**Supermicro**

SuperStorage 6029P-E1CR24H  
(X11DSC+, Intel Xeon Gold 6242R)

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**Hardware**

- **CPU Name:** Intel Xeon Gold 6242R  
- **Max MHz:** 4100  
- **Nominal:** 3100  
- **Enabled:** 40 cores, 2 chips, 2 threads/core  
- **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 chip  
- **Other:** None  
- **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 19.1.1.217 of Intel C/C++ Compiler for Linux; Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux  
- **Parallel:** No  
- **Firmware:** Version 3.2 released Oct-2019  
- **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.
## SPEC CPU®2017 Floating Point Rate Result

**Test Sponsor:** Supermicro  
**Hardware Availability:** Feb-2020  
**Software Availability:** Apr-2020  
**Test Date:** Aug-2020  
**CPU2017 License:** 001176

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**SPECrate®2017_fp_base** = 254  
**SPECrate®2017_fp_peak** = 268

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

### Compiler Notes

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux  
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

### 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"`  
`MALLOC_CONF = "retain:true"`
## SPEC CPU®2017 Floating Point Rate Result

Supermicro
SuperStorage 6029P-E1CR24H
(X11DSC+, Intel Xeon Gold 6242R)

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

### 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
  ```
- 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, 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.


---

### Platform Notes

- BIOS Settings:
  - Power Technology = Custom
  - Power Performance Tuning = BIOS Controls EPB
  - ENERGY_PERF_BIAS_CFG mode = Maximum 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 295195f888a3d7ed81e6a46a485a0011
  running on RHEL81-01 Sat Aug 15 06:32:10 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 6242R CPU @ 3.10GHz
  2 "physical id"s (chips)
  80 "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 : 20
  siblings : 40
  ```

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

physical 0: cores 0 1 2 3 5 6 8 10 12 13 16 17 18 19 20 21 26 27 28 29  
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 21 28 29

From lscpu:
- **Architecture:** x86_64  
- **CPU op-mode(s):** 32-bit, 64-bit  
- **Byte Order:** Little Endian  
- **CPU(s):** 80  
- **On-line CPU(s) list:** 0-79  
- **Thread(s) per core:** 2  
- **Core(s) per socket:** 20  
- **Socket(s):** 2  
- **NUMA node(s):** 4  
- **Vendor ID:** GenuineIntel  
- **CPU family:** 6  
- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Gold 6242R CPU @ 3.10GHz  
- **Stepping:** 7  
- **CPU MHz:** 3800.022  
- **CPU max MHz:** 4100.0000  
- **CPU min MHz:** 1200.0000  
- **BogoMIPS:** 6200.00  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 36608K  
- **NUMA node0 CPU(s):** 0-3,6,7,10-12,16,40-43,46,47,50-52,56  
- **NUMA node1 CPU(s):** 4,5,8,9,13-15,17-19,44,45,48,49,53-55,57-59  
- **NUMA node2 CPU(s):** 20-23,27-29,33-35,60-63,67-69,73-75  
- **NUMA node3 CPU(s):** 24-26,30-32,36-39,64-66,70-72,76-79  

From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a

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

**Supermicro**

SuperStorage 6029P-E1CR24H  
(X11DSC+, Intel Xeon Gold 6242R)

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

---

**Platform Notes (Continued)**

physical chip.  
available: 4 nodes (0-3)  
node 0 cpus: 0 1 2 3 6 7 10 11 12 16 40 41 42 43 46 47 50 51 52 56  
node 0 size: 95349 MB  
node 0 free: 83013 MB  
node 1 cpus: 4 5 8 9 13 14 15 17 18 19 44 45 48 49 53 54 55 57 58 59  
node 1 size: 96763 MB  
node 1 free: 88838 MB  
node 2 cpus: 20 21 22 23 27 28 29 33 34 35 60 61 62 63 67 68 69 73 74 75  
node 2 size: 96763 MB  
node 2 free: 88503 MB  
node 3 cpus: 24 25 26 30 31 32 36 37 38 39 64 65 66 70 71 72 76 77 78 79  
node 3 size: 96738 MB  
node 3 free: 88772 MB  
node distances:  
0: 10 11 21 21  
1: 11 10 21 21  
2: 21 21 10 11  
3: 21 21 11 10

From /proc/meminfo  
MemTotal: 394869796 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

(Continued on next page)
<spec>---</spec> SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

Supermicro
SuperStorage 6029P-E1CR24H
(X11DSC+, Intel Xeon Gold 6242R)

SPECrater®2017_fp_base = 254
SPECrater®2017_fp_peak = 268

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

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

Platform Notes (Continued)

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 Aug 14 22:57
SPEC is set to: /home/cpu2017
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      xfs   185G   59G  127G  32% /

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. 3.2 10/18/2019
Vendor: pm_2019-10-08_18:11:34
Product: ppm_2019-10-08_18:11:37
Serial: ps_2019-10-08_18:11:38

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 Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)
------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++             | 508.namd_r(base, peak) 510.parest_r(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1

(Continued on next page)
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CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Compiler Version Notes (Continued)

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==============================================================================
C++, C                  | 511.povray_r(base) 526.blender_r(base, peak)
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C++, C                  | 511.povray_r(peak)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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

### Supermicro
**SuperStorage 6029P-E1CR24H**  
(X11DSC+, Intel Xeon Gold 6242R)

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<td>for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306</td>
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<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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<td>Intel(R) C Compiler</td>
<td>for applications running on Intel(R) 64, Version 2021.1</td>
<td>NextGen Build 20200304</td>
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<tr>
<td>Fortran, C</td>
<td>521.wrf_r(peak)</td>
<td></td>
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<td>Intel(R) Fortran Intel(R) 64 Compiler</td>
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Supermicro
SuperStorage 6029P-E1CR24H
(X11DSC+, Intel Xeon Gold 6242R)

SPECrates®2017_fp_base = 254
SPECrates®2017_fp_peak = 268

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

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

Compiler Version Notes (Continued)

Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304
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------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 521.wrf_r(peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
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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
Supermicro
SuperStorage 6029P-E1CR24H
(X11DSC+, Intel Xeon Gold 6242R)

SPECrate®2017_fp_base = 254
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CPU2017 License: 001176
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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 -qnextgen -std=c11
-Wl, -plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -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 -fuse-ld=gold -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
-fuse-ld=gold -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
-fuse-ld=gold -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

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### Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
- `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`
- `-fuse-ld=gold -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`
- `-fuse-ld=gold -xCORE-AVX2 -Ofast -ffast-math -flto -mfpmath=sse`
- `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

### 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: basepeak = yes
- 538.imagick_r: basepeak = yes
- 544.nab_r: basepeak = yes

C++ benchmarks:

- 508.namd_r: basepeak = yes
- 510.parest_r: -m64 -qnextgen
  -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
  -Wl,-z,muldefs -fuse-ld=gold -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:

- 503.bwaves_r: -m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
  -Wl,-z,muldefs -fuse-ld=gold -xCORE-AVX2 -03 -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

- 549.fotonik3d_r: basepeak = yes

- 554.roms_r: Same as 503.bwaves_r

Benchmarks using both Fortran and C:

- 521.wrf_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2 -03 -ipo
  -no-prec-div -qopt-prefetch -ffinite-math-only
  -qopt-multiple-gather-scatter-by-shuffles
  -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
  -nostandard-realloc-lhs -align array32byte -auto

(Continued on next page)
Supermicro
SuperStorage 6029P-E1CR24H
(X11DSC+, Intel Xeon Gold 6242R)

| SPECrate®2017_fp_peak = 268 |
| SPECrate®2017_fp_base = 254 |

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

Peak Optimization Flags (Continued)

521.wrf_r (continued):
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

526.blender_r: basepeak = yes

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-revG.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-CLX-revG.xml

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