**SPEC CPU®2017 Floating Point Rate Result**

**Dell Inc.**
PowerEdge R740xd (Intel Xeon Gold 6258R, 2.70 GHz)

<table>
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<tr>
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<td>Tested by:</td>
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<th>Test Date:</th>
<th>May-2020</th>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Jul-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Apr-2020</td>
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**SPECrates:**
- **SPECrate®2017_fp_base = 293**
- **SPECrate®2017_fp_peak = 313**

**Hardware**

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<tr>
<th>Benchmark</th>
<th>Copies</th>
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<tr>
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<td>534</td>
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</tr>
<tr>
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<td>112</td>
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<td>508.namd_r</td>
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<td>554.roms_r</td>
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**Software**

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<th>OS:</th>
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<tr>
<td>Parallel:</td>
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<tr>
<td>Firmware:</td>
<td>Version 2.7.7 released May-2020</td>
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<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
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<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
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<tr>
<td>Peak Pointers:</td>
<td>64-bit</td>
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<tr>
<td>Other:</td>
<td>jemalloc memory allocator V5.0.1</td>
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<tr>
<td>Power Management:</td>
<td>BIOS set to prefer performance at the cost of additional power usage</td>
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**CPU Name:** Intel Xeon Gold 6258R

- **Max MHz:** 4000
- **Nominal:** 2700
- **Enabled:** 56 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:** 38.5 MB I+D on chip per chip
- **Other:** None

**Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933V-R, running at 2933)

**Storage:** 1 x 1.92 TB SATA SSD

**Other:** None

---

**Page 1**

Standard Performance Evaluation Corporation (info@spec.org) [https://www.spec.org/](https://www.spec.org/)
Dell Inc.
PowerEdge R740xd (Intel Xeon Gold 6258R, 2.70 GHz)

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

Results Table

<table>
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</table>

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

Compiler Notes
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

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"

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/mnt/ramdisk/cpu2017-ic19.1u1/lib/intel64:/mnt/ramdisk/cpu2017-ic19.1u1/je5.0.1-64"
MALLOCP_CONF = "retain:true"
SPEC CPU®2017 Floating Point Rate Result

Dell Inc.
PowerEdge R740xd (Intel Xeon Gold 6258R, 2.70 GHz)

SPECrate®2017_fp_base = 293
SPECrate®2017_fp_peak = 313

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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>
Benchmark run from a 225 GB ramdisk created with the cmd; "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk"
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS settings:
Sub NUMA Cluster enabled
Virtualization Technology 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
Logical Processor enabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
UPI Prefetch enabled
LLC Prefetch disabled
Dead Line LLC Alloc enabled
Directory AtoS disabled

Sysinfo program /mnt/ramdisk/cpu2017-ic19.1u1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011
running on user-pc.spa.lab Sat May 16 23:13:57 2020

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

(Continued on next page)
Dell Inc.
PowerEdge R740xd (Intel Xeon Gold 6258R, 2.70 GHz)

CPU2017 License: 55
Test Sponsor: Dell Inc.
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SPECrate®2017_fp_base = 293
SPECrate®2017_fp_peak = 313

Platform Notes (Continued)

From /proc/cpuinfo
model name : Intel(R) Xeon(R) Gold 6258R CPU @ 2.70GHz
  2 "physical id"s (chips)
  112 "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 : 28
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 2
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6258R CPU @ 2.70GHz
Stepping: 7
CPU MHz: 2300.724
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 5400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s):
0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,96,100,104,108
NUMA node1 CPU(s):
1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,97,101,105,109
NUMA node2 CPU(s):
2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94,98,102,106,110
NUMA node3 CPU(s):
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov

(Continued on next page)
Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 6258R, 2.70 GHz)

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Test Date: May-2020
Hardware Availability: Jul-2020
Software Availability: Apr-2020

SPECrate®2017_fp_base = 293
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Platform Notes (Continued)

pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpemgb rdtscp
lm constant_tsc art 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
xtrp pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
flexpriority ept vpid fsqgsbase 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 xsaves xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occult_llc cqm_mbm_total
cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_lld
arch_capabilities

/proc/cpuinfo cache data
  cache size : 39424 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 72 76 80 84 88 92 96
  100 104 108

  node 0 size: 192070 MB

  node 0 free: 181855 MB

  node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89 93 97
  101 105 109

  node 1 size: 193530 MB

  node 1 free: 193250 MB

  node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 66 70 74 78 82 86 90 94 98
  102 106 110

  node 2 size: 193530 MB

  node 2 free: 193184 MB

  node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67 71 75 79 83 87 91 95 99
  103 107 111

  node 3 size: 193504 MB

  node 3 free: 193209 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: 791179272 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Dell Inc.
PowerEdge R740xd (Intel Xeon Gold 6258R, 2.70 GHz)

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<td>Apr-2020</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

```
os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.1 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.1"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.1 (Ootpa)"
    ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga
```

```
uname -a:
Linux user-pc.spa.lab 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- CVE-2018-3620 (L1 Terminal Fault): Not affected
- Microarchitectural Data Sampling: Not affected
- CVE-2017-5754 (Meltdown): Not affected
- CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

```
run-level 3 May 16 17:33 last=5
```

```
SPEC is set to: /mnt/ramdisk/cpu2017-ic19.1ul
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 225G 4.2G 221G 2% /mnt/ramdisk
```

From /sys/devices/virtual/dmi/id
BIOS: Dell Inc. 2.7.7 05/04/2020
Vendor: Dell Inc.
Product: PowerEdge R740xd
Product Family: PowerEdge
Serial: F5BMCS2

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.

Memory:

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Dell Inc.
PowerEdge R740xd (Intel Xeon Gold 6258R, 2.70 GHz)

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

Test Date: May-2020
Hardware Availability: Jul-2020
Software Availability: Apr-2020

Platform Notes (Continued)

1x 002C00B30002C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
17x 002C00B30002C 36ASF4G72PZ-3G2E7 32 GB 2 rank 3200
1x 002C06320002C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
2x 002C069D0002C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
2x 002C069D0002C 36ASF4G72PZ-3G2E7 32 GB 2 rank 3200
1x 00AD063200AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200

(End of data from sysinfo program)

Compiler Version Notes

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<td>Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1</td>
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<tr>
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### Compiler Version Notes (Continued)

Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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<th>507.cactuBSSN_r(base, peak)</th>
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<tr>
<td>Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304</td>
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<th>Fortran</th>
<th>503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)</th>
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(Continued on next page)
Compiler Version Notes (Continued)

Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
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Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304
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Fortran, C      | 521.wrf_r(peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
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Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
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Dell Inc.
PowerEdge R740xd (Intel Xeon Gold 6258R, 2.70 GHz)

SPEC CPU®2017 Floating Point Rate Result

| SPECrate®2017_fp_base = 293 |
| SPECrate®2017_fp_peak = 313 |

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

Test Date: May-2020
Hardware Availability: Jul-2020
Software Availability: Apr-2020

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

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:
-m64 -mnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -gopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.
PowerEdge R740xd (Intel Xeon Gold 6258R, 2.70 GHz)

SPECrate®2017_fp_base = 293
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CPU2017 License: 55
Test Sponsor: Dell Inc.
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Base Optimization Flags (Continued)

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-auto -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo -no-prec-div
-qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both C and C++:
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo -no-prec-div
-qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
**SPEC CPU®2017 Floating Point Rate Result**

Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 6258R, 2.70 GHz)

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</table>

**SPECrate®2017_fp_base = 293**

**SPECrate®2017_fp_peak = 313**

---

### Peak Compiler Invocation

C benchmarks:

- icc

C++ benchmarks:

- icpc

Fortran benchmarks:

- ifort

Benchmarks using both Fortran and C:

- ifort icc

Benchmarks using both C and C++:

- icpc icc

Benchmarks using Fortran, C, and C++:

- icpc icc ifort

---

### Peak Portability Flags

Same as Base Portability Flags

---

### Peak Optimization Flags

C benchmarks:

- 519.lbm_r: basepeak = yes
- 538.imagick_r: basepeak = yes
- 544.nab_r: basepeak = yes

C++ benchmarks:

- 508.namd_r: basepeak = yes
- 510.parest_r: -m64 -qnextgen
  -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
  -Wl,-z,muldefs -fuse-ld=gold -xCORE-AVX512 -Ofast
  -ffast-math -flto -mfpmath=sse -funroll-loops
  -qopt-mem-layout-trans=4 -L/usr/local/jemalloc64-5.0.1/lib
  -ljemalloc

(Continued on next page)
Peak Optimization Flags (Continued)

Fortran benchmarks:

```
503.bwaves_r: -m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fuse-ld=gold -xCORE-AVX512 -O3 -ipo
-no-prec-div -gopt-prefetch -ffinite-math-only
-gopt-multiple-gather-scatter-by-shuffles
-gopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

549.fotonik3d_r: basepeak = yes

554.roms_r: Same as 503.bwaves_r

Benchmarks using both Fortran and C:

```
521.wrf_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -gopt-prefetch -ffinite-math-only
-gopt-multiple-gather-scatter-by-shuffles
-gopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

```
511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -gopt-prefetch -ffinite-math-only
-gopt-multiple-gather-scatter-by-shuffles
-gopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

```
507.cactuBSSN_r: basepeak = yes
```

The flags files that were used to format this result can be browsed at:

Dell Inc.  
PowerEdge R740xd (Intel Xeon Gold 6258R, 2.70 GHz)  

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You can also download the XML flags sources by saving the following links:
- [Intel-ic19.1u1-official-linux64_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml)
- [Dell-Platform-Flags-PowerEdge-revE10.xml](http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE10.xml)

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

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