## Dell Inc.

**PowerEdge R650 (Intel Xeon Platinum 8352Y, 2.20 GHz)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU2017 License:</strong></td>
<td>55</td>
</tr>
<tr>
<td><strong>Test Sponsor:</strong></td>
<td>Dell Inc.</td>
</tr>
<tr>
<td><strong>Tested by:</strong></td>
<td>Dell Inc.</td>
</tr>
<tr>
<td><strong>Test Date:</strong></td>
<td>Apr-2021</td>
</tr>
<tr>
<td><strong>Hardware Availability:</strong></td>
<td>May-2021</td>
</tr>
<tr>
<td><strong>Software Availability:</strong></td>
<td>Feb-2021</td>
</tr>
</tbody>
</table>

### Copies

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>128</td>
</tr>
<tr>
<td>507.cacluBSSN_r</td>
<td>128</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>128</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>128</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>128</td>
</tr>
<tr>
<td>519.ibm_r</td>
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</tr>
<tr>
<td>521.wrf_r</td>
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<tr>
<td>526.blender_r</td>
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</tr>
<tr>
<td>527.cam4_r</td>
<td>128</td>
</tr>
<tr>
<td>538.imagick_r</td>
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</tr>
<tr>
<td>544.nab_r</td>
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<tr>
<td>549.fotonik3d_r</td>
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</tr>
<tr>
<td>554.roms_r</td>
<td>128</td>
</tr>
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</table>

#### SPECrate®2017_fp_base = 394

# Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong></td>
<td>Intel Xeon Platinum 8352Y</td>
</tr>
<tr>
<td><strong>Max MHz:</strong></td>
<td>3400</td>
</tr>
<tr>
<td><strong>Nominal:</strong></td>
<td>2200</td>
</tr>
<tr>
<td><strong>Enabled:</strong></td>
<td>64 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td><strong>Orderable:</strong></td>
<td>1.2 chips</td>
</tr>
<tr>
<td><strong>Cache L1:</strong></td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>48 MB I+D on chip per chip</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Memory:</strong></td>
<td>512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R)</td>
</tr>
<tr>
<td><strong>Storage:</strong></td>
<td>225 GB on tmpfs</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OS:</strong></td>
<td>Red Hat Enterprise Linux 8.3 (Ootpa) 4.18.0-240.15.1.el8_3.x86_64</td>
</tr>
<tr>
<td><strong>Compiler:</strong></td>
<td>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><strong>Parallel:</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Firmware:</strong></td>
<td>JEMalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td><strong>File System:</strong></td>
<td>tmpfs</td>
</tr>
<tr>
<td><strong>System State:</strong></td>
<td>Run level 5 (graphical multi-user)</td>
</tr>
<tr>
<td><strong>Base Pointers:</strong></td>
<td>64-bit</td>
</tr>
<tr>
<td><strong>Peak Pointers:</strong></td>
<td>64-bit</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>None</td>
</tr>
</tbody>
</table>
Dell Inc.
PowerEdge R650 (Intel Xeon Platinum 8352Y, 2.20 GHz)

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

SPECrate®2017_fp_base = 394
SPECrate®2017_fp_peak = 414

Test Date: Apr-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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>521.wrf_r</td>
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<td></td>
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</tr>
</tbody>
</table>

SPECrates®2017_fp_base = 394
SPECrates®2017_fp_peak = 414

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/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/je5.0.1-64"
MALLOC_CONF = "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
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/ramdisk/cpu2017-1.1.5-1c2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Tue Apr 20 16:20:48 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

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

Dell Inc.
PowerEdge R650 (Intel Xeon Platinum 8352Y, 2.20 GHz)

SPECrate®2017_fp_base = 394
SPECrate®2017_fp_peak = 414

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

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

Platform Notes (Continued)

From /proc/cpuinfo

model name : Intel(R) Xeon(R) Platinum 8352Y CPU @ 2.20GHz
2 "physical id"s (chips)
128 "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
physical 1: 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 lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 128
On-line CPU(s) list: 0-127
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8352Y CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2800.000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
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,
112,116,120,124
NUMA node1 CPU(s):
2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94,98,102,106,110
,114,118,122,126
NUMA node2 CPU(s):
1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,97,101,105,109,
113,117,121,125
NUMA node3 CPU(s):

(Continued on next page)
Dell Inc.
PowerEdge R650 (Intel Xeon Platinum 8352Y, 2.20 GHz)

Platforms Notes (Continued)

,115,119,123,127
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 sdbg fma cx16  
xtpr 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_13 invpcid_single  
intel_pinn ssbd mba ibrs ibpb stibp ibrs_encoded fsgsbase tsc_adjust bmi1 hle avx2  
sme p bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma  
clflopshtopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaves cgm llc cqm_occup_llc cqm_mbml_total cqm_mbml_local split_lock_detect whnoinvd  
dtherrm ida arat pln pts avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpcmulldq  
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 numacll --hardware WARNING: a numacll '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  
100 104 108 112 116 120 124

node 0 size: 12511 MB

node 0 free: 127207 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  
102 106 110 114 118 122 126

node 1 size: 12562 MB

node 1 free: 128178 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  
101 105 109 113 117 121 125

node 2 size: 12562 MB

node 2 free: 127652 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  
103 107 111 115 119 123 127

node 3 size: 125842 MB

node 3 free: 113733 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: 527794132 kB

HugePages_Total: 0
### Platform Notes (Continued)

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:
    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:

<table>
<thead>
<tr>
<th>CVE</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVE-2018-12207</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2018-3620</td>
<td>Not affected</td>
</tr>
<tr>
<td>Microarchitectural Data Sampling:</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2017-5754</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2017-3639</td>
<td>Mitigation: Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
<tr>
<td>CVE-2017-5753</td>
<td>Mitigation: usercopy/swapgs barriers and __user pointer sanitization</td>
</tr>
<tr>
<td>CVE-2017-5715</td>
<td>Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling</td>
</tr>
<tr>
<td>CVE-2020-0543</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2019-11135</td>
<td>Not affected</td>
</tr>
</tbody>
</table>

run-level 5 Apr 20 10:46

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

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>tmpfs</td>
<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

(Continued on next page)
Dell Inc. PowerEdge R650 (Intel Xeon Platinum 8352Y, 2.20 GHz)

SPEC®CPU2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 394
SPECrate®2017_fp_peak = 414

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

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

Platform Notes (Continued)

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 HMAA4GR7AJR8N-XN 32 GB 2 rank 3200
9x 00AD063200AD HMAA4GR7AJR8N-XN 32 GB 2 rank 3200
16x Not Specified Not Specified

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

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| C | 519.lbm_r(base, peak) 538.imagick_r(base, peak)                             |
|   | 544.nab_r(base, peak)                                                     |
==============================================================================

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.

==============================================================================
| C++ | 508.namd_r(base, peak) 510.parest_r(base, peak)                           |
==============================================================================

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.

==============================================================================
| 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

(Continued on next page)
Dell Inc.
PowerEdge R650 (Intel Xeon Platinum 8352Y, 2.20 GHz)

SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 394
SPECrate®2017_fp_peak = 414

Compiler Version Notes (Continued)

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.

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

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.
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.

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

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
==============================================================================

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.
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.

(Continued on next page)
### Dell Inc.

PowerEdge R650 (Intel Xeon Platinum 8352Y, 2.20 GHz)

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

---

**Compiler Version Notes (Continued)**

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<table>
<thead>
<tr>
<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 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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

**Base Compiler Invocation**

C benchmarks:
```bash
icx
```

C++ benchmarks:
```bash
icpx
```

Fortran benchmarks:
```bash
ifort
```

Benchmarks using both Fortran and C:
```bash
ifort icx
```

Benchmarks using both C and C++:
```bash
icpx icx
```

Benchmarks using Fortran, C, and C++:
```bash
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
```

(Continued on next page)
Dell Inc.
PowerEdge R650 (Intel Xeon Platinum 8352Y, 2.20 GHz)

SPEC R2017_fp_base = 394
SPEC R2017_fp_peak = 414

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

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

Base Portability Flags (Continued)

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

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

(Continued on next page)
Dell Inc.
PowerEdge R650 (Intel Xeon Platinum 8352Y, 2.20 GHz)

SPECraté®2017_fp_base = 394
SPECraté®2017_fp_peak = 414

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

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

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- 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:
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:

(Continued on next page)
Dell Inc.
PowerEdge R650 (Intel Xeon Platinum 8352Y, 2.20 GHz)

SPEC CPU®2017 Floating Point Rate Result

| SPECrate®2017_fp_base = 394 |
| SPECrate®2017_fp_peak = 414 |

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

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

Peak Optimization Flags (Continued)

519.lbm_r: basepeak = yes

538.imagick_r: basepeak = yes

544.nab_r: -w -std=c11 -m64 -W1,-z,muldefs -xCORE-AVX512 -flto -Ofast -qopt-mem-layout-trans=4 -flto -finf-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 -W1,-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 -W1,-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++:

(Continued on next page)
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