## SPEC® CPU2017 Floating Point Speed Result

**Dell Inc.**  
PowerEdge T340 (Intel Xeon E-2144G, 3.60GHz)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
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<tr>
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</table>

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Dec-2018  
**Hardware Availability:** Dec-2018  
**Software Availability:** Apr-2018  

### Threads

<table>
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<tr>
<th>Benchmark</th>
<th>Threads</th>
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<th>SPECspeed2017_fp_peak</th>
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<tr>
<td>619.lbm_s</td>
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<td>621.wrf_s</td>
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<td>627.cam4_s</td>
<td>4</td>
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<td>628.pop2_s</td>
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<tr>
<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
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<td>79.9</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>79.9</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>4</td>
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</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon E-2144G  
- **Max MHz.:** 4500  
- **Nominal:** 3600  
- **Enabled:** 4 cores, 1 chip, 2 threads/core  
- **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:** 8 MB I+D on chip per core  
- **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 12 SP3  
- **Compiler:** C/C++: Version 18.0.2.20180210 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.2.20180210 of Intel Fortran Compiler for Linux  
- **Parallel:** Yes  
- **Firmware:** Version 1.0.1 released Oct-2018  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None
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PowerEdge T340 (Intel Xeon E-2144G, 3.60GHz)

SPECspeed2017_fp_base = 24.3
SPECspeed2017_fp_peak = 22.9

<table>
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</tr>
</tbody>
</table>

Results Table

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,1,0"
- LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
- OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4
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:
Virtualization Technology disabled
System Profile set to Custom
Dell Inc.
PowerEdge T340 (Intel Xeon E-2144G, 3.60GHz)  

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
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**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 enabled
- CPU Interconnect Bus Link Power Management disabled
- PCI ASPM L1 Link Power Management disabled
- Sysinfo program /home/cpu2017/bin/sysinfo
- Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
- running on linux-icjc Wed Dec 19 17:56:24 2018

**Platform Notes (Continued)**

- 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-2144G CPU @ 3.60GHz
- 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
- 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
- Model name: Intel(R) Xeon(R) E-2144G CPU @ 3.60GHz
- Stepping: 10
- CPU MHz: 4352.387
- CPU max MHz: 4500.0000
- CPU min MHz: 800.0000
- BogoMIPS: 7199.97
- Virtualization: VT-x
### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Cache Level</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>32K</td>
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<td>L1i</td>
<td>32K</td>
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<tr>
<td>L2</td>
<td>256K</td>
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<tr>
<td>L3</td>
<td>8192K</td>
</tr>
</tbody>
</table>

**NUMA node 0 CPU(s):** 0-7

**Flags:** fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 ccfliush 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 aperfmperf eagerfpu 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 ida arat epccid single pln pts dtherm hwp hwp_act_window hwp_epp intel_pt rsb_ctsw spec_ctrl stibp retolpeline kaiser tcp_shadow vmni flexpriority ept vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2 erms invpcid xsaveopt xsavec xgetbv1

```
From /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: 64277 MB
    node 0 free: 55715 MB
    node distances:
      node 0
      0: 10

From /proc/meminfo
  MemTotal:       65820248 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

From /usr/bin/lsb_release -d
  SUSE Linux Enterprise Server 12 SP3

From /etc/*release* /etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 3
    # This file is deprecated and will be removed in a future service pack or release.
    # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"
    VERSION="12-SP3"
    VERSION_ID="12.3"
```

(Continued on next page)
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SPECspeed2017_fp_base = 24.3
SPECspeed2017_fp_peak = 22.9

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

Test Date: Dec-2018
Hardware Availability: Dec-2018
Software Availability: Apr-2018

Platform Notes (Continued)

PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
 Linux linux-icjc 4.4.126-94.22-default #1 SMP Wed Apr 11 07:45:03 UTC 2018 (9649989)
 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Dec 19 13:14 last=5

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 301G 22G 279G 8% /

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. 1.0.1 10/19/2018
Memory:
  1x 00ADO00001A00 HMA82GU7CJR8N-VK 16 GB 2 rank 2666
  3x 00AD00000A02 HMA82GU7CJR8N-VK 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
==============================================================================
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
CC  619.lbm_s(peak) 638.imagick_s(peak) 644.nab_s(peak)
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#### Compiler Version Notes (Continued)

```
FC  607.cactuBSSN_s(base)
 icpc (ICC) 18.0.2 20180210
 Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
 icc (ICC) 18.0.2 20180210
 Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
 ifort (IFORT) 18.0.2 20180210
 Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

FC  607.cactuBSSN_s(peak)
 icpc (ICC) 18.0.2 20180210
 Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
 icc (ICC) 18.0.2 20180210
 Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
 ifort (IFORT) 18.0.2 20180210
 Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
 ifort (IFORT) 18.0.2 20180210
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FC  603.bwaves_s(peak) 649.fotonik3d_s(peak) 654.roms_s(peak)
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 icc (ICC) 18.0.2 20180210
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(Continued on next page)
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Compiler Version Notes (Continued)

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
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

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

C benchmarks (continued):
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -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=3 -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=3 -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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-prefetch

(Continued on next page)
## Dell Inc. PowerEdge T340 (Intel Xeon E-2144G, 3.60GHz)  

| SPECspeed2017_fp_base | 24.3 |  
| SPECspeed2017_fp_peak | 22.9 |  

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

### Peak Optimization Flags (Continued)

- **C benchmarks (continued):**
  - `-ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3`  
  - `-DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP`  

- **Fortran benchmarks:**
  - `-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=3 -gopenmp -nostandard-realloc-lhs`  

- **Benchmarks using both Fortran and C:**
  - `-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=3`  
  - `-DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP -nostandard-realloc-lhs`  

- **Benchmarks using Fortran, C, and C++:**
  - `-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=3`  
  - `-DSPEC_SUPPRESS_OPENMP -gopenmp -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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