## SPEC CPU®2017 Floating Point Speed Result

**Dell Inc.**

**PowerEdge T40 (Intel Core i3-9100, 3.60GHz)**

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Apr-2019</th>
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**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Test Date:** Apr-2019

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<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base = 23.8</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>33.8</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>33.9</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>14.8</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>14.7</td>
</tr>
<tr>
<td>621.cam4_s</td>
<td>17.1</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>27.0</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>27.8</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>29.8</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>35.4</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>35.4</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>12.5</td>
</tr>
</tbody>
</table>

- **SPECspeed®2017_fp_peak = 24.2**
- **SPECspeed®2017_fp_base = 23.8**

### 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
- **Cache L2:** 256 KB I+D on chip per core
- **Cache L3:** 6 MB I+D on chip per chip
- **Other:** None
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

### Software

- **OS:** Ubuntu 18.04.2 LTS
- **Compiler:** C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux;
  Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux
- **Parallel:** Yes
- **Firmware:** Version 0.1.3 released Apr-2019
- **File System:** ext4
- **System State:** Run level 5 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** --
Dell Inc.

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SPECspeed®2017_fp_base = 23.8
SPECspeed®2017_fp_peak = 24.2

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>4</td>
<td>816</td>
<td>72.3</td>
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<td>72.3</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>33.9</td>
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</tr>
<tr>
<td>627.cam4_s</td>
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<td>17.1</td>
<td>519</td>
<td>17.1</td>
<td>518</td>
<td>17.1</td>
<td>519</td>
<td>17.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>4</td>
<td>428</td>
<td>27.8</td>
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<tr>
<td>638.imagick_s</td>
<td>4</td>
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<td>18.5</td>
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<td>18.6</td>
<td>773</td>
<td>18.7</td>
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</tr>
<tr>
<td>644.nab_s</td>
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<td>35.4</td>
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<td>35.4</td>
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<td>649.fotonik3d_s</td>
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<td>15.6</td>
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<td>654.roms_s</td>
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<td>12.5</td>
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<td></td>
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SPECspeed®2017_fp_base = 23.8
SPECspeed®2017_fp_peak = 24.2

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"

General Notes
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

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

Platform Notes
BIOS settings:
CPU Performance set to Maximum Performance

(Continued on next page)
Dell Inc.

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**SPECspeed®2017_fp_base = 23.8**

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### Platform Notes (Continued)

C States set to Autonomous
C1E disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on intel-sut Sat Apr 27 01:55:28 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) 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
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
CPU MHz:            4051.451
CPU max MHz:        4200.0000
CPU min MHz:        800.0000
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
```

(Continued on next page)
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---

### Platform Notes (Continued)

```
* lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpcrf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 sse3 sdbg
fma cx16 xtrr pdcm pccid 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 tpr_shadow vmmi flexpriority ept vpid fpgasbase tsc_adjust bmi1
avx2 smep bmi2 erms invpcid mxrt rdeseed adx smap clflushopt intel_pt xsaveopt xsavec
xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp flush_l1d

/proc/cpuinfo cache data  
cache size : 6144 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: 64255 MB  
node 0 free: 44150 MB  
node distances:  
node 0  
0: 10

From /proc/meminfo  
MemTotal: 65797688 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d  
Ubuntu 18.04.2 LTS

From /etc/*release* /etc/*version*  
debian_version: buster/sid  
os-release:  
NAME="Ubuntu"  
VERSION="18.04.2 LTS (Bionic Beaver)"  
ID=ubuntu  
ID_LIKE=debian  
PRETTY_NAME="Ubuntu 18.04.2 LTS"  
VERSION_ID="18.04"  
HOME_URL="https://www.ubuntu.com/"  
SUPPORT_URL="https://help.ubuntu.com/"

uname -a:  
Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64  
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

(Continued on next page)
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Platform Notes (Continued)

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full generic retpoline, IBPB, IBRS_FW

run-level 5 Apr 26 13:32

SPEC is set to: /home/cpu2017

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.

BIOS Dell Inc. 0.1.3 04/22/2019
Memory:
4x 80CE000080CE M391A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

C++, C, Fortran | 607.cactuBSSN_s(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

(Continued on next page)
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Compiler Version Notes (Continued)

```
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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

Base 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

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
```

(Continued on next page)
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Base Portability Flags (Continued)

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

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
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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

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
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SPECspeed®2017_fp_peak = 24.2  
SPECspeed®2017_fp_base = 23.8

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


Originally published on 2019-09-17.  

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

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