SPECFZ CPU2017 Floating Point Speed Result

Dell Inc.

PowerEdge R640 (Intel Xeon Gold 6254, 3.10GHz)  SPECspeed2017_fp_base = 139

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_peak = 140</th>
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<table>
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<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Dell Inc.</td>
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</tbody>
</table>

| Threads | 0  | 20.0 | 50.0 | 80.0 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 500 |
|----------|----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 603.bwaves_s | 36 |      |      |      |     |     |     |     | 151 | 151 | 151 | 151 | 151 | 151 | 151 | 151 | 151 | 151 | 151 | 151 | 151 | 151 | 151 |     |
| 607.cactuBSSN_s | 36 |      |      |      |     |     |     |     | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 |     |
| 621.wrf_s | 36 |      |      |      |     |     |     |     | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 |     |
| 627.cam4_s | 36 |      |      |      |     |     |     |     | 72.4 | 72.4 | 72.4 | 72.4 | 72.4 | 72.4 | 72.4 | 72.4 | 72.4 | 72.4 | 72.4 | 72.4 | 72.4 | 72.4 | 72.4 |     |
| 628.pop2_s | 36 |      |      |      |     |     |     |     | 73.4 | 73.4 | 73.4 | 73.4 | 73.4 | 73.4 | 73.4 | 73.4 | 73.4 | 73.4 | 73.4 | 73.4 | 73.4 | 73.4 | 73.4 |     |
| 638.imagick_s | 36 |      |      |      |     |     |     |     | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 133 |     |
| 644.nab_s | 36 |      |      |      |     |     |     |     | 264 | 264 | 264 | 264 | 264 | 264 | 264 | 264 | 264 | 264 | 264 | 264 | 264 | 264 | 264 |     |
| 649.fotonik3d_s | 36 |      |      |      |     |     |     |     | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 |     |
| 654.roms_s | 36 |      |      |      |     |     |     |     | 122 | 122 | 122 | 122 | 122 | 122 | 122 | 122 | 122 | 122 | 122 | 122 | 122 | 122 | 122 |     |

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<tr>
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<tr>
<td>kernel 4.15.0-45-generic</td>
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<tr>
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<td>Fortran: Version 19.0.1.144 of Intel Fortran</td>
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<td>Peak Pointers:</td>
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## SPEC CPU2017 Floating Point Speed Result

**Dell Inc.**  
PowerEdge R640 (Intel Xeon Gold 6254, 3.10GHz)

**SPECspeed2017_fp_base = 139**  
**SPECspeed2017_fp_peak = 140**

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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"
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:
ADDC setting disabled
Sub NUMA Cluster disabled

(Continued on next page)
<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtualization Technology disabled</td>
</tr>
<tr>
<td>DCU Streamer Prefetcher disabled</td>
</tr>
<tr>
<td>System Profile set to Custom</td>
</tr>
<tr>
<td>CPU Performance set to Maximum Performance</td>
</tr>
<tr>
<td>C States set to Autonomous</td>
</tr>
<tr>
<td>C1E disabled</td>
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<tr>
<td>Uncore Frequency set to Dynamic</td>
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<tr>
<td>Energy Efficiency Policy set to Performance</td>
</tr>
<tr>
<td>Memory Patrol Scrub disabled</td>
</tr>
<tr>
<td>Logical Processor disabled</td>
</tr>
<tr>
<td>CPU Interconnect Bus Link Power Management disabled</td>
</tr>
<tr>
<td>PCI ASPM L1 Link Power Management disabled</td>
</tr>
<tr>
<td>Sysinfo program /home/cpu2017/bin/sysinfo</td>
</tr>
<tr>
<td>Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9</td>
</tr>
<tr>
<td>running on intel-sut Fri Apr 5 20:20:05 2019</td>
</tr>
</tbody>
</table>

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)
- 36 "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 : 18
- 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 1scpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 36
- On-line CPU(s) list: 0-35
- Thread(s) per core: 1
- Core(s) per socket: 18
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6254 CPU @ 3.10GHz
- Stepping: 6
- CPU MHz: 3764.986

(Continued on next page)
## SPEC CPU2017 Floating Point Speed Result

### Dell Inc.

**PowerEdge R640 (Intel Xeon Gold 6254, 3.10GHz)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<td>Test Sponsor</td>
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### SPECspeed2017_fp_base = 139

### SPECspeed2017_fp_peak = 140

### 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, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34  
**NUMA node1 CPU(s):** 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35  
**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 aperfmperf 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 vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

```bash
/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:** 2 nodes (0-1)  
**node 0 cpus:** 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34  
**node 0 size:** 191936 MB  
**node 0 free:** 188639 MB  
**node 1 cpus:** 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35  
**node 1 size:** 193510 MB  
**node 1 free:** 188813 MB  
**node distances:**  
**node 0 1**  
  0: 10 21  
  1: 21 10

From /proc/meminfo  
**MemTotal:** 394697312 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

(Continued on next page)
### Platform Notes (Continued)

```
os-release:
    NAME="Ubuntu"
    VERSION="18.04.2 LTS (Bionic Beaver)"
    ID=ubuntu
    IDLIKE=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 Apr 5 15:05

SPEC is set to: /home/cpu2017
    Filesystem  Type  Size  Used Avail Use%  Mounted on
    /dev/nvme0n1p2  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. 2.1.7 04/03/2019
    Memory:
        12x 002C069D002C 36ASF4G72FZ-2G9E2 32 GB 2 rank 2933
        12x Not Specified Not Specified

(End of data from sysinfo program)
```
## Dell Inc.

**PowerEdge R640 (Intel Xeon Gold 6254, 3.10GHz)**

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<thead>
<tr>
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<td><strong>SPECspeed2017_fp_peak</strong> = 140</td>
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</tbody>
</table>

### Compiler Version Notes (Continued)

---

**FC 607.cactuBSSN_s(base, peak)**

**Intel(R) C++ Compiler for applications running on Intel(R) 64,**

**Version 19.0.1.144 Build 20181018**

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

**Intel(R) C 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 603.bwaves_s(base)**

**Intel(R) Fortran 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 603.bwaves_s(peak)**

**Intel(R) Fortran Compiler for applications running on Intel(R) 64,**

**Version 19.0.1.144 Build 20181018**

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---

**CC 621.wrf_s(base)**

**Intel(R) Fortran Compiler for applications running on Intel(R) 64,**

**Version 19.0.1.144 Build 20181018**

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

---

**CC 621.wrf_s(peak)**

**Intel(R) Fortran Compiler for applications running on Intel(R) 64,**

**Version 19.0.1.144 Build 20181018**

(Continued on next page)
Dell Inc.
PowerEdge R640 (Intel Xeon Gold 6254, 3.10GHz)

SPECspeed2017_fp_base = 139
SPECspeed2017_fp_peak = 140

Compiler Version Notes (Continued)

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

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 -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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

(Continued on next page)
Dell Inc. PowerEdge R640 (Intel Xeon Gold 6254, 3.10GHz)

SPEC CPU2017 Floating Point Speed Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECspeed2017_fp_base = 139
SPECspeed2017_fp_peak = 140

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

Base Optimization Flags (Continued)

Fortran benchmarks:
-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:
-xCORE-AVX512 -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-AVX512 -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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: basepeak = yes

(Continued on next page)
## Dell Inc.

**PowerEdge R640 (Intel Xeon Gold 6254, 3.10GHz)**

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### Peak Optimization Flags (Continued)

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

**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: basepeak = yes

**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: basepeak = yes

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


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


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