# SPEC CPU®2017 Floating Point Speed Result

## Dell Inc.

### PowerEdge R650 (Intel Xeon Gold 5315Y, 3.20 GHz)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
</tr>
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<td>Dell Inc.</td>
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</table>

### SPECspeed®2017_fp_base = 104

### SPECspeed®2017_fp_peak = 106

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>May-2021</th>
</tr>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>May-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Feb-2021</td>
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</table>

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### Hardware

#### CPU Name:
Intel Xeon Gold 5315Y

#### Max MHz:
3600

#### Nominal:
3200

#### Enabled:
16 cores, 2 chips

#### 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:
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:
225 GB on tmpfs

#### Other:
None

---

### Software

#### OS:
Red Hat Enterprise Linux 8.3 (Ootpa)

#### Compiler:
C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;

#### Fortran:
Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;

#### C/C++:
Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux

#### Parallel:
Yes

#### Firmware:
Version 1.2.3 released May-2021

#### File System:
tmpfs

#### System State:
Run level 5 (graphical 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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<th>603.bwaves_s</th>
<th>16</th>
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</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 = "/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/je5.0.1-64"
- MALLOC_CONF = "retain:true"
- 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:

```
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.
Dell Inc.

PowerEdge R650 (Intel Xeon Gold 5315Y, 3.20 GHz)

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<th>SPECspeed®2017_fp_peak</th>
<th>SPECspeed®2017_fp_base</th>
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<tr>
<td>106</td>
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</tr>
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.

**Test Date:** May-2021  
**Hardware Availability:** May-2021  
**Software Availability:** Feb-2021

### General Notes (Continued)

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 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk"

### Platform Notes

From `/proc/cpuinfo`
- `model name`: Intel(R) Xeon(R) Gold 5315Y CPU @ 3.20GHz
- `physical id``s (chips)`: 2
- `"processors"`: 16
- `cpu cores`: 8
- `siblings`: 8
- `physical 0`: cores 0 1 2 3 4 5 6 7
- `physical 1`: cores 0 1 2 3 4 5 6 7

From `lscpu`:
- `Architecture`: x86_64
- `CPU op-mode(s)`: 32-bit, 64-bit
- `Byte Order`: Little Endian

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

Dell Inc.

PowerEdge R650 (Intel Xeon Gold 5315Y, 3.20 GHz)

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SPECspeed®2017_fp_peak = 106

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

Test Date: May-2021
Hardware Availability: May-2021
Software Availability: Feb-2021

Platform Notes (Continued)

CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5315Y CPU @ 3.20GHz
Stepping: 6
CPU MHz: 2763.082
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
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15
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 pdpe1gb rdtscp lm constant_tsc 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 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm ablp abm 3dnowprefetch cpuid_fault ebpx cat_l3 invpcid_single intel_p gpiv sdbg mba ibrs ibpb stibp ibrs-enhanced fsogbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaves cqm_llc cqm_occu llc cqm_mmb_total cqm_mmb_local split_lock_detect wbinvnd dtherm ida arat pln pts avx512vmbi umip pku ospke avx512_vmbi2 gfni vaes vpcm1ldq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

/cache/cpuinfo cache data
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
  node 0 size: 254680 MB
  node 0 free: 241154 MB
  node 1 cpus: 1 3 5 7 9 11 13 15
  node 1 size: 255347 MB
  node 1 free: 250919 MB
  node distances:
## Platform Notes (Continued)

<table>
<thead>
<tr>
<th>node</th>
<th>MemTotal</th>
<th>HugePages_Total</th>
<th>Hugepagesize</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>527819028</td>
<td>0</td>
<td>2048 kB</td>
</tr>
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</table>

```
MemTotal:       527819028 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

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

```
From /etc/*release* /etc/*version*
```

```
NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
```

```
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
```

```
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
```

```
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga
```

```
uname -a:
Linux localhost.localdomain 4.18.0-240.15.1.el8_3.x86_64 #1 SMP Wed Feb 3 03:12:15 EST 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):** Not affected
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5753 (Spec tre variant 1):** Mitigation: usercopy/swaps barriers and __user pointer sanitization
- **CVE-2017-5715 (Spec ture 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

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Dell Inc.

PowerEdge R650 (Intel Xeon Gold 5315Y, 3.20 GHz)

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Test Date: May-2021
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### Platform Notes (Continued)

run-level 5 May 24 03:14

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.5-ic2021.1

Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 225G 13G 213G 6% /mnt/ramdisk

From /sys/devices/virtual/dmi/id

Vendor: Dell Inc.
Product: PowerEdge R650
Product Family: PowerEdge
Serial: 1234567

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:
7x 00AD00B300AD HMAA4GR7AJR8N-XN 32 GB 2 rank 3200, configured at 2933
9x 00AD063200AD HMAA4GR7AJR8N-XN 32 GB 2 rank 3200, configured at 2933
16x Not Specified Not Specified

BIOS:
Vendor: Dell Inc.
Version: 1.2.3
Date: 05/21/2021
Revision: 1.2

(End of data from sysinfo program)

### Compiler Version Notes

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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
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Dell Inc. PowerEdge R650 (Intel Xeon Gold 5315Y, 3.20 GHz)

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64, Version 2021.1 Build 20201112_000000
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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

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
-mbranches-within-32B-boundaries

(Continued on next page)
# Dell Inc.

PowerEdge R650 (Intel Xeon Gold 5315Y, 3.20 GHz)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>55</th>
</tr>
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<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Dell Inc.</td>
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| SPECspeed®2017 fp base = 104 |
| SPECspeed®2017 fp peak = 106 |

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<th>Test Date:</th>
<th>May-2021</th>
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<td>May-2021</td>
</tr>
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<td>Feb-2021</td>
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</tbody>
</table>

### Base Optimization Flags (Continued)

Fortran benchmarks:
- `-m64`  
- `–Wl,-z,muldefs`  
- `–DSPEC_OPENMP`  
- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-nostandard-realloc-lhs`  
- `-L/usr/local/jemalloc64-5.0.1/lib`  
- `-ljemalloc`

Benchmarks using both Fortran and C:
- `-m64`  
- `–std=c11`  
- `–Wl,-z,muldefs`  
- `–xCORE-AVX512`  
- `–ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-mbranches-within-32B-boundaries`  
- `-nostandard-realloc-lhs`  
- `-L/usr/local/jemalloc64-5.0.1/lib`  
- `-ljemalloc`

Benchmarks using Fortran, C, and C++:
- `-m64`  
- `–std=c11`  
- `–Wl,-z,muldefs`  
- `–xCORE-AVX512`  
- `–ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-mbranches-within-32B-boundaries`  
- `-nostandard-realloc-lhs`  
- `-L/usr/local/jemalloc64-5.0.1/lib`  
- `-ljemalloc`

### Peak Compiler Invocation

**C benchmarks (except as noted below):**

```
icc
```

644.nab_s: icx

**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
PowerEdge R650 (Intel Xeon Gold 5315Y, 3.20 GHz)

Dell Inc.

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

SPECspeed®2017_fp_base = 104
SPECspeed®2017_fp_peak = 106

Test Date: May-2021
Hardware Availability: May-2021
Software Availability: Feb-2021

Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes
638.imagick_s: basepeak = yes

Fortran benchmarks:

603.bwaves_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
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 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes
Dell Inc.  
PowerEdge R650 (Intel Xeon Gold 5315Y, 3.20 GHz)

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The flags files that were used to format this result can be browsed at:

- [Intel-ic2021-official-linux64_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.html)
- [Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.1.html](http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.1.html)

You can also download the XML flags sources by saving the following links:

- [Intel-ic2021-official-linux64_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml)
- [Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.1.xml](http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.1.xml)

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