## SPEC® CPU2017 Floating Point Speed Result

### Dell Inc.

**PowerEdge T640 (Intel Xeon Gold 6254, 3.10GHz)**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s 72</td>
<td>72</td>
<td>139</td>
</tr>
<tr>
<td>607.cactuBSSN_s 72</td>
<td>72</td>
<td>89.2</td>
</tr>
<tr>
<td>619.lbm_s 72</td>
<td>72</td>
<td>89.2</td>
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<tr>
<td>621.wrf_s 72</td>
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<td>137</td>
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<tr>
<td>627.cam4_s 72</td>
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<td>628.pop2_s 72</td>
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<td>69.4</td>
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<tr>
<td>638.imagick_s 72</td>
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<td>126</td>
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<td>644.nab_s 72</td>
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<tr>
<td>649.fotonik3d_s 72</td>
<td>72</td>
<td>74.4</td>
</tr>
<tr>
<td>654.roms_s 72</td>
<td>72</td>
<td>118</td>
</tr>
</tbody>
</table>

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### Hardware

- **CPU Name:** Intel Xeon Gold 6254  
- **Max MHz.:** 4000  
- **Nominal:** 3100  
- **Enabled:** 36 cores, 2 chips, 2 threads/core  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 24.75 MB I+D on chip per chip  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

### Software

- **OS:** Ubuntu 18.04.2 LTS  
  kernel 4.15.0-45-generic  
- **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 2.1.8 released Apr-2019  
- **File System:** ext4  
- **System State:** Run level 5 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None
Dell Inc.  

PowerEdge T640 (Intel Xeon Gold 6254, 3.10GHz)  

SPECspeed2017_fp_base = 134  
SPECspeed2017_fp_peak = 134  

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</tbody>
</table>

SPECspeed2017_fp_base = 134  
SPECspeed2017_fp_peak = 134

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

NA: 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:
ADDDC setting disabled
Sub NUMA Cluster disabled
Dell Inc. PowerEdge T640 (Intel Xeon Gold 6254, 3.10GHz)

**SPEC CPU2017 Floating Point Speed Result**

**Dell Inc.**

**SPECspeed2017_fp_base = 134**

**SPECspeed2017_fp_peak = 134**

**CPU2017 License:** 55  
**Test Date:** May-2019  
**Test Sponsor:** Dell Inc.  
**Hardware Availability:** Apr-2019  
**Tested by:** Dell Inc.  
**Software Availability:** Feb-2019

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**Platform Notes (Continued)**

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 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 9bcde8f2999c33d61f64985e45859ea9  
runtime on intel-sut Wed May 22 21:58:03 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) Gold 6254 CPU @ 3.10GHz
  2 "physical id"s (chips)
  72 "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 2
Core(s) per socket: 18
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6254 CPU @ 3.10GHz
Stepping: 6
CPU MHz: 1764.643
```

(Continued on next page)
Spec CPU2017 Floating Point Speed Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.
PowerEdge T640 (Intel Xeon Gold 6254, 3.10GHz)

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SPECspeed2017_fp_base = 134
SPECspeed2017_fp_peak = 134

Platform Notes (Continued)

BogoMIPS: 6200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68
NUMA node1 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69
NUMA node2 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70
NUMA node3 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63,67,71
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
vm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aernfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand
lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs
ibpb stibp ibrs_enhanced tpr_shadow vmmflexpriority ept vpid fsgsbase tsc_adjust
bmi1 hle avx2 smep bmi2 ermi invpcid rtm cqm mpx rndt_a avx512f avx512dq rdseed adx
smap cflushtest clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves xsavec xgetbv
xsaves cmq_llc cmq_occmp_llc cmq_mbm_total cmq_mbm_local dtherm ida arat pln pts pku
ospke avx512_vnni flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size: 25344 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68
  node 0 size: 46763 MB
  node 0 free: 44528 MB
  node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69
  node 1 size: 48380 MB
  node 1 free: 46787 MB
  node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 66 70
  node 2 size: 48380 MB
  node 2 free: 45708 MB
  node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67 71
  node 3 size: 48379 MB
  node 3 free: 46777 MB
  node distances:
    node 0 1 2 3
    0: 10 21 21 21
    1: 21 10 21 21
    2: 11 21 10 21
    3: 21 11 21 10

(Continued on next page)
Platform Notes (Continued)

From /proc/meminfo
MemTotal: 196509044 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
go+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:
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB

run-level 5 May 22 17:04
SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 439G 25G 392G 6% /

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. 2.1.8 04/30/2019
Memory:
1x 002C0632002C 18ASF2G72PDZ-2G9E1 16 GB 2 rank 2933
7x 002C069D002C 18ASF2G72PDZ-2G9E1 16 GB 2 rank 2933
4x 00AD069D00AD HMA82GR7CJR8N-WM 16 GB 2 rank 2933
12x Not Specified Not Specified

(Continued on next page)
Dell Inc. PowerEdge T640 (Intel Xeon Gold 6254, 3.10GHz)

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**Test Date:** May-2019  
**Tested by:** Dell Inc.  
**Hardware Availability:** Apr-2019  
**Software Availability:** Feb-2019

**SPECspeed2017_fp_base = 134**  
**SPECspeed2017_fp_peak = 134**

**Platform Notes (Continued)**

(End of data from sysinfo program)

**Compiler Version Notes**

==============================================================================
CC  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.
------------------------------------------------------------------------------

==============================================================================
FC  607.cactuBSSN_s(base, peak)
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Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
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.
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FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
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FC  603.bwaves_s(peak) 649.fotonik3d_s(peak)
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)

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Compiler Version Notes (Continued)

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Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel (R) C Intel (R) 64 Compiler for applications running on Intel(R) 64,
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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.cactusBSSN_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

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

- `649.fotonik3d_s: -DSPEC_LP64`
- `654.roms_s: -DSPEC_LP64`

---

**Base Optimization Flags**

**C benchmarks:**
- `xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
- `ffinite-math-only -qopt-mem-layout-trans=4 -openmp -DSPEC_OPENMP`

**Fortran benchmarks:**
- `-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
- `ffinite-math-only -qopt-mem-layout-trans=4 -openmp`
- `nostandard-realloc-lhs`

**Benchmarks using both Fortran and C:**
- `xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
- `ffinite-math-only -qopt-mem-layout-trans=4 -openmp -DSPEC_OPENMP`
- `nostandard-realloc-lhs`

**Benchmarks using Fortran, C, and C++:**
- `xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
- `ffinite-math-only -qopt-mem-layout-trans=4 -openmp -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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CPU2017 License: 55                 Test Date: May-2019
Test Sponsor: Dell Inc.            Hardware Availability: Apr-2019
Tested by: Dell Inc.               Software Availability: Feb-2019

### Peak Portability Flags
Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**
-`-xCORE-AVX512` `-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-AVX512` `-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-AVX512` `-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-AVX512`
- `-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-AVX512` `-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-AVX512` `-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
## SPEC CPU2017 Floating Point Speed Result

### Dell Inc.

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**PowerEdge T640 (Intel Xeon Gold 6254, 3.10GHz)**

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


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