### Dell Inc. PowerEdge R550 (Intel Xeon Gold 5317, 3.00 GHz)

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Apr-2022  
**Hardware Availability:** May-2021  
**Software Availability:** Dec-2021

### SPEC CPU 2017 Floating Point Rate Result

**SPECraten2017_fp_base = 229**  
**SPECraten2017_fp_peak = 236**

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<td>554.roms_r</td>
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</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 5317  
- **Max MHz:** 3600  
- **Nominal:** 3000  
- **Enabled:** 24 cores, 2 chips, 2 threads/core  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 48 KB D on chip per core  
- **L2:** 1.25 MB I+D on chip per core  
- **L3:** 18 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)  
- **Storage:** 125 GB on tmpfs  
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux 8.4 (Ootpa) 4.18.0-305.el8.x86_64  
- **Compiler:** C/C++: Version 2022.0 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2021.5 of Intel Fortran Compiler Classic for Linux; C/C++: Version 2021.5 of Intel C/C++ Compiler Classic for Linux  
- **Parallel:** No  
- **Firmware:** Version 1.5.4 released Dec-2021  
- **File System:** tmpfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.
# SPEC CPU®2017 Floating Point Rate Result

**Dell Inc.**

**PowerEdge R550 (Intel Xeon Gold 5317, 3.00 GHz)**

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## Results Table

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**SPECrate®2017_fp_base = 229**

**SPECrate®2017_fp_peak = 236**

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 = 
"/mnt/ramdisk/cpu2017-1.1.8-ic2022.0-DL/lib/intel64:/mnt/ramdisk/cpu2017 
-1.1.8-ic2022.0-DL/je5.0.1-64"
MALLOC_CONF = "retain:true"
```

## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4

Transparent Huge Pages enabled by default

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

### Dell Inc.

**PowerEdge R550** (Intel Xeon Gold 5317, 3.00 GHz)

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**CPU2017 License:** 55  
**Test Date:** Apr-2022  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.

### General Notes (Continued)

Prior to runcpu invocation:

Filesystem page cache synced and cleared with:
```
sync; echo 3> /proc/sys/vm/drop_caches
```

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

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

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.

Benchmark run from a 125 GB ramdisk created with the cmd:  
```
mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk
```

### Platform Notes

**BIOS settings:**
- Sub NUMA Cluster : 2-Way Clustering  
- Virtualization Technology : Disabled

- System Profile : Custom  
- CPU Power Management : Maximum Performance  
  - C1E : Disabled  
  - C States : Autonomous  
- Memory Patrol Scrub : Disabled  
- Energy Efficiency Policy : Performance  
- CPU Interconnect Bus Link  
  - Power Management : Disabled  
- PCI ASPM L1 Link  
  - Power Management : Disabled

**Sysinfo program** /mnt/ramdisk/cpu2017-1.1.8-ic2022.0-DL/bin/sysinfo  
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d  
running on localhost.localdomain Wed Apr 13 16:02:42 2022

**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 5317 CPU @ 3.00GHz

(Continued on next page)
Dell Inc.

PowerEdge R550 (Intel Xeon Gold 5317, 3.00 GHz)

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---

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

**SPECrate®2017_fp_base = 229**  
**SPECrate®2017_fp_peak = 236**

---

**Platform Notes (Continued)**

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.)

```plaintext
cpu cores : 12
siblings : 24
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11
```

From lscpu from util-linux 2.32.1:

```plaintext
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: 2
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz
BIOS Model name: Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz
Stepping: 6
CPU MHz: 1535.775
BogoMIPS: 6000.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 18432K
NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,44
NUMA node1 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46
NUMA node2 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,45
NUMA node3 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,47
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr ss sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
apeperf perf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrm pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abr3nowprefetch cpuid_fault epb cat_l3 invpcid_single
intel_pmm ssbd mba ibrs ibpb stibp ibrs_enabled fsgsbase tsc_adjust bmi1 hle avx2
smep bmi2 erm invpcid cqm rdt_a avx512f avx512dq rdseed adx amap avx512ifma
clflushopt clwb intel_pt avx512cd sha_ha avx512bw avx512vl xsaveopt xsaves cqm_llc
cqcm_occup_llc cqm_mbb_total cqm_mbb_local split_lock_detect wpнoinvd
```

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

Dell Inc.
PowerEdge R550 (Intel Xeon Gold 5317, 3.00 GHz)

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Platform Notes (Continued)

dtherm ida arat pln pts avx512vbmi umpk pkv ospe avx512_vbmi2 gfni vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid fsrm md_clear pconfig
flush_lld arch_capabilities

/proc/cpuinfo cache data
  cache size : 18432 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 4 8 12 16 20 24 28 32 36 40 44
node 0 size: 128121 MB
node 0 free: 116462 MB
node 1 cpus: 2 6 10 14 18 22 26 30 34 38 42 46
node 1 size: 129021 MB
node 1 free: 118669 MB
node 2 cpus: 1 5 9 13 17 21 25 29 33 37 41 45
node 2 size: 129021 MB
node 2 free: 123816 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47
node 3 size: 129018 MB
node 3 free: 124013 MB
node distances:
node   0   1   2   3
0:  10  11  20  20
1:  11  10  20  20
2:  20  20  10  11
3:  20  20  11  10

From /proc/meminfo
MemTotal:       527547252 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.4 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.4"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"
    ANSI_COLOR="0;31"

(Continued on next page)
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SPECrate®2017 fp_base = 229
SPECrate®2017 fp_peak = 236

Test Date: Apr-2022
Hardware Availability: May-2021
Software Availability: Dec-2021

Platform Notes (Continued)

redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga

uname -a:
Linux localhost.localdomain 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30 EDT 2021
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
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
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Apr 13 11:32

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2022.0-DL

Filesystem     Type   Size  Used Avail Use% Mounted on
/tmpfs          tmpfs  125G   26G  100G  21% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R550
Product Family: PowerEdge
Serial: 5GCVNK3

Additional information from dmidecode 3.2 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:
16x 002C00B3002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200, configured at 2933

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 1.5.4

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SPECCPU®2017 Floating Point Rate Result

Dell Inc.
PowerEdge R550 (Intel Xeon Gold 5317, 3.00 GHz)

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Test Date: Apr-2022
Hardware Availability: May-2021
Software Availability: Dec-2021

Platform Notes (Continued)

BIOS Date: 12/17/2021
BIOS Revision: 1.5

(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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.0.0 Build 20211123
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

==============================================================================
C++  | 508.namd_r(base, peak) 510.parest_r(base, peak)
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
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==============================================================================
C++, C  | 511.povray_r(peak)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.5.0 Build 20211109_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.5.0 Build 20211109_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

==============================================================================
C++, C  | 511.povray_r(base) 526.blender_r(base, peak)
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## Compiler Version Notes (Continued)

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<th>521.wrf_r(base, peak) 527.cam4_r(base, peak)</th>
</tr>
</thead>
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(Continued on next page)
**SPEC CPU®2017 Floating Point Rate Result**

**Dell Inc.**

PowerEdge R550 (Intel Xeon Gold 5317, 3.00 GHz)

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</table>

**SPECrate®2017_fp_base = 229**

**SPECrate®2017_fp_peak = 236**

---

**Compiler Version Notes (Continued)**

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.5.0 Build 20211109_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.0.0 Build 20211123
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

---

**Base Compiler Invocation**

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx 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.ibm_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

(Continued on next page)
Dell Inc.

PowerEdge R550 (Intel Xeon Gold 5317, 3.00 GHz)

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Base Portability Flags (Continued)

554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-mlto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -mlto
-mlfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -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 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-mlto -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
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-mlto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-mlto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-mbranches-within-32B-boundaries -nostandard-realloc-lhs

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### Dell Inc.

PowerEdge R550 (Intel Xeon Gold 5317, 3.00 GHz)

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#### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- `align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

#### Peak Compiler Invocation

C benchmarks:
- `icx`

C++ benchmarks:
- `icpx`

Fortran benchmarks:
- `ifort`

Benchmarks using both Fortran and C:
- `ifort icx`

Benchmarks using both C and C++:
- `511.povray_r icpc icc`
- `526.blender_r icpx icx`

Benchmarks using Fortran, C, and C++:
- `icpx icx 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`

(Continued on next page)
Dell Inc.  PowerEdge R550 (Intel Xeon Gold 5317, 3.00 GHz)  Dell Inc.

| CPU2017 License: | 55 |
| Test Sponsor: | Dell Inc. |
| Tested by: | Dell Inc. |

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

| Test Date: | Apr-2022 |
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| Software Availability: | Dec-2021 |

### Peak Optimization Flags (Continued)

**C++ benchmarks:**

508.namd_r: basepeak = yes

510.parest_r: -w -m64 -W1,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-fllo -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

**Fortran benchmarks:**

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: -w -m64 -W1,-z,muldefs -xCORE-AVX512 -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
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

**Benchmarks using both Fortran and C:**

521.wrf_r: basepeak = yes

527.cam4_r: basepeak = yes

**Benchmarks using both C and C++:**

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -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


Dell Inc.

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Dell-ic2022-linux64-v1.0.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.5.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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