Dell Inc.

PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)

SPEC CPU®2017 Floating Point Speed Result

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

Dell Inc.

SPECspeed®2017_fp_base = 106
SPECspeed®2017_fp_peak = 108

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

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**Hardware**

- **CPU Name:** Intel Xeon Gold 5318N
- **Max MHz:** 3400
- **Nominal:** 2100
- **Enabled:** 24 cores, 1 chip
- **Orderable:** 1 chip
- **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:** 36 MB I+D on chip per chip
- **Other:** None
- **Memory:** 512 GB (8 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)
- **Storage:** 225 GB on tmpfs
- **Other:** None

---

**Software**

- **OS:** Red Hat Enterprise Linux 8.3 (Ootpa) 4.18.0-240.15.1.el8_3.x86_64
- **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 202011112 for Linux;
  C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 202011112 for Linux
- **Parallel:** Yes
- **Firmware:** Version 0.6.3 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.
# SPEC CPU®2017 Floating Point Speed Result

**Dell Inc.**

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**Test Date:** May-2021  
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## Results Table

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</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"

MALLOCONF = "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  
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.

(Continued on next page)
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PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)

SPECspeed®2017_fp_base = 106
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CPU2017 License: 55
Test Sponsor: Dell Inc.
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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

BIOS Settings:
  Logical Processor : Disabled
  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

Sysinfo program /mnt/ramdisk/cpu2017-1.1.5-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Wed May 12 09:40:03 2021

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 5318N CPU @ 2.10GHz
  1 "physical id"s (chips)
    24 "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 : 24
  siblings : 24
  physical 0: cores 0 1 10 11 12 13 14 15 16 17 18 19 20 21 22 23

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 24

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

On-line CPU(s) list: 0-23  
Thread(s) per core: 1  
Core(s) per socket: 24  
Socket(s): 1  
NUMA node(s): 1  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 106  
Model name: Intel(R) Xeon(R) Gold 5318N CPU @ 2.10GHz  
Stepping: 6  
CPU MHz: 2899.885  
BogoMIPS: 4200.00  
Virtualization: VT-x  
L1d cache: 48K  
L1i cache: 32K  
L2 cache: 1280K  
L3 cache: 36864K  
NUMA node0 CPU(s): 0-23  
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 abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single intel_pppin ssbd mba ibrs ibpb stibp ibrs_enhanced fs.gsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cmov rdt_a avx512ifma clflushopt clwb intel_pt avx512bw avx512vl xsaveopt xsave xsetbv1 xsaves cmov_llc cmov_occup_llc cmov_mb_total cmov_mb_local split_lock_detect wbnoinvd dtc dtherm ida arat pln pts avx512vbm1 umip pkpu ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_vbitalg tme avx512_vpopcntdq 1a57 rdpid md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data  
cache size : 36864 KB

From numactl --hardware  
WARNING: a numactl 'node' might or might not correspond to a physical chip.  
available: 1 nodes (0)  
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23  
node 0 size: 492206 MB  
node 0 free: 492340 MB  
node distances:  
node 0  
0: 10

From /proc/meminfo  
MemTotal: 527817248 KB

(Continued on next page)
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**PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)**

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### Platform Notes (Continued)

- **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="8.3 (Ootpa)"  
  ID="rhel"  
  ID_LIKE="fedora"  
  VERSION_ID="8.3"  
  PLATFORM_ID="platform:el8"  
  PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
  ANSI_COLOR="0;31"

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

```
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):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: usercopy/swapgs barriers and __user pointer sanitization
- **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 5 May 12 05:02**

**Filesystem**  
**Type**  
**Size**  
**Used**  
**Avail**  
**Use%**  
**Mounted on**

tmpfs  
tmpfs 225G 13G 213G 6% /mnt/ramdisk

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

- From /sys/devices/virtual/dmi/id
- **Vendor:** Dell Inc.
- **Product:** PowerEdge XR11
- **Product Family:** PowerEdge
- **Serial:** 09A000N

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:**
  - 2x 002C0632002C 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2666
  - 3x 002C069D002C 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2666
  - 1x 00AD063200AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200, configured at 2666
  - 2x 00CE063200CE M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2666

- **BIOS:**
  - **BIOS Vendor:** Dell Inc.
  - **BIOS Version:** 0.6.3
  - **BIOS Date:** 05/04/2020
  - **BIOS Revision:** 0.6

(End of data from sysinfo program)

**BIOS Note:** Version 0.6.3 was built with an incorrect date stamp which is reflected in the sysinfo section. The correct release date is reflected in the "Firmware" field of the disclosure.

### Compiler Version Notes

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Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on  
Intel(R) 64, Version 2021.1 Build 20201112_000000  
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Fortran    | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)  
          | 654.roms_s(base, peak)  

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on  
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Fortran, C | 621.wrf_s(base, peak) 627.cam4_s(base, peak)  
          | 628.pop2_s(base, peak)  

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## Compiler Version Notes (Continued)

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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

- 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

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## 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`
- `-mbranches-within-32B-boundaries`

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SPEC CPU®2017 Floating Point Speed Result

Dell Inc.

PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)

SPECspeed®2017_fp_base = 106
SPECspeed®2017_fp_peak = 108

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

Dell Inc.

PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)

SPECspeed®2017_fp_base = 106
SPECspeed®2017_fp_peak = 108

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

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
-mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -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 -O3 -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
**SPEC CPU®2017 Floating Point Speed Result**

**Dell Inc.**

PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)  

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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** May-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** Feb-2021

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**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 XR11 (Intel Xeon Gold 5318N, 2.10 GHz)

**SPECspeed®2017_fp_base = 106**

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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/Intel-ic2021-official-linux64_revA.xml

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