### CPU2017 Floating Point Rate Result

**Dell Inc.**

**PowerEdge R740 (Intel Xeon Gold 6242, 2.80GHz)**  

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
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<tr>
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<tr>
<td>503.bwaves_r</td>
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<td>507.cactuBSSN_r</td>
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<td>511.povray_r</td>
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<td>521.wrf_r</td>
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<td>527.cam4_r</td>
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</tr>
<tr>
<td>554.roms_r</td>
<td>89.5</td>
<td>97.8</td>
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</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6242  
- **Max MHz.:** 3900  
- **Nominal:** 2800  
- **Enabled:** 32 cores, 2 chips, 2 threads/core  
- **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:** 22 MB I+D on chip per chip  
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage:** 1 x 960 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:** No  
- **Firmware:** Version 2.1.6 released Mar-2019  
- **File System:** ext4  
- **System State:** Run level 5 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None

---

**Test Sponsor:** Dell Inc.  
**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Jan-2019
SPEC CPU2017 Floating Point Rate Result

Dell Inc. PowerEdge R740 (Intel Xeon Gold 6242, 2.80GHz)

SPECrate2017_fp_base = 201
SPECrate2017_fp_peak = 206

Results Table

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

SPECrate2017_fp_base = 201
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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
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

(Continued on next page)
Dell Inc.
PowerEdge R740 (Intel Xeon Gold 6242, 2.80GHz)

SPECrate2017_fp_base = 201
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Mar-2019
Tested by: Dell Inc.
Hardware Availability: Apr-2019
Software Availability: Jan-2019

General Notes (Continued)

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>

Platform Notes

BIOS settings:
ADDDC setting disabled
Sub NUMA Cluster enabled
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
running on intel-sut Fri Mar 29 17:54:35 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 6242 CPU @ 2.80GHz
  2 "physical id"s (chips)
  64 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 64

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

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Platform Notes (Continued)

On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6242 CPU @ 2.80GHz
Stepping: 6
CPU MHz: 2682.716
BogoMIPS: 5600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60
NUMA node1 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61
NUMA node2 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62
NUMA node3 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmprefx pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrr 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 vmmi flexpriority ept vpid fsgsbase tsc_adjust
bm1 hle avx2 smep bmi2 ets invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx
smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1
xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pku
ospke avx512_vni flush_l1d arch_capabilities

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
node 0 size: 95147 MB
node 0 free: 94628 MB
node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61
node 1 size: 96764 MB
node 1 free: 96298 MB
node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62
node 2 size: 96764 MB

(Continued on next page)
Dell Inc.  
PowerEdge R740 (Intel Xeon Gold 6242, 2.80GHz) 

SPEC CPU2017 Floating Point Rate Result  

Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECrate2017_fp_base = 201  
SPECrate2017_fp_peak = 206

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

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

Platform Notes (Continued)

```plaintext
node 2 free: 96279 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63
node 3 size: 96763 MB
node 3 free: 96311 MB
node distances:
  node 0 1 2 3
  0:  10  21  11  21
  1:  21  10  21  11
  2:  11  21  10  21
  3:  21  11  21  10
```

From `/proc/meminfo`
```
MemTotal:       394691808 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
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 5 Mar 29 12:23
```

```
SPEC is set to: /home/cpu2017
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda2      ext4  439G  19G  398G   5% /
```

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

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. 2.1.6 03/03/2019
Memory:
  12x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
  12x Not Specified Not Specified

(End of data from sysinfo program)

**Compiler Version Notes**

```
==============================================================================
  CC   519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(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.

==============================================================================
  CC   519.lbm_r(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.

==============================================================================
  CXXC 508.namd_r(base) 510.parest_r(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.

==============================================================================
  CXXC 508.namd_r(peak)
  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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---

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

** Tested by:** Dell Inc.

---

**Compiler Version Notes (Continued)**

** CC 511.povray_r(base) 526.blender_r(base, peak) **

---

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

Version 19.0.1.144 Build 20181018

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

Version 19.0.1.144 Build 20181018

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** CC 511.povray_r(peak) **

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

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

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---

** FC 507.cactuBSSN_r(base, peak) **

---

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

Version 19.0.1.144 Build 20181018

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

Version 19.0.1.144 Build 20181018

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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.

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** FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base) **

---

**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 554.roms_r(peak) **

---

**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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**(Continued on next page)**
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Software Availability: Jan-2019

Compiler Version Notes (Continued)

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.

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64
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Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte
Dell Inc.  
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Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: Jan-2019

### Peak Compiler Invocation

**C benchmarks:**  
```bash  
icc -m64 -std=c11  
```

**C++ benchmarks:**  
```bash  
icpc -m64  
```

**Fortran benchmarks:**  
```bash  
ifort -m64  
```

**Benchmarks using both Fortran and C:**  
```bash  
ifort -m64 icc -m64 -std=c11  
```

**Benchmarks using both C and C++:**  
```bash  
icpc -m64 icc -m64 -std=c11  
```

**Benchmarks using Fortran, C, and C++:**  
```bash  
icpc -m64 icc -m64 -std=c11 ifort -m64  
```

(Continued on next page)
## Dell Inc.

**PowerEdge R740 (Intel Xeon Gold 6242, 2.80GHz)**

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

**SPECrerate2017_fp_base = 201**

**SPECrerate2017_fp_peak = 206**

| Test Date: | Mar-2019 |
| Hardware Availability: | Apr-2019 |
| Software Availability: | Jan-2019 |

### Peak Optimization Flags (Continued)

510.parest_r: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

Fortran benchmarks:

503.bwaves_r: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte`

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte`

Benchmarks using both Fortran and C:

- `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte`

Benchmarks using both C and C++:

511.povray_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

526.blender_r: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

Benchmarks using Fortran, C, and C++:

- `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte`

---

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 Rate Result

**Dell Inc.**

PowerEdge R740 (Intel Xeon Gold 6242, 2.80GHz)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base = 201</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak = 206</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

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Tested with SPEC CPU2017 v1.0.5 on 2019-03-29 13:54:35-0400.


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