Dell Inc.

PowerEdge R650 (Intel Xeon Gold 5320, 2.20 GHz)

SPECrates® 2017_FP_base = 348
SPECrates® 2017_FP_peak = 364

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

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

---

**Copies**

| Benchmark | Copies | 0 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 440 | 480 | 520 | 560 | 600 | 640 | 680 | 720 | 760 | 800 | 840 | 880 | 920 |
|-----------|--------|---|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 503.bwaves_r | 104    | 52 |  |    |  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 507.caetuBSSN_r | 104 |  |  |  |  |  |  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 489 |
| 508.namd_r | 104    |    |    |    |    |    |    | 272 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 48 |
| 510.parest_r | 104    | 52 |    |    |    |    |    | 183 |  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 44 |
| 511.povray_r | 104    | 52 |    |    |    |    |    | 231 |  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 44 |
| 519.lbm_r | 104    |    |    |    |    |    |    | 245 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 44 |
| 521.wrf_r | 104    |    |    |    |    |    |    | 308 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 44 |
| 526.blender_r | 104 |    |    |    |    |    |    | 375 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 44 |
| 527.cam4_r | 104    |    |    |    |    |    |    | 368 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 44 |
| 538.imagick_r | 104 |    |    |    |    |    |    | 896 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 44 |
| 544.nab_r | 104    |    |    |    |    |    |    | 624 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 44 |
| 549.fotonik3d_r | 104 |    |    |    |    |    |    | 654 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 44 |
| 554.roms_r | 104    | 52 |  |    |    |    |    | 140 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 44 |

---

**Hardware**

CPU Name: Intel Xeon Gold 5320
Max MHz: 3400
Nominal: 2200
Enabled: 52 cores, 2 chips, 2 threads/core
Orderable: 1.2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
Cache L2: 1.25 MB I+D on chip per core
Cache L3: 39 MB I+D on chip per chip
Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)
Storage: 225 GB on tmpfs
Other: None

**Software**

OS: Red Hat Enterprise Linux 8.3 (Ootpa)
Version: 4.18.0-240.15.1.el8_3.x86_64
Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++
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
Parallel: No
File System: tmpfs
System State: Run level 5 (graphical multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS and OS set to prefer performance
at the cost of additional power usage.
Dell Inc.

PowerEdge R650 (Intel Xeon Gold 5320, 2.20 GHz)

RESULTS

SPECrate®2017_fp_base = 348

SPECrate®2017_fp_peak = 364

Results Table

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

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:

```bash
LD_LIBRARY_PATH = "/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/je5.0.1-64"
MALLOCONF = "retain:true"
```

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

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

Dell Inc. PowerEdge R650 (Intel Xeon Gold 5320, 2.20 GHz)

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SPECrate®2017_fp_peak = 364

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

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

General Notes (Continued)

Prior to runcpu invocation
Filesystem page cache synced and cleared with:
 sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numacl i.e.:
 numacl --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/ramdisk/cpu2017-1.1.5-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d7080afeaa89d4b38e2f1c
running on localhost.localdomain Wed Jun  2 15:24:57 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
    model name : Intel(R) Xeon(R) Gold 5320 CPU @ 2.20GHz
    2 "physical id"s (chips)
    104 "processors"

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

**Dell Inc.**

**PowerEdge R650 (Intel Xeon Gold 5320, 2.20 GHz)**

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<th>SPECrate®2017_fp_peak</th>
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Jun-2021  
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---

**Platform Notes (Continued)**

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`: 52  
- `physical 0: cores`: 0 1 2 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25  
- `physical 1: cores`: 0 1 2 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

From `lscpu`:

- `Architecture`: x86_64  
- `CPU op-mode(s)` : 32-bit, 64-bit  
- `Byte Order`: Little Endian  
- `CPU(s)`: 104  
- `On-line CPU(s) list`: 0-103  
- `Thread(s) per core`: 2  
- `Core(s) per socket`: 26  
- `Socket(s)`: 2  
- `NUMA node(s)`: 4  
- `Vendor ID`: GenuineIntel  
- `CPU family`: 6  
- `Model`: 106  
- `Model name`: Intel(R) Xeon(R) Gold 5320 CPU @ 2.20GHz  
- `Stepping`: 6  
- `CPU MHz`: 3309.675  
- `BogoMIPS`: 4400.00  
- `Virtualization`: VT-x  
- `L1d cache`: 48K  
- `L1i cache`: 32K  
- `L2 cache`: 1280K  
- `L3 cache`: 39936K  

**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

**NUMA node1 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

**NUMA node2 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

**NUMA node3 CPU(s):**


**Flags:**

- fpu  
- vme  
- vmx  
- smm  
- svm  
-imei  
- cx8  
- apic  
- pbe  
- mtrr  
- pge  
- mca  
- cmov  
- pat  
- pse  
- pqe  
- mca  
- cmov  
- pat  
- pse36  
- clflush  
- dts  
- acpi  
- mmx  
- fxsr  
- sse  
- sse2  
- ss  
- sse3  
- sse4_1  
- sse4_2  
- x2apic  
- movbe  
- popcnt  
- tsc_deadline_timer  
- aes  
- xsave  
- avx  
- f16c  
- rdrand  
- lahf_lm  
- abm  
- 3dnowprefetch  
- cpuid_fault  
- epb  
- cat_13  
- invpcid_single  
- intel_pni  
- ssbd  
- mba  
- ibrs  
- ibpb  
- ibrs_enhanced  
- fsbgbase  
- tsc_adjust  
- bmi1  
- hle  
- avx2  
- smep  
- bmi2  
- 3m  
- invpcid  
- cqm  
- rdt_a  
- avx512f  
- avx512dq  
- rdseed  
- adx  
- ams  
- avx512ifma  
- clflushopt  
- cwb  
- intel_pt  
- avx512cd  
- sha_h  
- avx512bw  
- avx512vl  
- xsaveopt  
- xsavec  
- xgetbv1  
- xsaves  
- cqm_llc  
- cqm_occup_llc  
- cqm_mbb_total  
- cqm_mbb_local  
- split_lock_detect  
- wbnoinvd

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

dtherm ida arat pln pts avx512vbmi umip pku ospke avx512_vbmi2 qfni vaes vpcmullqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data
cache size: 39936 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
node 0 size: 125458 MB
node 0 free: 127244 MB
node 1 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
node 1 size: 126288 MB
node 1 free: 127865 MB
node 2 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
node 2 size: 126257 MB
node 2 free: 117082 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
node 3 size: 126485 MB
node 3 free: 125109 MB
node distances:
node 0 1 2 3
0: 10 11 20 20
1: 11 10 20 20
2: 20 20 10 11
3: 20 20 11 10

From /proc/meminfo
MemTotal: 527799312 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"

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

Dell Inc.

PowerEdge R650 (Intel Xeon Gold 5320, 2.20 GHz)

<table>
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CPU2017 License: 55
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Platform Notes (Continued)

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:
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 (iLTB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapsgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2): Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 5 Jun 2 10:02

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.5-ic2021.1

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<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
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<td>tmpfs</td>
<td>225G</td>
<td>6.9G</td>
<td>219G</td>
<td>4%</td>
<td>/mnt/ramdisk</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R650
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:
7x 00AD00B300AD HMMA4GR7AJR8N-XN 32 GB 2 rank 3200, configured at 2933
## Platform Notes (Continued)

9x 00AD063200AD HMAA4GR7AJR8N-XN 32 GB 2 rank 3200, configured at 2933
16x Not Specified Not Specified

### BIOS:
- **Vendor:** Dell Inc.
- **Version:** 1.2.4
- **Date:** 05/28/2021
- **Revision:** 1.2

(End of data from sysinfo program)

## Compiler Version Notes

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<tr>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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Compiler Version Notes (Continued)

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
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C++, C          | 511.povray_r(peak)

Intel(R) C++ 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
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C++, C          | 511.povray_r(base) 526.blender_r(base, peak)

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Version 2021.1 Build 20201113
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
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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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C++, C, Fortran | 507.cactuBSSN_r(base, peak)

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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
Intel(R) 64, Version 2021.1 Build 20201112_000000
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Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on

(Continued on next page)
Dell Inc.

PowerEdge R650 (Intel Xeon Gold 5320, 2.20 GHz)

Compiler Version Notes (Continued)

Intel(R) 64, Version 2021.1 Build 20201112_000000
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---------------------------------------------------------------------
Fortran, C      | 521.wrf_r(base, peak) 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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
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---------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

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 icf

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

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

## Dell Inc.

### PowerEdge R650 (Intel Xeon Gold 5320, 2.20 GHz)

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Test Date</th>
<th>Test Sponsor</th>
<th>Hardware Availability</th>
<th>Software Availability</th>
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<td>Jun-2021</td>
<td>Dell Inc.</td>
<td>May-2021</td>
<td>Feb-2021</td>
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<td>Tested by</td>
<td>Dell Inc.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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### SPECrate®2017_fp_base = 348

### SPECrate®2017_fp_peak = 364

## Base Portability Flags (Continued)

- 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 -qopt-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 -qopt-mem-layout-trans=4`
- `-mbranches-within-32B-boundaries -ljemalloc`
- `-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`

(Continued on next page)
## Base Optimization Flags (Continued)

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

Benchmarks using both Fortran and C:
- ifort icx

Benchmarks using both C and C++:
- 511.povray_r: icpx 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:**

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

519.lbm_r: basepeak = yes

538.imagick_r: basepeak = yes

544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xcORE-AVX512 -flto
         -Ofast -qopt-mem-layout-trans=4
         -ffinite-accuracy-bits=14:sqrt
         -mbranches-within-32B-boundaries
         -ljemalloc
         -L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: -w -m64 -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

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: basepeak = yes

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

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

Dell Inc.
PowerEdge R650 (Intel Xeon Gold 5320, 2.20 GHz)

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</tr>
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<td>Tested by: Dell Inc.</td>
<td>Software Availability: Feb-2021</td>
</tr>
</tbody>
</table>

Peak Optimization Flags (Continued)

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


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

http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml

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