## SPEC CPU®2017 Floating Point Speed Result

**Dell Inc.**

PowerEdge T140 (Intel Xeon E-2244G, 3.80 GHz)

### CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Dec-2019

Hardware Availability: Dec-2019

Software Availability: Jun-2019

### SPECspeed®2017_fp_base = 20.7

### SPECspeed®2017_fp_peak = 20.9

---

### Hardware

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (20.7)</th>
<th>SPECspeed®2017_fp_peak (20.9)</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>4</td>
<td>24.0</td>
<td>27.0</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>4</td>
<td>13.3</td>
<td>14.3</td>
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<tr>
<td>619.lbm_s</td>
<td>4</td>
<td>25.7</td>
<td>27.0</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>4</td>
<td>14.4</td>
<td>14.3</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>4</td>
<td>22.7</td>
<td>24.9</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>4</td>
<td>11.3</td>
<td>13.3</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>4</td>
<td>25.9</td>
<td>25.9</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>4</td>
<td>17.1</td>
<td>17.0</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>4</td>
<td>14.1</td>
<td>14.1</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>4</td>
<td>24.0</td>
<td>27.0</td>
</tr>
</tbody>
</table>

### 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
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>
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<tr>
<td>628.pop2_s</td>
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</table>

SPECspeed®2017_fp_base = 20.7
SPECspeed®2017_fp_peak = 20.9

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/ODM-SPECcpu2017-194/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 T140 (Intel Xeon E-2244G, 3.80 GHz)

| SPECspeed®2017_fp_base = 20.7 |
| SPECspeed®2017_fp_peak = 20.9 |

**Platform Notes**

BIOS settings:
- Sub NUMA Cluster enabled
- 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
- Logical Processor disabled
- CPU Interconnect Bus Link Power Management enabled
- PCI ASPM L1 Link Power Management disabled

Sysinfo program /home/cpu2017/ODM-SPECcpu2017-194/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on linux-g3ob Wed Dec 4 13:06:27 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-2244G CPU @ 3.80GHz
  - 1 "physical id"s (chips)
  - 8 "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 : 8
  - 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): 8
- On-line CPU(s) list: 0-7
- Thread(s) per core: 2
- Core(s) per socket: 4
- Socket(s): 1
- NUMA node(s): 1
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 158

(Continued on next page)
Dell Inc.
PowerEdge T140 (Intel Xeon E-2244G, 3.80 GHz)  

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

Platform Notes (Continued)

Model name: Intel(R) Xeon(R) E-2244G CPU @ 3.80GHz
Stepping: 10
CPU MHz: 3800.000
BogoMIPS: 7584.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 8192K
NUMA node0 CPU(s): 0-7
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
aperfmpref 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 xSAVE xsavec xgetbv1 xsaves dtherm ida arat pln pts md_clear flush_lld

/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 4 5 6 7
    node 0 size: 64258 MB
    node 0 free: 56445 MB
    node distances:
    node 0
    0: 10

From /proc/meminfo
    MemTotal: 65800812 kB
    HugePages_Total: 0
    Hugepagesize: 4096 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"

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

**Dell Inc.**

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**CPU2017 License:** 55
**Test Sponsor:** Dell Inc.
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**Test Date:** Dec-2019
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**Platform Notes (Continued)**

CPE_NAME="cpe:/o:suse:sles:15:sp1"

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 4 09:02 last=5

**SPEC is set to:** /home/cpu2017/ODM-SPECcpu2017-194/cpu2017

From /sys/devices/virtual/dmi/id

```
BIOS: Dell Inc. 2.1.6 09/27/2018
Vendor: Dell Inc.
Product: PowerEdge T140
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 00AD0000A02 HMA82GU7CJR8N-VK 16 GB 2 rank 2666
2x 00AD0000A07 HMA82GU7CJR8N-VK 16 GB 2 rank 2666
```

(End of data from sysinfo program)

**Compiler Version Notes**

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

(Continued on next page)
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CPU2017 License: 55
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Compiler Version Notes (Continued)

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.

==============================================================================
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<th>621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)</th>
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

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

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
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

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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- 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

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

(Continued on next page)
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</table>

**Peak Optimization Flags (Continued)**

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:


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


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