### SPECspeed2017_int_base = 10.1

<table>
<thead>
<tr>
<th>SPECspeed2017_int_peak = 10.3</th>
</tr>
</thead>
</table>

### Test Details

**CPU Name:** Intel Xeon Gold 6248R  
**Max MHz:** 4000  
**Nominal:** 3000  
**Enabled:** 48 cores, 2 chips  
**Orderable:** 1.2 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**Cache L2:** 1 MB I+D on chip per core  
**Cache L3:** 35.75 MB I+D on chip per core  
**Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
**Storage:** 1 x 200 GB SATA III SSD  
**Other:** None

### Software

**OS:** Red Hat Enterprise Linux release 8.1  
**Kernel:** 4.18.0-147.el8.x86_64  
**Compiler:** C/C++: Version 19.0.5.281 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.5.281 of Intel Fortran Compiler for Linux  
**Parallel:** Yes  
**Firmware:** Version 3.3 released Feb-2020  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** BIOS set to prefer performance at the cost of additional power usage

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench</td>
<td>48</td>
<td>6.69</td>
<td>7.51</td>
</tr>
<tr>
<td>gcc</td>
<td>48</td>
<td>9.99</td>
<td>10.2</td>
</tr>
<tr>
<td>mcf</td>
<td>48</td>
<td>9.08</td>
<td>9.16</td>
</tr>
<tr>
<td>omnetpp</td>
<td>48</td>
<td>10.8</td>
<td>12.6</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>48</td>
<td>14.5</td>
<td></td>
</tr>
<tr>
<td>x264</td>
<td>48</td>
<td>5.47</td>
<td></td>
</tr>
<tr>
<td>deepsjeng</td>
<td>48</td>
<td>4.69</td>
<td></td>
</tr>
<tr>
<td>leela</td>
<td>48</td>
<td>15.6</td>
<td></td>
</tr>
<tr>
<td>exchange2</td>
<td>48</td>
<td>23.5</td>
<td></td>
</tr>
<tr>
<td>xz</td>
<td>48</td>
<td>23.7</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 6248R
- **Max MHz:** 4000
- **Nominal:** 3000
- **Enabled:** 48 cores, 2 chips
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 35.75 MB I+D on chip per core
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 1 x 200 GB SATA III SSD
- **Other:** None

### Conclusion

This system was tested using SPEC CPU®2017 Integer benchmarks, achieving a SPECspeed2017_int_base of 10.1 and SPECspeed2017_int_peak of 10.3.

---

*Standard Performance Evaluation Corporation (info@spec.org) https://www.spec.org/*
Supermicro
SuperServer 6029U-TR4
(X11DPU , Intel Xeon Gold 6248R)

SPECspeed®2017_int_base = 10.1
SPECspeed®2017_int_peak = 10.3

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>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
<td>267</td>
<td>6.65</td>
<td>265</td>
<td>6.70</td>
<td>265</td>
<td>6.69</td>
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<tr>
<td>602.gcc_s</td>
<td>48</td>
<td>399</td>
<td>9.99</td>
<td>394</td>
<td>10.1</td>
<td>399</td>
<td>9.99</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>48</td>
<td>376</td>
<td>12.6</td>
<td>373</td>
<td>12.7</td>
<td>379</td>
<td>12.5</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>48</td>
<td>178</td>
<td>9.16</td>
<td>181</td>
<td>9.01</td>
<td>180</td>
<td>9.08</td>
</tr>
<tr>
<td>623.xalanchmk_s</td>
<td>48</td>
<td>132</td>
<td>10.8</td>
<td>131</td>
<td>10.8</td>
<td>132</td>
<td>10.7</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>48</td>
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<td>14.5</td>
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<td>631.deepsjeng_s</td>
<td>48</td>
<td>262</td>
<td>5.47</td>
<td>262</td>
<td>5.47</td>
<td>262</td>
<td>5.46</td>
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<tr>
<td>641.leela_s</td>
<td>48</td>
<td>363</td>
<td>4.69</td>
<td>364</td>
<td>4.69</td>
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<td>4.69</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>48</td>
<td>189</td>
<td>15.6</td>
<td>187</td>
<td>15.7</td>
<td>189</td>
<td>15.6</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>48</td>
<td>262</td>
<td>23.6</td>
<td>263</td>
<td>23.5</td>
<td>263</td>
<td>23.5</td>
</tr>
</tbody>
</table>

SPECspeed®2017_int_base = 10.1
SPECspeed®2017_int_peak = 10.3

Operating System Notes
Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

General Notes
Binaries compiled on a system with 1x Intel Core i9-9900K CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0
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

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

(Continued on next page)
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CPU2017 License: 001176
Test Date: May-2020
Test Sponsor: Supermicro
Hardware Availability: Feb-2020
Tested by: Supermicro
Software Availability: Nov-2019

General Notes (Continued)


Platform Notes

BIOS Settings:
Hyper-Threading = Disable
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Performance
Stale AtoS = Disable
Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbble6e46a485a0011
running on RHEL81-01 Mon May  4 20:15:36 2020

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) Gold 6248R CPU @ 3.00GHz
   2  "physical id"s (chips)
   48 "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 : 24
   siblings : 24
   physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
   physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

From lscpu:
   Architecture: x86_64
   CPU op-mode(s): 32-bit, 64-bit
   Byte Order: Little Endian
   CPU(s): 48
   On-line CPU(s) list: 0-47
   Thread(s) per core: 1
   Core(s) per socket: 24
   Socket(s): 2
   NUMA node(s): 2
   Vendor ID: GenuineIntel
   CPU family: 6
   Model: 85
   Model name: Intel(R) Xeon(R) Gold 6248R CPU @ 3.00GHz
   Stepping: 7

(Continued on next page)
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**Platform Notes (Continued)**

```
CPU MHz: 3378.971
CPU max MHz: 4000.0000
CPU min MHz: 1200.0000
BogoMIPS: 6000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf 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 ablp Enums 3dnowprefetch cpuid_fault epb cat _13 cdp _13 invpcid_single intel_pppin ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vnmi flexpriority ept_vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ibrms invpd rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbb_local dtherm ida arat pln pts pkp ospke avx512_vnni md_clear flush_lld arch_capabilities
```

From /proc/cpuinfo cache data
```
cache size : 36608 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 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
node 0 size: 192116 MB
node 0 free: 191009 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 193505 MB
node 1 free: 193265 MB
node distances:
  node 0 1
  0: 10 21
  1: 21 10
```

From /proc/meminfo
```
MemTotal: 394876684 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

From /etc/*release*, /etc/*version*

(Continued on next page)
### Platform Notes (Continued)

```bash
os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.1 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.1"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.1 (Ootpa)"
    ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga

uname -a:
    Linux RHEL81-01 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019 x86_64
    x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
    via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user
    pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional,
    RSB filling

run-level 3 May 4 20:11
SPEC is set to: /home/cpu2017

From /sys/devices/virtual/dmi/id
    BIOS:    American Megatrends Inc. 3.3 02/21/2020
    Vendor:  Supermicro
    Product: Super Server
    Serial:  0123456789

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.
    Memory:
        12x NO DIMM NO DIMM
```

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Platform Notes (Continued)

12x SK Hynix HMA84GR7CJR4N-WM 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| C     | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak) |
------------------------------------------------------------------------------
| Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.5.281 Build 20190815 |
Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |
------------------------------------------------------------------------------

==============================================================================
| C++   | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak) |
------------------------------------------------------------------------------
| Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.5.281 Build 20190815 |
Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |
------------------------------------------------------------------------------

==============================================================================
| Fortran | 648.exchange2_s(base, peak) |
------------------------------------------------------------------------------
| Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.5.281 Build 20190815 |
Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |
------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort
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</table>

**Base 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: -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

**Base Optimization Flags**

C benchmarks:
- m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
- L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
- m64 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=4
- L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
- lqkmalloc

Fortran benchmarks:
- m64 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
- nostandard-realloc-lhs

**Peak Compiler Invocation**

C benchmarks:
- icc

C++ benchmarks:
- icpc

Fortran benchmarks:
- ifort
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SPECspeed®2017_int_base = 10.1
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CPU2017 License: 001176
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Test Date: May-2020
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Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlench_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
-prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib
-ljemalloc

602.gc_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
-prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -L/usr/local/je5.0.1-64/lib
-ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: basepeak = yes

657.xz_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
-prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:

620.omnetpp_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-ipo -xCORE-AVX512 -O3 -no-prec-div
-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
-lqkmalloc

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

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

Fortran benchmarks:

648.exchange2_s: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-CLX-revG.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-CLX-revG.xml

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

Tested with SPEC CPU®2017 v1.1.0 on 2020-05-04 08:15:35-0400.