**Dell Inc.**

PowerEdge R750 (Intel Xeon Gold 6314U, 2.30 GHz)

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Test Date</th>
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<tbody>
<tr>
<td>55</td>
<td>May-2021</td>
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Test Sponsor: Dell Inc.
Tested by: Dell Inc.

**SPECrate®2017_fp_base = 201**
**SPECrate®2017_fp_peak = 214**

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<td>214</td>
<td>201</td>
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<table>
<thead>
<tr>
<th>Software</th>
</tr>
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<tr>
<td>OS: Red Hat Enterprise Linux 8.3 (Ootpa) 4.18.0-240.15.1.el8_3.x86_64</td>
</tr>
<tr>
<td>Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux; C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux</td>
</tr>
<tr>
<td>Parallel: No</td>
</tr>
<tr>
<td>Firmware: Version 1.1.2 released Apr-2021</td>
</tr>
<tr>
<td>File System: tmpfs</td>
</tr>
<tr>
<td>System State: Run level 5 (graphical multi-user)</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Peak Pointers: 64-bit</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>jemalloc memory allocator V5.0.1</td>
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(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

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SPECrate®2017_fp_base = 201
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: May-2021
Hardware Availability: May-2021
Software Availability: Feb-2021

Software (Continued)
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.

Results Table

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</tbody>
</table>

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"

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
"/mnt/ramdisk2/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk2/cpu2017-1.1.5-ic2021.1/je5.0.1-64"
MALLOCONF = "retain:true"
**SPEC CPU®2017 Floating Point Rate Result**

Dell Inc.

PowerEdge R750 (Intel Xeon Gold 6314U, 2.30 GHz)

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<td>= 201</td>
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</table>

**CPU2017 License**: 55  
**Test Sponsor**: Dell Inc.  
**Tested by**: Dell Inc.  
**CPU2017 License**: 55  
**Test Date**: May-2021  
**Software Availability**: Feb-2021

---

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM  
memory using Red Hat Enterprise Linux 8.1  
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>  
jemalloc, a general purpose malloc implementation  
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5  

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.

Benchmark run from a 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk"

---

**Platform Notes**

**BIOS Settings:**

Sub NUMA Cluster : 2-Way Clustering  
Virtualization Technology : Disabled

System Profile : Custom  
CPU Power Management : Maximum Performance  
C1E : Disabled  
C States : Autonomous  
Memory Patrol Scrub : Disabled  
Energy Efficiency Policy : Performance  
CPU Interconnect Bus Link  
Power Management : Disabled

Sysinfo program /mnt/ramdisk2/cpu2017-1.1.5-ic2021.1/bin/sysinfo  
Rev: r6538 of 2020-09-24 e8664e66d2d7080afea89d4b38e2f1c  
running on localhost.localdomain Thu May  6 22:44:38 2021

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

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

model name : Intel(R) Xeon(R) Gold 6314U CPU @ 2.30GHz
  1 "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 : 32
siblings : 64
physical 0: cores 0 1 2 3 4 5 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
From 1scpu:
  Architecture:          x86_64
  CPU op-mode(s):        32-bit, 64-bit
  Byte Order:            Little Endian
  CPU(s):                64
  On-line CPU(s) list:   0-63
  Thread(s) per core:    2
  Core(s) per socket:    32
  Socket(s):             1
  NUMA node(s):          2
  Vendor ID:             GenuineIntel
  CPU family:            6
  Model:                 106
  Model name:            Intel(R) Xeon(R) Gold 6314U CPU @ 2.30GHz
  Stepping:              6
  CPU MHz:               3090.046
  BogoMIPS:              4600.00
  Virtualization:       VT-x
  L1d cache:             48K
  L1i cache:             32K
  L2 cache:              1280K
  L3 cache:              49152K
From 1scpu:
  NUMA node0 CPU(s):
  0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58
  60,62
  NUMA node1 CPU(s):
  1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59
  61,63
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 art arch_perfmon pebs bts rep_good nopl xtopology
               nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx
               est tm2 ssse3 fma cx16 xtrunc pdcm pcid dca sse4_1 sse4_2 x2apic movbe
               popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch
               cpuid_fault epb cat_l3 invpcid_single intel_pni sdbg mce ibrs ibpb ibrs
               enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid
               cmov retכ 16 rbzw aa 16 rbwi intel_pt avx512f avx512dq rdseed adx smap
               avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl
               xsaveopt xsavec xgetbv1

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

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CPU2017 License: 55
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SPECrates®2017_fp_base = 201
SPECrates®2017_fp_peak = 214

Test Date: May-2021
Hardware Availability: May-2021
Software Availability: Feb-2021

Platform Notes (Continued)

xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect wbnoinvd
dterm ida arat pln pts avx512vbmi umip pku ospke avx512_vbmi2 qfni vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_lld
arch_capabilities

/proc/cpuinfo cache data
  cache size : 49152 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
  52 54 56 58 60 62
  node 0 size: 122854 MB
  node 0 free: 112288 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
  53 55 57 59 61 63
  node 1 size: 123670 MB
  node 1 free: 127349 MB
  node distances:
  node 0 1
  0: 10 11
  1: 11 10

From /proc/meminfo
  MemTotal: 263567800 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

/sbin/tuned-adm active
  Current active profile: throughput-performance

From /etc/*release*/etc/*version*/
  os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.3 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.3"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
    ANSI_COLOR="0;31"
    redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
    system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:

(Continued on next page)
Dell Inc.  
PowerEdge R750 (Intel Xeon Gold 6314U, 2.30 GHz)  

<table>
<thead>
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#### Platform Notes (Continued)

Linux localhost.localdomain 4.18.0-240.15.1.el8_3.x86_64 #1 SMP Wed Feb 3 03:12:15 EST 2021 x86_64 x86_64 x86_64 GNU/Linux  

Kernel self-reported vulnerability status:

- **CVE-2018-12207 (iTLB Multihit):** Not affected  
- **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  
- **CVE-2020-0543 (Special Register Buffer Data Sampling):** Not affected  
- **CVE-2019-11135 (TSX Asynchronous Abort):** Not affected  

- **run-level 5 May 6 17:24**  

- **SPEC is set to:** /mnt/ramdisk2/cpu2017-1.1.5-ic2021.1  
  - **Filesystem** | **Type** | **Size** | **Used** | **Avail** | **Use%** | **Mounted on**  
  - tmpfs | tmpfs | 225G | 6.9G | 219G | 4% | /mnt/ramdisk2  

- **From /sys/devices/virtual/dmi/id**  
  - **Vendor:** Dell Inc.  
  - **Product:** PowerEdge R750  
  - **Product Family:** PowerEdge  
  - **Serial:** 1234567  

- **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:**  
    - 6x 002C069D002C 18ASF4G72PD2-3G2E1 32 GB 2 rank 3200  
    - 2x 00AD063200AD HMAA4GR7A8R8N-XN 32 GB 2 rank 3200  
    - 24x Not Specified Not Specified  

- **BIOS:**  
  - **BIOS Vendor:** Dell Inc.  
  - **BIOS Version:** 1.1.2  
  - **BIOS Date:** 04/09/2021  
  - **BIOS Revision:** 1.1  

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

(End of data from sysinfo program)

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### Compiler Version Notes

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<th>Libraries and Compilers</th>
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<td>519.ibm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)</td>
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<tr>
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<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>C++</td>
<td>508.namd_r(base, peak) 510.parest_r(base, peak)</td>
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<tr>
<td>C++, C</td>
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<td>Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112.000000 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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<td>Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112.000000 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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<td>C++, C</td>
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Compiler Version Notes (Continued)

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Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
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Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
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---

### Compiler Version Notes ( Continued )

---

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

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R)  
64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)  
64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

Fortran, C  | 521.wrf_r(peak)  
--------------

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R)  
64, Version 2021.1 Build 20201112_000000  
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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)  
64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

### Base Compiler Invocation

**C benchmarks:**  
icx  

**C++ benchmarks:**  
icpx

(Continued on next page)
Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx 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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc

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

Dell Inc.
PowerEdge R750 (Intel Xeon Gold 6314U, 2.30 GHz)

\[\text{SPECrate}^\circlearrowleft 2017\text{\_fp\_peak} = 214\]
\[\text{SPECrate}^\circlearrowleft 2017\text{\_fp\_base} = 201\]

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

Test Date: May-2021
Hardware Availability: May-2021
Software Availability: Feb-2021

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-\L /usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-\w -m64 -Wl,-z,muldefs -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 -ljemalloc
-\L /usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
-\w -m64 -std=c11 -Wl,-z,muldefs -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
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-\align array32byte -auto -ljemalloc -\L /usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
-\w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-\flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-\L /usr/local/jemalloc64-5.0.1/lib

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

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

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### Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

- `521.wrf_r`: `ifort icc`
- `527.cam4_r`: `ifort icx`

Benchmarks using both C and C++:

- `511.povray_r`: `icpc icc`
- `526.blender_r`: `icpx icx`

Benchmarks using Fortran, C, and C++:

- `icpx icx ifort`

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**

- `519.lbm_r`: `basepeak = yes`
- `538.imagick_r`: `basepeak = yes`

**C++ benchmarks:**

- `508.namd_r`: `basepeak = yes`

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**Peak Optimization Flags (Continued)**

Fortran benchmarks:

503.bwaves_r: `-w -m64 -Wl,-z,muldefs -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  
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

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 -qopt-prefetch -ffinite-math-only  
-qopt-multiple-gather-scatter-by-shuffles  
-qopt-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 -qopt-prefetch -ffinite-math-only  
-qopt-multiple-gather-scatter-by-shuffles  
-qopt-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`

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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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Tested with SPEC CPU®2017 v1.1.5 on 2021-05-06 23:44:37-0400.  
Originally published on 2021-06-08.