# SPEC® CPU2017 Floating Point Speed Result

## Dell Inc.

**PowerEdge M640 (Intel Xeon Platinum 8270, 2.70GHz)**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>52</td>
<td>172</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>52</td>
<td>172</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>52</td>
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</tr>
<tr>
<td>621.wrf_s</td>
<td>52</td>
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<tr>
<td>627.cam4_s</td>
<td>52</td>
<td>172</td>
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<tr>
<td>628.pop2_s</td>
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<td>172</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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<tr>
<td>649.fotonik3d_s</td>
<td>52</td>
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</tr>
<tr>
<td>654.roms_s</td>
<td>52</td>
<td>172</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8270
- **Max MHz.:** 4000
- **Nominal:** 2700
- **Enabled:** 52 cores, 2 chips
- **Orderable:** 1,2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 35.75 MB I+D on chip per core
- **Other:** None
- **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 19.0.4.227 of Intel C/C++
- **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
SPEC CPU2017 Floating Point Speed Result

Dell Inc.

PowerEdge M640 (Intel Xeon Platinum 8270, 2.70GHz)

SPECspeed2017_fp_base = 149
SPECspeed2017_fp_peak = 150

Results Table

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<td>149</td>
<td></td>
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</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 149
SPECspeed2017_fp_peak = 150

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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.:
umactl --interleave=all runcpu <etc>
Dell Inc. PowerEdge M640 (Intel Xeon Platinum 8270, 2.70GHz)

SPEC CPU2017 Floating Point Speed Result

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SPECsped2017_fp_peak = 150
SPECsped2017_fp_base = 149

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.
Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: May-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 Wed Jun 26 00:02:43 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) Platinum 8270 CPU @ 2.70GHz
2 "physical id"s (chips)
52 "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 : 26
siblings : 26
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 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 22 24 25 26 27 28 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 52
On-line CPU(s) list: 0-51
Thread(s) per core: 1
Core(s) per socket: 26
Socket(s): 2
NUMA node(s) : 2
Vendor ID: GenuineIntel

(Continued on next page)
Dell Inc.  
PowerEdge M640 (Intel Xeon Platinum 8270, 2.70GHz)  

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

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

**Platform Notes (Continued)**

- **CPU family:** 6  
- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Platinum 8270 CPU @ 2.70GHz  
- **Stepping:** 6  
- **CPU MHz:** 2800.135  
- **BogoMIPS:** 5400.00  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 36608K  

**NUMA node0 CPU(s):**  
0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50  
**NUMA node1 CPU(s):**  
1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51  
**Flags:**  
- `fpu`  
- `vme`  
- `de`  
- `pse`  
- `tsc`  
- `msr`  
- `mca`  
- `cmov`  
- `pat`  
- `pse36`  
- `clflush`  
- `dts`  
- `acpi`  
- `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`  
- `monitor`  
- `ds_cpl`  
- `vmx`  
- `smx`  
- `est`  
- `tm2`  
- `ssse3`  
- `sdbg`  
- `fxsr`  
- `sse2`  
- `sse4_1`  
- `x2apic`  
- `movbe`  
- `popcnt`  
- `aes`  
- `avx`  
- `f16c`  
- `rdrand`  
- `lahf_lm`  
- `abm`  
- `ibrs`  
- `ibpb`  
- `ibrs_enhanced`  
- `tpr_shadow`  
- `vnmi`  
- `flexpriority`  
- `ept`  
- `vpid`  
- `fsgsbase`  
- `tsc_adjust`  
- `bmi1`  
- `hle`  
- `avx2`  
- `smep`  
- `bm12`  
- `erms`  
- `invpcid`  
- `rtm`  
- `cqmp`  
- `mpx`  
- `rdt_a`  
- `avx512f`  
- `avx512dq`  
- `rdseed`  
- `adx`  
- `msap`  
- `clflushopt`  
- `clwb`  
- `intel_pt`  
- `avx512cd`  
- `avx512bw`  
- `avx512vl`  
- `xsaves`  
- `xsaveopt`  
- `xsavec`  
- `xgetbv1`  
- `xsave`  
- `cqmg_occup_llc`  
- `cqmg_mbb_total`  
- `cqmg_mbb_local`  
- `dtherm`  
- `ida`  
- `arat`  
- `pln`  
- `pts`  
- `pku`  
- `ospke`  
- `avx512_vnni`  
- `flush_l1d`  
- `arch_capabilities`  

/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 48 50  
- **node 0 size:** 191911 MB  
- **node 0 free:** 188669 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 49 51  
- **node 1 size:** 193509 MB  
- **node 1 free:** 188704 MB  

**From /proc/meminfo**  
- **MemTotal:** 394670932 kB  
- **HugePages_Total:** 0
Dell Inc. 
PowerEdge M640 (Intel Xeon Platinum 8270, 2.70GHz) 

SPEC speed 2017 Floating Point Speed Result
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PowerEdge M640 (Intel Xeon Platinum 8270, 2.70GHz) 

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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: May-2019

Platform Notes (Continued)

Hugepagesize: 2048 kB

/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 Jun 25 19:35
SPEC is set to: /home/cpu2017
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda2 ext4 439G 37G 380G 9% /

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)
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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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
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.
Intel(R) Fortran 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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FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
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Compiler Version Notes (Continued)

==============================================================================
CC   621.wrf_s(peak) 628.pop2_s(peak)
Intel(R) Fortran 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.
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.

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
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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 8270, 2.70GHz)**

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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`  
- `-ffinite-math-only`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-DSPEC_SUPPRESS_OPENMP`  
- `-qopenmp`  
- `-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:


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

## SPEC CPU2017 Floating Point Speed Result

### Dell Inc.

#### PowerEdge M640 (Intel Xeon Platinum 8270, 2.70GHz)

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<thead>
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<th>SPECspeed2017_fp_base</th>
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
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