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

**Supermicro**

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

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>127</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>128</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Tested by:** Supermicro  
**Test Date:** Apr-2020  
**Hardware Availability:** Feb-2020  
**Software Availability:** Nov-2019

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
</table>
| **CPU Name:** Intel Xeon Gold 6226R  
**Max MHz:** 3900  
**Nominal:** 2900  
**Enabled:** 32 cores, 2 chips  
**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 core  
**Other:** None  
**Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
**Storage:** 1 x 200 GB SATA III SSD  
**Other:** None  
**Power Management:** BIOS set to prefer performance at the cost of additional power usage |
| **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:** Intel Fortran 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:** None |
## SPEC CPU®2017 Floating Point Speed Result

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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>32</td>
<td>119 497</td>
<td>119</td>
<td>119 494</td>
<td>120</td>
<td>119 490</td>
<td>120</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>32</td>
<td>118 141</td>
<td>118</td>
<td>119 140</td>
<td>119</td>
<td>119 140</td>
<td>119</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>32</td>
<td>57.7 90.8</td>
<td>56.0</td>
<td>93.5 58.5</td>
<td>89.6</td>
<td>56.0 93.5</td>
<td>89.6</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>32</td>
<td>109 121</td>
<td>109</td>
<td>121 108</td>
<td>123</td>
<td>109 121</td>
<td>123</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>32</td>
<td>106 83.5</td>
<td>106</td>
<td>106 83.9</td>
<td>106</td>
<td>106 83.7</td>
<td>106</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>32</td>
<td>176 67.5</td>
<td>179</td>
<td>66.2 177</td>
<td>66.9</td>
<td>174 68.2</td>
<td>173</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>32</td>
<td>140 103</td>
<td>141</td>
<td>103 142</td>
<td>102</td>
<td>140 103</td>
<td>142</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>32</td>
<td>80.5 217</td>
<td>80.5</td>
<td>217 80.6</td>
<td>217</td>
<td>80.5 217</td>
<td>80.6</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
<td>118 77.4</td>
<td>116</td>
<td>78.4 114</td>
<td>79.9</td>
<td>115 79.5</td>
<td>117</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
<td>105 151</td>
<td>106</td>
<td>149 104</td>
<td>151</td>
<td>105 151</td>
<td>104</td>
</tr>
</tbody>
</table>

**RESULTS APPEAR IN THE ORDER IN WHICH THEY WERE RUN. BOLD UNDERLINED TEXT INDICATES A MEDIAN MEASUREMENT.**

### 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,compact"
- LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64"
- OMP_STACKSIZE = "192M"

### 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:

```bash
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.
Supermicro
SuperServer 6029U-TR4
(X11DPU, Intel Xeon Gold 6226R)

---

**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 295195f888a3d7edbbe6e46a485a0011
running on RHEL81-01 Mon Apr 13 15:20:47 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)
  32 "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 : 16
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 lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6226R CPU @ 2.90GHz
Stepping: 7
CPU MHz: 3389.601
CPU max MHz: 3900.0000
CPU min MHz: 1200.0000
BogoMIPS: 5800.00
Virtualization: VT-x

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

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

---

**SPECspeed®2017_fp_base = 127**

**SPECspeed®2017_fp_peak = 128**

---

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

---

**Platform Notes (Continued)**

L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 22528K  
NUMA node0 CPU(s): 0-15  
NUMA node1 CPU(s): 16-31  
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 pdpte1gb rdtscp lm constant_tsc art 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 xptr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm ablp 3nowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pmm ssbd mba ibrs ibpb stibp ibrs_penhc tpr_shado vnmi fpext priority ept vpid fsgsbase tsc_adjust bni hle avx2 smep hmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512v1 xsaveopt xsavec xgetbv1 xsavec cgmi llc cgmi_occu llc cgmi_mbml_total cgmi_mbml_local dtherm ida arat pln pts pkue ospke avx512_vmni 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: 2 nodes (0-1)  
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
node 0 size: 192092 MB  
node 0 free: 184295 MB  
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31  
node 1 size: 193532 MB  
node 1 free: 192249 MB  
nodem distances:  
nodem 0 1  
0: 10 21  
1: 21 10

From /proc/meminfo  
MemTotal: 394879828 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"

(Continued on next page)
Supermicro
SuperServer 6029U-TR4
(X11DPU , Intel Xeon Gold 6226R)

SPECspeed®2017_fp_base = 127
SPECspeed®2017_fp_peak = 128

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro
Test Date: Apr-2020
Hardware Availability: Feb-2020
Software Availability: Nov-2019

Platform Notes (Continued)

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 9 20:10
SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 185G 15G 171G 8% /

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

SPECspeed®2017_fp_base = 127
SPECspeed®2017_fp_peak = 128

Compiler Version Notes

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
                | 644.nab_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++, C, Fortran | 607.cactuBSSN_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.
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.
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.
==============================================================================
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
                | 654.roms_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.
==============================================================================
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
                | 628.pop2_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.
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.
==============================================================================
Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Gold 6226R)

SPECspeed®2017_fp_base = 127
SPECspeed®2017_fp_peak = 128

CPU2017 License: 001176
Test Sponsor: Supermicro
Test Date: Apr-2020
Tested by: Supermicro
Hardware Availability: Feb-2020
Software Availability: Nov-2019

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
   -assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -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 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-m64 -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs

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 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

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

**Supermicro**

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

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>127</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>128</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Apr-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Feb-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Nov-2019</td>
</tr>
</tbody>
</table>

### Base Optimization Flags (Continued)

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 -qopenmp -DSPEC_OPENMP`  
- `-nostandard-realloc-lhs`

### Peak Compiler Invocation

- **C benchmarks:**  
  - `icc`

- **Fortran benchmarks:**  
  - `ifort`

- **Benchmarks using both Fortran and C:**  
  - `ifort icc`

- **Benchmarks using Fortran, C, and C++:**  
  - `icpc icc ifort`

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

- **C benchmarks:**
  - `619.lbm_s: basepeak = yes`
  - `638.imagick_s: basepeak = yes`
  - `644.nab_s: -m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP`

- **Fortran benchmarks:**
  - `603.bwaves_s: -m64 -prof-gen(pass 1) -prof-use(pass 2)`  
  - `-DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -O2 -xCORE-AVX512`  
  - `-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div`
Supermicro
SuperServer 6029U-TR4
(X11DPU, Intel Xeon Gold 6226R)

SPECspeed®2017_fp_base = 127
SPECspeed®2017_fp_peak = 128

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

Test Date: Apr-2020
Hardware Availability: Feb-2020
Software Availability: Nov-2019

Peak Optimization Flags (Continued)

603.bwaves_s (continued):
-qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -std=c11 -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only
-no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

627.cam4_s: -m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_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-revF.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.0u5-official-linux64_rev0.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-CLX-revF.xml

SPEC CPU and SPECspeed are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2020-04-13 03:20:46-0400.