## SPEC® CPU2017 Floating Point Speed Result

**Dell Inc.**

**PowerEdge M640 (Intel Xeon Platinum 8268, 2.90GHz)**

**SPECspeed2017_fp_base = 150**

**SPECspeed2017_fp_peak = 150**

<table>
<thead>
<tr>
<th>Threads</th>
<th>603.bwaves_s</th>
<th>607.cactuBSSN_s</th>
<th>619.ibm_s</th>
<th>621.wrf_s</th>
<th>627.cam4_s</th>
<th>628.pop2_s</th>
<th>638.imagick_s</th>
<th>644.nab_s</th>
<th>649.fotonik3d_s</th>
<th>654.roms_s</th>
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<tr>
<td>48</td>
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</tbody>
</table>

### Hardware

- **CPU Name**: Intel Xeon Platinum 8268
- **Max MHz.**: 3900
- **Nominal**: 2900
- **Enabled**: 48 cores, 2 chips
- **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**: 35.75 MB I+D on chip per core
- **Memory**: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage**: 1 x 480 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 2.3.1 released May-2019
- **File System**: ext4
- **System State**: Run level 3 (multi-user)
- **Base Pointers**: 64-bit
- **Peak Pointers**: 64-bit
- **Other**: None
Dell Inc. PowerEdge M640 (Intel Xeon Platinum 8268, 2.90GHz) SPECspeed2017_fp_base = 150

SPECspeed2017_fp_peak = 150

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base</th>
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SPECspeed2017_fp_base = 150
SPECspeed2017_fp_peak = 150

Submit Notes
The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

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:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64"

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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
# SPEC CPU2017 Floating Point Speed Result

**Dell Inc.**

PowerEdge M640 (Intel Xeon Platinum 8268, 2.90GHz)

<table>
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</table>

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

## Platform Notes

- BIOS settings:
  - ADDDC setting disabled
  - Sub NUMA Cluster enabled
  - Virtualization Technology disabled
  - DCU Streamer Prefetcher enabled
  - 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 disabled
  - PCI ASPM L1 Link Power Management disabled
  - Sysinfo program `/home/cpu2017/bin/sysinfo`
  - Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
  - running on intel-sut Mon May 20 21:53:38 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

- From `/proc/cpuinfo`
  - model name : Intel(R) Xeon(R) Platinum 8268 CPU @ 2.90GHz
  - 2 "physical id"s (chips)
  - 48 "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 : 24
  - siblings : 24
  - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
  - physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 24 26 27 28 29

- From `lscpu`:
  - Architecture: x86_64
  - CPU op-mode(s): 32-bit, 64-bit
  - Byte Order: Little Endian
  - CPU(s): 48
  - On-line CPU(s) list: 0-47
  - Thread(s) per core: 1
  - Core(s) per socket: 24
  - Socket(s): 2
  - NUMA node(s): 2
  - Vendor ID: GenuineIntel
  - CPU family: 6
  - Model: 85

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

<table>
<thead>
<tr>
<th>Model name:</th>
<th>Intel(R) Xeon(R) Platinum 8268 CPU @ 2.90GHz</th>
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<tbody>
<tr>
<td>Stepping:</td>
<td>6</td>
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<tr>
<td>CPU MHz:</td>
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<td>BogoMIPS:</td>
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<td>L1i cache:</td>
<td>32K</td>
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<td>L2 cache:</td>
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<td>L3 cache:</td>
<td>36608K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s):</td>
<td>0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
<td>1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47</td>
</tr>
<tr>
<td>Flags:</td>
<td>fpu vme de pse tsc msr 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 apic cpuid nonstop_tsc cpuid incr perfmrperf 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 3nowprefetch cpuid_fault ebp cat_l3 cd p3 instruction set extensionsarch_capabilities</td>
</tr>
</tbody>
</table>

/proc/cpuinfo cache data
- cache size: 36608 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 36 38 40 42 44 46
- node 0 size: 191891 MB
- node 0 free: 187104 MB
- node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
- node 1 size: 193530 MB
- node 1 free: 190297 MB
- node distances:
  - node 0: 0 1
  - 0: 10 21
  - 1: 21 10

From /proc/meminfo
- MemTotal: 394671668 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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

**Dell Inc.**

PowerEdge M640 (Intel Xeon Platinum 8268, 2.90GHz)

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

**Platform Notes (Continued)**

```
/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:

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 3 May 20 17:16

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. 2.3.1 05/02/2019
   Memory:
      6x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
      6x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
      4x Not Specified Not Specified

(End of data from sysinfo program)
Dell Inc.

PowerEdge M640 (Intel Xeon Platinum 8268, 2.90GHz)

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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)
------------------------------------------------------------------------------
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.
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.
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.
------------------------------------------------------------------------------
==============================================================================
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
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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.
------------------------------------------------------------------------------
==============================================================================
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) 64,
  Version 19.0.1.144 Build 20181018
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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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(Continued on next page)
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PowerEdge M640 (Intel Xeon Platinum 8268, 2.90GHz)

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

Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

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
### Dell Inc.

**PowerEdge M640 (Intel Xeon Platinum 8268, 2.90GHz)**

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#### 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

**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
Dell Inc.

PowerEdge M640 (Intel Xeon Platinum 8268, 2.90GHz)

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**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_SUPPRESS_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:


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

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<td>Tested by: Dell Inc.</td>
<td>Software Availability: Feb-2019</td>
</tr>
</tbody>
</table>

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