Supermicro
SuperServer 6029U-TRT
(X11DPU, Intel Xeon Gold 6238R)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 263</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak = Not Run</td>
</tr>
</tbody>
</table>

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

Test Date: Dec-2020
Hardware Availability: Feb-2020
Software Availability: Aug-2020

**Hardware**

- **CPU Name:** Intel Xeon Gold 6238R
- **Max MHz:** 4000
- **Nominal:** 2200
- **Enabled:** 56 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:** 38.5 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)
- **Storage:** 1 x 200 GB SATA III SSD
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux release 8.2
- **Kernel:** 4.18.0-193.el8.x86_64
- **Compiler:** C/C++: Version 19.1.2.275 of Intel C/C++ Compiler for Linux; Fortran: Version 19.1.2.275 of Intel Fortran Compiler for Linux
- **Parallel:** No
- **Firmware:** Version 3.3a released Jul-2020
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage.

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<table>
<thead>
<tr>
<th>Test</th>
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<th>SPECrate®2017_fp_base (263)</th>
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<tr>
<td>507.cactuBSSN_r</td>
<td>112</td>
<td></td>
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<tr>
<td>508.namd_r</td>
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**Results Table**

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<td>1822</td>
<td>97.7</td>
</tr>
</tbody>
</table>

SPECrate®2017_fp_base = 263
SPECrate®2017_fp_peak = Not Run

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"

**Environment Variables Notes**

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOCONF = "retain:true"

**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:

(Continued on next page)
Supermicro
SuperServer 6029U-TRT
(X11DPU , Intel Xeon Gold 6238R)

General Notes (Continued)

sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numacll i.e.:
umacll --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, 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

Platform Notes

BIOS Settings:
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Extreme Performance
SNC = Enable
Stale AtoS = Disable
IMC Interleaving = 1-way Interleave
Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbble6e46a485a0011
running on X11DPU-01 Wed Dec 9 18:24:15 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 6238R CPU @ 2.20GHz
  2 "physical id"s (chips)
  112 "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 : 28
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
SPEC CPU®2017 Floating Point Rate Result

Supermicro
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CPU2017 License: 001176
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Tested by: Supermicro

Platform Notes (Continued)

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 2
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6238R CPU @ 2.20GHz
Stepping: 7
CPU MHz: 3000.000
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0-3, 7-9, 14-17, 21-23, 56-59, 63-65, 70-73, 77-79
NUMA node1 CPU(s): 4-6, 10-13, 18-20, 24-27, 60-62, 66-69, 74-76, 80-101, 105-107
NUMA node2 CPU(s): 28-31, 35-37, 42-45, 49-51, 84-87, 91-93, 98-101, 102-104, 108-111
NUMA node3 CPU(s): 32-34, 38-41, 46-48, 52-55, 88-90, 94-97, 102-104, 108-111
Flags:
  fpu vme de pse tsc msr pae mce 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 cpuid aperff perf pni pclmulqdq dtes64 ds_cpl vmx smx
  est tm2 ssse3 sdbg fma cx16 xtpr pdcm pdcid dcasse4_1 sse4_2 x2apic movbe
  popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch
  cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pinn ssbd mbd mibb ibpb
  ibrs ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust
  bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpzx rdts a
  avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw
  avx512vl xsaveopt xsaves xsavec xasvc xsave xsaveopt xsaves cqm_llc cqm_occup_llc
  cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pkup ospe avx512_vnni
  md_clear tflush l1d arch_capabilities

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 7 8 9 14 15 16 17 21 22 23 56 57 58 59 63 64 65 70 71 72 73 77 78

(Continued on next page)
Supermicro
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Software Availability: Aug-2020

Platform Notes (Continued)

79
node 0 size: 95342 MB
node 0 free: 94789 MB
node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 60 61 62 66 67 68 69 74 75 76 80 81
82 83
node 1 size: 96761 MB
node 1 free: 96267 MB
node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51 84 85 86 87 91 92 93 98 99 100
101 105 106 107
node 2 size: 96761 MB
node 2 free: 96145 MB
node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 88 89 90 94 95 96 97 102 103 104
108 109 110 111
node 3 size: 96733 MB
node 3 free: 95284 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: 394854600 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.2 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.2"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
Linux X11DPU-01 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020 x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

(Continued on next page)
Supermicro
SuperServer 6029U-TRT
(X11DPU, Intel Xeon Gold 6238R)

SPECrate®2017_fp_base = 263
SPECrate®2017_fp_peak = Not Run

Platform Notes (Continued)

itlb_multihit:                               KVM: Mitigation: Split huge pages
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
tsx_async_abort:                             Mitigation: Clear CPU buffers; SMT vulnerable

run-level 3 Dec 9 01:06

SPEC is set to: /home/cpu2017
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs  184G  8.6G  176G   5% /

From /sys/devices/virtual/dmi/id
   BIOS:    American Megatrends Inc. 3.3a 07/21/2020
   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
   12x SK Hynix HMA84GR7CJR4N-XN 32 GB 2 rank 3200

(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on Intel(R) 64, Version
19.1.2.275 Build 20200604
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================
C++             | 508.namd_r(base) 510.parest_r(base)
(Continued on next page)
Supermicro
SuperServer 6029U-TRT
(X11DPU , Intel Xeon Gold 6238R)

SPECrates

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SPECrates®2017_fp_base = 263
SPECrates®2017_fp_peak = Not Run

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**Compiler Version Notes (Continued)**

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200604
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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C++, C         | 511.povray_r(base) 526.blender_r(base)

---

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200604
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200604
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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C++, C, Fortran | 507.cactuBSSN_r(base)

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Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200604
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200604
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200623
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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Fortran         | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)

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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200623
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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Fortran, C      | 521.wrf_r(base) 527.cam4_r(base)

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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200623
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Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200604

(Continued on next page)
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Software Availability: Aug-2020

Compiler Version Notes (Continued)
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Base 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

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
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Base Optimization Flags

C benchmarks:
- m64 -qnextgen -std=c11
  -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
  -xCORE-AVX2 -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops
  -qopt-mem-layout-trans=4 -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
- m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
  -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math -flto -mfpmath=sse
  -funroll-loops -qopt-mem-layout-trans=4
  -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
- m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
  -xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-prefetch -ffinite-math-only
  -qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4
  -nostandard-realloc-lhs -align array32byte -auto
  -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib
  -ljemalloc

Benchmarks using both Fortran and C:
- m64 -qnextgen -std=c11
  -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
  -xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-prefetch
  -ffinite-math-only -qopt-multiple-gather-scatter-by-shuffles
  -nostandard-realloc-lhs -align array32byte -auto
  -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib
  -ljemalloc

Benchmarks using both C and C++:
- m64 -qnextgen -std=c11
  -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
  -xCORE-AVX2 -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops
  -qopt-mem-layout-trans=4 -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
- m64 -qnextgen -std=c11
  -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
  -xCORE-AVX2 -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops
  -qopt-mem-layout-trans=4 -O3 -ipo -no-prec-div -qopt-prefetch
  -ffinite-math-only -qopt-multiple-gather-scatter-by-shuffles
  -nostandard-realloc-lhs -align array32byte -auto
  -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib
  -ljemalloc
Supermicro
SuperServer 6029U-TRT
(X11DPU , Intel Xeon Gold 6238R)

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

SPECrate®2017_fp_base = 263
SPECrate®2017_fp_peak = Not Run

Test Date: Dec-2020
Hardware Availability: Feb-2020
Software Availability: Aug-2020

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.

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