Dell Inc.
PowerEdge C6520 (Intel Xeon Platinum 8360Y, 2.40 GHz)

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

Test Date: Mar-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

Copies

503.bwaves_r
507.cactuBSSN_r
508.namd_r
510.parest_r
511.povray_r
519.lbm_r
521.wrf_r
526.blender_r
527.cam4_r
538.imagick_r
544.nab_r
549.fotonik3d_r
554.roms_r

SPECrate®2017_fp_base = 429
SPECrate®2017_fp_peak = 454

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: Red Hat Enterprise Linux 8.2 (Ootpa)</td>
<td>CPU Name: Intel Xeon Platinum 8360Y</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;</td>
<td>Max MHz: 3500</td>
</tr>
<tr>
<td>Firmware: Version 1.1.0 released Mar-2021</td>
<td>Nominal: 2400</td>
</tr>
<tr>
<td>File System: tmpfs</td>
<td>Enabled: 72 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>Orderable: 1.2 chips</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>Cache L1: 32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>Peak Pointers: 64-bit</td>
<td>L2: 1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>Other: jemalloc memory allocator V5.0.1</td>
<td>L3: 54 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.</td>
<td>Other: None</td>
</tr>
</tbody>
</table>

Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R)
Storage: 125 GB on tmpfs
Other: None
SPEC CPU®2017 Floating Point Rate Result

Dell Inc.
PowerEdge C6520 (Intel Xeon Platinum 8360Y, 2.40 GHz)

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

SPECrate®2017_fp_base = 429
SPECrate®2017_fp_peak = 454

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>144</td>
<td>935</td>
<td>345</td>
<td>936</td>
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<td>441</td>
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<tr>
<td>526.blender_r</td>
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<td>507</td>
<td>432</td>
<td>508</td>
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<td>527.cam4_r</td>
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<td>1290</td>
<td>144</td>
<td>290</td>
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<tr>
<td>544.nab_r</td>
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<td>847</td>
<td>286</td>
<td>847</td>
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<td>281</td>
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<tr>
<td>549.fotonik3d_r</td>
<td>144</td>
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<td>228</td>
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<tr>
<td>554.roms_r</td>
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<td>158</td>
<td>1443</td>
<td>159</td>
<td>72</td>
<td>573</td>
</tr>
</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/ramdisk/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/jre5.0.1-64"
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)
Dell Inc.
PowerEdge C6520 (Intel Xeon Platinum 8360Y, 2.40 GHz)

SPEC CPU®2017 Floating Point Rate Result

SPECrate®2017_fp_base = 429
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Mar-2021
Hardware Availability: Apr-2021
Software Availability: Mar-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 numactl i.e.:
numactl --interleave=all runcpu <etc>

Benchmark run from a 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"

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.

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 : 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 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Thu Mar 25 19:21:41 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) Platinum 8360Y CPU @ 2.40GHz

(Continued on next page)
Dell Inc.

PowerEdge C6520 (Intel Xeon Platinum 8360Y, 2.40 GHz)

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<td>Tested by: Dell Inc.</td>
<td>Software Availability: Mar-2021</td>
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**Platform Notes (Continued)**

2 "physical id"s (chips)
144 "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 : 36
siblings : 72
physical 0: cores 0 1 2 3 4 5 6 7 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
26 27 28 29 30 31 32 33 34 35
physical 1: cores 0 1 2 3 4 5 6 7 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
26 27 28 29 30 31 32 33 34 35

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 144
On-line CPU(s) list: 0-143
Thread(s) per core: 2
Core(s) per socket: 36
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8360Y CPU @ 2.40GHz
Stepping: 6
CPU MHz: 1602.902
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 55296K
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,
112,116,120,124,128,132,136,140
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
,114,118,122,126,130,134,138,142
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,
113,117,121,125,129,133,137,141
NUMA node3 CPU(s):
,115,119,123,127,131,135,139,143
Flags: fpu vme de pse tsc msr pae mce cx8 apa sse mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp

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

**SPECrate®2017_fp_base = 429**

**SPECrate®2017_fp_peak = 454**

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Test Date:** Mar-2021

**CPU2017 License:** 55

**Tested by:** Dell Inc.

**Hardware Availability:** Apr-2021

**Software Availability:** Mar-2021

---

**Platform Notes (Continued)**

```
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xptr pdcmandc 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 ssbd
mba ibpb stibp ibrs_enhanced tpr_shadow vmni flexpriority ept vpid fsqgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmq rdt_a avx512f avx512dq
rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw
avx512vl xsaveopt xsavec xsetc xgetbv1 xsavees cmq_llc cmq_occup_llc cmq_mbm_total
cmq_mbm_local whnoiinvd dtherm ida arat pln pts avx512vmbi umip pku ospke
avx512_vmbi gfn vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq
la57 rdpid md_clear pconfig flush_lld arch_capabilities
```

```
/proc/cpuinfo cache data
  cache size : 55296 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
  100 104 108 112 116 120 124 128 132 136 140
  node 0 size: 257434 MB
  node 0 free: 234501 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
  102 106 110 114 118 122 126 130 134 138 142
  node 1 size: 258012 MB
  node 1 free: 234501 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
  101 105 109 113 117 121 125 129 133 137 141
  node 2 size: 258039 MB
  node 2 free: 244462 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
  103 107 111 115 119 123 127 131 135 139 143
  node 3 size: 258035 MB
  node 3 free: 244467 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: 1056279020 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB
```

/sbin/tuned-adm active

---

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

**Dell Inc.**

PowerEdge C6520 (Intel Xeon Platinum 8360Y, 2.40 GHz)

---

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 429</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak = 454</td>
</tr>
</tbody>
</table>

---

**Platform Notes (Continued)**

Current active profile: throughput-performance

From /etc/*release* /etc/*version*  
  os-release:  
    NAME="Red Hat Enterprise Linux"  
    VERSION="8.2 (Ootpa)"  
    ID="rhel"  
    ID_LIKE="fedora"  
    VERSION_ID="8.2"  
    PLATFORM_ID="platform:el8"  
    PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"  
    ANSI_COLOR="0;31"  
    redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)  
    system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)  
    system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:  
Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020  
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

<table>
<thead>
<tr>
<th>CVE-2018-12207 (iTLB Multihit):</th>
<th>Not affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVE-2018-3620 (L1 Terminal Fault):</td>
<td>Not affected</td>
</tr>
<tr>
<td>Microarchitectural Data Sampling:</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2017-5754 (Meltdown):</td>
<td>Mitigation: Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
<tr>
<td>CVE-2018-3639 (Speculative Store Bypass):</td>
<td>Mitigation: usercopy/swapgs barriers and __user pointer sanitation</td>
</tr>
<tr>
<td>CVE-2017-5753 (Spectre variant 1):</td>
<td>Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling</td>
</tr>
<tr>
<td>CVE-2017-5715 (Spectre variant 2):</td>
<td>No status reported</td>
</tr>
<tr>
<td>CVE-2020-0543 (Special Register Buffer Data Sampling):</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2019-11135 (TSX Asynchronous Abort):</td>
<td>Not affected</td>
</tr>
</tbody>
</table>

run-level 3  
Mar 25 13:50

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>
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<tbody>
<tr>
<td>tmpfs</td>
<td>tmpfs</td>
<td>125G</td>
<td>61G</td>
<td>65G</td>
<td>49%</td>
<td>/mnt/ramdisk</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id  
Vendor: Dell Inc.  
Product: PowerEdge C6520  
Product Family: PowerEdge

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

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Test Hardware: Dell Inc.
Hardware Availability: Apr-2021
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Platform Notes (Continued)

Serial: SDPT078

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:
  16x 00AD063200AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200

BIOS:
  BIOS Vendor: Dell Inc.
  BIOS Version: 1.1.0
  BIOS Date: 03/25/2021
  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)
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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 | 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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

(Continued on next page)
Dell Inc.  
PowerEdge C6520 (Intel Xeon Platinum 8360Y, 2.40 GHz)

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Compiler Version Notes (Continued)

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

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

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

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

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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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(Continued on next page)
Compiler Version Notes (Continued)

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**Dell Inc.**  
PowerEdge C6520 (Intel Xeon Platinum 8360Y, 2.40 GHz)  

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<th>SPECrate®2017_fp_base = 429</th>
<th>SPECrate®2017_fp_peak = 454</th>
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**CPU2017 License:** 55  
**Test Date:** Mar-2021  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Hardware Availability:** Apr-2021  
**Software Availability:** Mar-2021

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**Compiler Version Notes (Continued)**

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 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`
Dell Inc.
PowerEdge C6520 (Intel Xeon Platinum 8360Y, 2.40 GHz)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 429
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Dell Inc.

GHz)

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

Test Date: Mar-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

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`
- `-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:
- `519.lbm_r: basepeak = yes`
- `538.imagick_r: basepeak = yes`
**Peak Optimization Flags (Continued)**

**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 -gopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-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 -gopt-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 -gopt-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++:**

(Continued on next page)
Dell Inc.  
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**Peak Optimization Flags (Continued)**

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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