Dell Inc.

PowerEdge T340 (Intel Core i3-9100, 3.60 GHz)

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

Test Date: Jan-2020
Hardware Availability: Dec-2019

Software Availability: Jun-2019

### Hardware
- **CPU Name:** Intel Core i3-9100
- **Max MHz:** 4200
- **Nominal:** 3600
- **Enabled:** 4 cores, 1 chip
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 256 KB I+D on chip per core
- **L3:** 6 MB I+D on chip per chip
- **Other:** None
- **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
  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 Sep-2018
- **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 Core i3-9100, 3.60 GHz)  

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>603.bwaves_s</td>
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<tr>
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<tr>
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</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 24.4**  
**SPECspeed®2017_fp_peak = 24.8**

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

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7900X 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
SPEC CPU®2017 Floating Point Speed Result

Dell Inc.

PowerEdge T340 (Intel Core i3-9100, 3.60 GHz)

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CPU2017 License: 55
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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
CPU Interconnect Bus Link Power Management enabled
PCI ASPM L1 Link Power Management enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011
running on linux-g3ob Wed Jan 15 15:04:00 2020

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) Core(TM) i3-9100 CPU @ 3.60GHz
  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

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): 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
CPU family: 6
Model: 158
Model name: Intel(R) Core(TM) i3-9100 CPU @ 3.60GHz
Stepping: 11

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

**Dell Inc.**

PowerEdge T340 (Intel Core i3-9100, 3.60 GHz)

### SPECbest®2017_fp_base = 24.4

### SPECbest®2017_fp_peak = 24.8

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

#### Platform Notes (Continued)

- **CPU MHz:** 3600.000  
- **BogoMIPS:** 7200.00  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 256K  
- **L3 cache:** 6144K  
- **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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx 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 3nowprefetch cpuid_fault epb invpcid_single pti ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbse tsc_adjust bmi1 avx2 smep bmi2 erts invpcid mxr 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:** 6144 KB

**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:** 64259 MB  
- **node 0 free:** 55563 MB  
- **nodes:**  
  - **node 0:** 0  
  - **0:** 10

**MemTotal:** 65801564 kB  
**HugePages_Total:** 0  
**Hugepagesize:** 2048 kB

**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 Core i3-9100, 3.60 GHz)

**SPEC®2017_fp_base = 24.4**

**SPEC®2017_fp_peak = 24.8**

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

---

### 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 disabled
- **CVE-2017-5754 (Meltdown):** Mitigation: PTI
- **CVE-2017-3639 (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: disabled, RSB filling

```
run-level 3 Jan 15 11:24 last=5
```

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

```
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda2      xfs   440G   37G  404G   9% /
```

From /sys/devices/virtual/dmi/id

- **BIOS:** Dell Inc. 2.1.6 09/27/2018
- **Vendor:** Dell Inc.
- **Product:** PowerEdge T340
- **Product Family:** PowerEdge

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 00AD00000A02 HMA82GU7CJR8N-VK 16 GB 2 rank 2666
- 2x 00AD00000A06 HMA82GU7CJR8N-VK 16 GB 2 rank 2666

(End of data from sysinfo program)

---

**Compiler Version Notes**

```
C | 619.ibm_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
### Dell Inc.

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#### Compiler Version Notes (Continued)

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#### Base Compiler Invocation

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

Fortran benchmarks:  
`ifort -m64`

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

Benchmarks using both Fortran and C:

```bash
ifort -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:

```bash
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:**

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

**Fortran benchmarks:**

```bash
-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:**

```bash
-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++:**

```bash
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```
```markdown
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Dell Inc.

### Test Date:
Jan-2020

### Hardware Availability:
Dec-2019

### Software Availability:
Jun-2019

---

## 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

(Continued on next page)
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Peak Optimization Flags (Continued)

627.cam4_s: -xCORE-AVX2 -ipo -O3 -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 -O3 -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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