# Dell Inc.

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

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## CPU Specifications

- **CPU Name:** Intel Xeon Gold 5315Y  
- **Max MHz:** 3600  
- **Nominal:** 3200  
- **Enabled:** 16 cores, 2 chips, 2 threads/core  
- **Orderable:** 1,2 chips  
- **Cache L1:** 32 KB I + 48 KB D on chip per core  
- **Cache L2:** 1.25 MB I+D on chip per core  
- **Cache L3:** 12 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  
- **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 and OS set to prefer performance at the cost of additional power usage.

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## SPEC CPU 2017 Floating Point Rate Result

### SPECrate®2017_fp_base = 167

### SPECrate®2017_fp_peak = 171

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<th>Copies</th>
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<td>507.cactuBSSN_r</td>
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## Hardware

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## Test Information

- **Test Date:** Apr-2022  
- **Hardware Availability:** May-2021  
- **Software Availability:** Dec-2021
Dell Inc.

PowerEdge R550 (Intel Xeon Gold 5315Y, 3.20 GHz)

SPECrate®2017_fp_base = 167
SPECrate®2017_fp_peak = 171

Results Table

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</table>

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"
MALLOCONF = "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 5315Y, 3.20 GHz)

SPECrate®2017_fp_base = 167
SPECrate®2017_fp_peak = 171

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 numactl i.e.:
numactl --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 982a61ec0915b55891ef0e16aca64d
running on localhost.localdomain Thu Apr 14 19:16:06 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 5315Y CPU @ 3.20GHz

(Continued on next page)
Dell Inc.

PowerEdge R550 (Intel Xeon Gold 5315Y, 3.20 GHz)

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

Copyright 2017-2022 Standard Performance Evaluation Corporation

**CPU2017 License:** 55  
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**Tested by:** Dell Inc.

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**SPECrate®2017_fp_peak = 171**

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

**Platform Notes (Continued)**

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 : 8  
siblings : 16  
physical 0: cores 0 1 2 3 4 5 6 7  
physical 1: cores 0 1 2 3 4 5 6 7

From lscpu from util-linux 2.32.1:

- 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: 2
- Core(s) per socket: 8
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- BIOS Vendor ID: Intel
- CPU family: 6
- Model: 106
- Model name: Intel(R) Xeon(R) Gold 5315Y CPU @ 3.20GHz
- BIOS Model name: Intel(R) Xeon(R) Gold 5315Y CPU @ 3.20GHz
- Stepping: 6
- CPU MHz: 1510.207
- BogoMIPS: 6400.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 12288K
- NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30
- NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31
- Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperffmperf pni pclmulqdq dtes64 monitor 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 abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrsmercial fsqmbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cmqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_nn avx512bw avx512vl xsaves opt xsavexgetbv1 xsavec cmqm_recv cmqm_occup llc cmqm_mbb_total cmqm_mbb_local split_lock_detect wbinvd dtm acquire pts avx512vbmi umip pku ospke avx512_vbmi2 gfn i vaes vpcuclmqdq avx512_vnni avx512_rbitalg tme avx512_vpopcntdq la57 rdpid fsrm md_clear pconfig

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

**Dell Inc.**

**PowerEdge R550 (Intel Xeon Gold 5315Y, 3.20 GHz)**

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**SPECrate®2017_fp_base = 167**

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**Platform Notes (Continued)**

```latex
flush_l1d arch_capabilities

/proc/cpuinfo cache data
    cache size : 12288 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  2  4  6  8 10 12 14 16 18 20 22 24 26 28 30
    node 0 size: 257181 MB
    node 0 free: 238141 MB
    node 1 cpus:  1  3  5  7  9 11 13 15 17 19 21 23 25 27 29 31
    node 1 size: 258004 MB
    node 1 free: 250747 MB
    node distances:
        node   0   1
        0:  10  20
        1:  20  10

From /proc/meminfo
    MemTotal:       527551048 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"
    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:
```

(Continued on next page)
Dell Inc. PowerEdge R550 (Intel Xeon Gold 5315Y, 3.20 GHz)

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

Platform Notes (Continued)

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: usercopy/swaps barriers and __user pointer sanitation
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2): Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Apr 14 15:05

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2022.0-DL
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 125G 21G 105G 17% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R550
Product Family: PowerEdge
Serial: 5GCVNXK3

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
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)

(Continued on next page)
Compiler Version Notes (Continued)

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Test Sponsor: Dell Inc.
Tested by: Dell Inc.

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SPECrater\textsuperscript{\textcopyright}2017\_fp\_base = 167

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**Compiler Version Notes (Continued)**

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**C++, C**

511.povray\_r(base) 526.blender\_r(base, peak)

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Intel\textregistered R oneAPI DPC++/C++ Compiler for applications running on Intel\textregistered R 64,
Version 2022.0.0 Build 20211123
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**C++, C, Fortran**

507.cactuBSSN\_r(base, peak)

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Intel\textregistered R oneAPI DPC++/C++ Compiler for applications running on Intel\textregistered R 64,
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**Fortran**

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Intel\textregistered R Fortran Intel\textregistered R 64 Compiler Classic for applications running on
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**Fortran, C**

521.wrf\_r(base, peak) 527.cam4\_r(base, peak)

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Intel\textregistered R Fortran Intel\textregistered R 64 Compiler Classic for applications running on
Intel\textregistered R 64, Version 2021.5.0 Build 20211109\_000000
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Dell Inc.
PowerEdge R550 (Intel Xeon Gold 5315Y, 3.20 GHz)

SPECrate®2017_fp_base = 167
SPECrate®2017_fp_peak = 171

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

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

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
- 554.roms_r: -DSPEC_LP64

Base Optimization Flags

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

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## SPEC CPU®2017 Floating Point Rate Result

**Dell Inc.**

PowerEdge R550 (Intel Xeon Gold 5315Y, 3.20 GHz)

<table>
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### Base Optimization Flags (Continued)

#### C++ benchmarks:
- `-w` `-m64` `-Wl,-z,muldefs` `-xCORE-AVX512` `-Ofast` `-ffast-math` `-flto`  
- `-mfpmath=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`  
- `-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`  
- `-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`  
- `-flto` `-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`  
- `-flto` `-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`  
- `-align array32byte` `-auto` `-ljemalloc` `-L/usr/local/jemalloc64-5.0.1/lib`

### Peak Compiler Invocation

#### C benchmarks:
- `icx`

#### C++ benchmarks:
- `icpx`
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PowerEdge R550 (Intel Xeon Gold 5315Y, 3.20 GHz)

SPECratenumfp_base = 167
SPECratenumfp_peak = 171

CPU2017 License: 55
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Peak Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
511.povray_r: icpc icx
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

C++ benchmarks:
508.namd_r: basepeak = yes

510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -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

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Peak Optimization Flags (Continued)

549.fotonik3d_r: basepeak = yes

554.roms_r: -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:

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

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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