## Dell Inc.

**PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)**

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<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
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<td>SPECspeed®2017_fp_peak</td>
<td>26.5</td>
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</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon E-2246G
- **Max MHz:** 4800
- **Nominal:** 3600
- **Enabled:** 12 cores, 1 chip
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 256 KB I+D on chip per core
- **Cache L3:** 12 MB I+D on chip per chip
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-R)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

### Software

- **OS:** Suse Linux Enterprise Server 15 SP1
  - kernel 4.12.14-195-default
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux;
  - Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux
- **Parallel:** Yes
- **Firmware:** Version 2.1.6 released Nov-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage.
SPEC CPU®2017 Floating Point Speed Result

Dell Inc.

PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)

SPECspeed®2017_fp_base = 26.1
SPECspeed®2017_fp_peak = 26.5

Results Table

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<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
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<td>603.bwaves_s</td>
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<td>78.3</td>
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<td>491</td>
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<td>34.2</td>
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<td>628.pop2_s</td>
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<td>29.4</td>
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<td>638.imagick_s</td>
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<td>845</td>
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<td>845</td>
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<td>644.nab_s</td>
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<td>39.1</td>
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<td>649.fotonik3d_s</td>
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<td>541</td>
<td>16.9</td>
<td>541</td>
<td>16.9</td>
<td>541</td>
<td>16.9</td>
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<tr>
<td>654.roms_s</td>
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<td>984</td>
<td>16.0</td>
<td>975</td>
<td>16.2</td>
<td>976</td>
<td>16.1</td>
</tr>
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</table>

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 = "/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
Yes: 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.
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
Dell Inc.

PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)

| SPECspeed®2017_fp_base = 26.1 |
| SPECspeed®2017_fp_peak = 26.5 |

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Dec-2019
Tested by: Dell Inc.
Hardware Availability: Dec-2019
Software Availability: Aug-2019

Platform Notes

BIOS settings:
Virtualization Technology disabled
DCU Streamer Prefetcher disabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
C1E disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
PCI ASPM L1 Link Power Management disabled
Logical Processor disabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbler6e46a485a0011
running on linux-g3ob Mon Dec 2 19:48:40 2019

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-2246G CPU @ 3.60GHz
  1 "physical id"s (chips)
  12 "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 : 6
    siblings : 12
    physical 0: cores 0 1 2 3 4 5

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  Address sizes: 39 bits physical, 48 bits virtual
  CPU(s): 12
  On-line CPU(s) list: 0-11
  Thread(s) per core: 2
  Core(s) per socket: 6
  Socket(s): 1
  NUMA node(s): 1
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 158
  Model name: Intel(R) Xeon(R) E-2246G CPU @ 3.60GHz
  Stepping: 10

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

**Dell Inc.**

PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)

**SPECspeed®2017_fp_base = 26.1**

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**Platform Notes (Continued)**

- CPU MHz: 3600.000
- BogoMIPS: 7200.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 256K
- L3 cache: 12288K
- NUMA node0 CPU(s): 0-11
- 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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single pti ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt intel_pt xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts md_clear flush_l1d

/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: 1 nodes (0)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
  node 0 size: 64257 MB
  node 0 free: 56445 MB
  node distances:
  node 0
  0: 10

From /proc/meminfo
  MemTotal: 65800056 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"
    VERSION="15-SP1"
    VERSION_ID="15.1"
    PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
    ID="sles"
    ID_LIKE="suse"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:15:sp1"

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

PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)

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

**SPECspeed®2017_fp_base = 26.1**

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**CPU2017 License:** 55  
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**Platform Notes (Continued)**

```
uname -a:
Linux linux-g3ob 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- **CVE-2018-3620 (L1 Terminal Fault):** Mitigation: PTE Inversion
- **Microarchitectural Data Sampling:** Mitigation: Clear CPU buffers; SMT vulnerable
- **CVE-2017-5754 (Meltdown):** Mitigation: PTI
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Indirect Branch Restricted Speculation, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

```
run-level 3 Dec 2 16:00 last=5
```

```
SPEC is set to: /home/cpu2017
```

```
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 440G 42G 399G 10% /
```

---

**Compiler Version Notes**

```
C 619.lbm_s(base, peak) 638.imagick_s(base, peak)
644.nab_s(base, peak)
```

---

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416

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**Test Date:** Dec-2019  
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### Compiler Version Notes (Continued)

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<table>
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<th>Base Compiler Invocation</th>
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C++, C, Fortran | 607.cactuBSSN_s(base, peak) |

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak) |

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran, C | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak) |

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

---

**Base Compiler Invocation**

**C benchmarks:**
```
icc -m64 -std=c11
```

**Fortran benchmarks:**
```
ifort -m64
```
Dell Inc.  
PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)  

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**Base Compiler Invocation (Continued)**

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

**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

**Base Optimization Flags**

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp  
-nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
-nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
-nostandard-realloc-lhs
Dell Inc.
PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)

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

**Dell Inc.**
PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)

**SPECspeed®2017_fp_base = 26.1**
**SPECspeed®2017_fp_peak = 26.5**

### Peak Compiler Invocation

**C benchmarks:**
`icc -m64 -std=c11`

**Fortran benchmarks:**
`ifort -m64`

**Benchmarks using both Fortran and C:**
`ifort -m64 icc -m64 -std=c11`

**Benchmarks using Fortran, C, and C++:**
`icpc -m64 icc -m64 -std=c11 ifort -m64`

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**
-`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
-`-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP`

**Fortran benchmarks:**

603.bwaves_s: `-prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP`
-`-DSPEC_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3`
-`-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=4`
-`-qopenmp -nostandard-realloc-lhs`

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: `-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div`
-`-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`
-`-qopenmp -nostandard-realloc-lhs`

**Benchmarks using both Fortran and C:**

621.wrf_s: `-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2`
-`-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div`
-`-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp`
-`-DSPEC_OPENMP -nostandard-realloc-lhs`

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## Dell Inc.

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### Peak Optimization Flags (Continued)

627.cam4_s: `-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs`

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

- `-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs`

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:


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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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