Dell Inc.

PowerEdge T350 (Intel Xeon E-2314, 2.80 GHz)

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

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
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<tbody>
<tr>
<td>38.6</td>
<td>39.1</td>
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**CPU2017 License:** 55  
**Test Date:** Sep-2021

<table>
<thead>
<tr>
<th>Test Sponsor: Dell Inc.</th>
<th>Hardware Availability: Oct-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by: Dell Inc.</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon E-2314  
  - **Max MHz:** 4500  
  - **Nominal:** 2800  
  - **Enabled:** 4 cores, 1 chip  
  - **Orderable:** 1 chip  
  - **Cache L1:** 32 KB I + 48 KB D on chip per core  
  - **Cache L2:** 512 KB I+D on chip per core  
  - **Cache L3:** 8 MB I+D on chip per chip  
  - **Other:** None  
- **Memory:** 64 GB (2 x 32 GB 2Rx8 PC4-3200AA-E)  
- **Storage:** 70 GB on tmpfs  
- **Other:** None  

### Software

- **OS:** Red Hat Enterprise Linux 8.4 (Ootpa)  
  - **Version:** 4.18.0-305.el8.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 20201112 for Linux;  
- **Parallel:** No  
- **Firmware:** Version 1.0.1 released Aug-2021  
- **File System:** tmpfs  
- **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.
Dell Inc.

PowerEdge T350 (Intel Xeon E-2314, 2.80 GHz)

SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

PowerEdge T350 (Intel Xeon E-2314, 2.80 GHz)

SPECrate®2017_fp_base = 38.6

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Results Table

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

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/je5.0.1-64"

MALLOC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1

Transparent Huge Pages enabled by default

(Continued on next page)
General Notes (Continued)

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.
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 70 GB ramdisk created with the cmd: "mount -t tmpfs -o size=70G tmpfs /mnt/ramdisk"

Platform Notes

BIOS settings:
  Virtualization Technology : Disabled
  System Profile : Custom
  CPU Power Management : Maximum Performance
  C1E : Disabled
  C States : Autonomous
  PCI ASPM L1 Link
  Power Management : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-ic2021.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on localhost.localdomain Mon Sep 6 11:33:39 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) E-2314 CPU @ 2.80GHz
  1 "physical id"s (chips)
  4 "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 : 4
  siblings : 4
  physical 0: cores 0 1 2 3

(Continued on next page)
**Dell Inc.**

**PowerEdge T350 (Intel Xeon E-2314, 2.80 GHz)**

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---

**SPECrate®2017_fp_base = 38.6**

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---

**Platform Notes (Continued)**

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):** 4
- **On-line CPU(s) list:** 0-3
- **Thread(s) per core:** 1
- **Core(s) per socket:** 4
- **Socket(s):** 1
- **NUMA node(s):** 1
- **Vendor ID:** GenuineIntel
- **BIOS Vendor ID:** Intel
- **CPU family:** 6
- **Model:** 167
- **Model name:** Intel(R) Xeon(R) E-2314 CPU @ 2.80GHz
- **BIOS Model name:** Intel(R) Xeon(R) E-2314 CPU @ 2.80GHz
- **Stepping:** 1
- **CPU MHz:** 3500.000
- **BogoMIPS:** 5616.00
- **Virtualization:** VT-x
- **L1d cache:** 48K
- **L1i cache:** 32K
- **L2 cache:** 512K
- **L3 cache:** 8192K
- **NUMA node0 CPU(s):** 0-3

**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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
- aperfmperf tsc_known_freq pni pmlinstrq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
- sdbg fma cx16 xtrapaclm pcds3 sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
- aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault invpcid_single ssbd
- ibrs ibbp stibp ibrs-enhanced fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid
- mpx avx512f avx512dq rdseed adx smap avx512ifma clflushopt intel_pt avx512cd sha_ni
- avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts avx512vmbmi
- umip kpu ospke avx512_vmbmi gfn vaes vpclmulqdq avx512_vnni avx512_bitalg
- avx512_vpopcntdq rdpid fsrmd_clear flush_l1d arch_capabilities

/proc/cpuinfo cache data
- cache size : 8192 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
- node 0 size: 64030 MB
- node 0 free: 46847 MB

(Continued on next page)
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SPECrate®2017_fp_base = 38.6
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Platform Notes (Continued)

node distances:
node 0
  0: 10

node distances:
node 0
  0: 10

From /proc/meminfo
  MemTotal: 65567244 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:

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: usecopy/swaps barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
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

(Continued on next page)
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Platform Notes (Continued)

run-level 3 Sep 6 08:54

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2021.1
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 70G 12G 59G 17% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge T350
Product Family: PowerEdge
Serial: B50KFF3

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:
2x 00CE00000C01 M391A4G43AB1-CWE 32 GB 2 rank 3200

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 1.0.1
BIOS Date: 08/18/2021
BIOS Revision: 1.0

(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 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C++ | 508.namd_r(base, peak) 510.parest_r(base, peak)
==============================================================================

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
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(Continued on next page)
### Compiler Version Notes (Continued)

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<th>Language</th>
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Compiler Version Notes (Continued)

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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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

(Continued on next page)
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## Base Compiler Invocation (Continued)

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.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:**

- -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

**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

(Continued on next page)
Dell Inc. PowerEdge T350 (Intel Xeon E-2314, 2.80 GHz) Dell Inc.

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**Hardware Availability:** Oct-2021
**Software Availability:** May-2021

### Base Optimization Flags (Continued)

For Fortran benchmarks (continued):

```
-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
```

**Fortran benchmarks:**

```
ifort
```

Benchmarks using both Fortran and C:

```
ifort icx
```

Benchmarks using both C and C++:

```
511.povray_r icpc icc
```

(Continued on next page)
Dell Inc.
PowerEdge T350 (Intel Xeon E-2314, 2.80 GHz)

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

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

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**Peak Compiler Invocation (Continued)**

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: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -gopt-mem-layout-trans=4
-fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

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

Fortran benchmarks:
503.bwaves_r: basepeak = yes
549.fotonik3d_r: basepeak = yes
554.roms_r: basepeak = yes

Benchmarks using both Fortran and C:
521.wrf_r: basepeak = yes

(Continued on next page)
## Dell Inc.

**PowerEdge T350 (Intel Xeon E-2314, 2.80 GHz)**

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<thead>
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<td>Software Availability: May-2021</td>
</tr>
</tbody>
</table>

### SPECrate®2017_fp_base = 38.6

### SPECrate®2017_fp_peak = 39.1

### Peak Optimization Flags (Continued)

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:


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/Intel-ic2021-official-linux64_revA.xml

http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.4.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.