## Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Gold 6226R)

**SPEC CPU®2017 Floating Point Rate Result**

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>204</th>
</tr>
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<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>212</td>
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**Cpu2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Tested by:** Supermicro  
**Test Date:** Apr-2020  
**Hardware Availability:** Feb-2020  
**Software Availability:** Nov-2019

<table>
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<th>Test Name</th>
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<tr>
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<td>507.caettBSSN_r</td>
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<tr>
<td>554.roms_r</td>
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</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6226R  
- **Max MHz:** 3900  
- **Nominal:** 2900  
- **Enabled:** 32 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:** 22 MB I+D on chip per chip  
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage:** 1 x 200 GB SATA III SSD  
- **OS:** Red Hat Enterprise Linux release 8.1  
- **Compiler:** C/C++: Version 19.0.5.281 of Intel  
- **Parallel:** No  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage.

**Software**

- **OS:** Red Hat Enterprise Linux release 8.1  
- **Compiler:** C/C++: Version 19.0.5.281 of Intel  
- **Parallel:** No  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
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SuperServer 6029U-TR4  
(X11DPU, Intel Xeon Gold 6226R)

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#### Results Table

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<tr>
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</table>

**SPECrate®2017_fp_base = 204**  
**SPECrate®2017_fp_peak = 212**

### 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"

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64"
```

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE 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

(Continued on next page)
General Notes (Continued)

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

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, thatCVE-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.

Platform Notes

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

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e646a485a0011
running on RHEL81-01 Wed Apr 8 09:44:21 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 6226R CPU @ 2.90GHz
  2 "physical id"s (chips)
  64 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lsclp:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16

(Continued on next page)
**SPEC CPU®2017 Floating Point Rate Result**

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

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**Platform Notes (Continued)**

| Socket(s): | 2 |
| NUMA node(s): | 4 |
| Vendor ID: | GenuineIntel |
| CPU family: | 6 |
| Model: | 85 |
| Model name: | Intel(R) Xeon(R) Gold 6226R CPU @ 2.90GHz |
| Stepping: | 7 |
| CPU MHz: | 3600.017 |
| CPU max MHz: | 3900.0000 |
| CPU min MHz: | 1200.0000 |
| BogoMIPS: | 5800.00 |
| Virtualization: | VT-x |
| L1d cache: | 32K |
| L1i cache: | 32K |
| L2 cache: | 1024K |
| L3 cache: | 22528K |
| NUMA node0 CPU(s): | 0-3,8-11,32-35,40-43 |
| NUMA node1 CPU(s): | 4-7,12-15,36-39,44-47 |
| NUMA node2 CPU(s): | 16-19,24-27,48-51,56-59 |
| NUMA node3 CPU(s): | 20-23,28-31,52-55,60-63 |
| Flags: | fpu vme de pse tsc msr pmr mcm cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pcpelgb rtsc cpuid lms constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmerpf pni pclmulqdq dtes64 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 abml 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmq mxpx rd_t_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsave xsavec xgetbv1 xsaves cmq_llc cmq_occup_llc cmq_mbm_total cmq_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d arch_capabilities |

/proc/cpuinfo cache data
  cache size : 22528 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0 1 2 3 8 9 10 11 32 33 34 35 40 41 42 43
  node 0 size: 95324 MB
  node 0 free: 94569 MB
  node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47
  node 1 size: 96764 MB
  node 1 free: 96132 MB
  node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
  node 2 size: 96764 MB
  node 2 free: 95498 MB

(Continued on next page)
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**Supermicro**  
SuperServer 6029U-TR4  
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</table>

### Platform Notes (Continued)

```plaintext
node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63  
node 3 size: 96764 MB  
node 3 free: 96182 MB  
node distances:  
  node 0 1 2 3  
  0: 10 11 21 21  
  1: 11 10 21 21  
  2: 21 21 10 11  
  3: 21 21 11 10  

From /proc/meminfo  
MemTotal: 394872872 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB  

From /etc/*release* /etc/*version*  
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 Apr 7 11:29
```

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

SPEC is set to: /home/cpu2017

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<th>Filesystem</th>
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<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
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<td>/dev/sda3</td>
<td>xfs</td>
<td>185G</td>
<td>8.2G</td>
<td>177G</td>
<td>5%</td>
<td>/</td>
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</table>

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 Micron Technology 36ASF4G72PZ-2G9E2 32 GB 2 rank 2933
- 12x NO DIMM NO DIMM

(End of data from sysinfo program)

### Compiler Version Notes

<table>
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<th>C</th>
<th>519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)</th>
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Test Date: Apr-2020
Hardware Availability: Feb-2020
Software Availability: Nov-2019

Compiler Version Notes (Continued)

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C++, C, Fortran | 507.cactuBSSN_r(base, peak)
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Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

(Continued on next page)
Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

503.bwaves_r: –DSPEC_LP64
507.cactuBSSN_r: –DSPEC_LP64
508.namd_r: –DSPEC_LP64
510.parest_r: –DSPEC_LP64
511.povray_r: –DSPEC_LP64
519.lbm_r: –DSPEC_LP64
521.wrf_r: –DSPEC_LP64 –DSPEC_CASE_FLAG –convert big_endian
526.blender_r: –DSPEC_LP64 –DSPEC_LINUX –funsigned-char
527.cam4_r: –DSPEC_LP64 –DSPEC_CASE_FLAG
538.imagick_r: –DSPEC_LP64
544.nab_r: –DSPEC_LP64
549.fotonik3d_r: –DSPEC_LP64
554.roms_r: –DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 –std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

C++ benchmarks:
-m64 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Fortran benchmarks:
-m64 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-noautomatic-reallocate

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

Benchmarks using both Fortran and C:
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs

Benchmarks using both C and C++:
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Peak Portability Flags

Same as Base Portability Flags
Peak Optimization Flags

C benchmarks:

519.lbm_r: -m64 -std=c11 -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

538.imagick_r: basepeak = yes

544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_r: -m64 -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

510.parest_r: -m64 -CORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Fortran benchmarks:

503.bwaves_r: -m64 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs

549.fotonik3d_r: basepeak = yes

554.roms_r: -m64 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs

Benchmarks using both Fortran and C:

-std=c11 -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:

511.povray_r: -m64 -std=c11 -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

526.blender_r: basepeak = yes
Supermicro
SuperServer 6029U-TR4
(X11DPU, Intel Xeon Gold 6226R)

SPECrate®2017_fp_base = 204
SPECrate®2017_fp_peak = 212

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Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: 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-revF.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-revF.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 2020-04-07 21:44:20-0400.