Dell Inc. PowerEdge R450 (Intel Xeon Gold 5317, 3.00 GHz)  

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>219</td>
<td>226</td>
</tr>
</tbody>
</table>

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

### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 5317</td>
<td></td>
</tr>
<tr>
<td>Max MHz</td>
<td>3600</td>
<td></td>
</tr>
<tr>
<td>Nominal</td>
<td>3000</td>
<td></td>
</tr>
<tr>
<td>Enabled</td>
<td>24 cores, 2 chips, 2 threads/core</td>
<td></td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
<td></td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 48 KB D on chip per core</td>
<td></td>
</tr>
<tr>
<td>Cache L2</td>
<td>1.25 MB I+D on chip per core</td>
<td></td>
</tr>
<tr>
<td>Cache L3</td>
<td>18 MB I+D on chip per chip</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>125 GB on tmpfs</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Red Hat Enterprise Linux 8.4 (Ootpa) 4.18.0-305.el8.x86_64</td>
<td></td>
</tr>
<tr>
<td>Compiler</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>
<td></td>
</tr>
<tr>
<td>File System</td>
<td>tmpfs</td>
<td></td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
<td></td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
<td></td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>64-bit</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
<td></td>
</tr>
<tr>
<td>Power Management</td>
<td>BIOS and OS set to prefer performance at the cost of additional power usage.</td>
<td></td>
</tr>
</tbody>
</table>

---

Test Date: Dec-2021  
Hardware Availability: Oct-2021  
Software Availability: May-2021
SPEC CPU®2017 Floating Point Rate Result

Dell Inc.
PowerEdge R450 (Intel Xeon Gold 5317, 3.00 GHz)

SPECrater®2017_fp_base = 219
SPECrater®2017_fp_peak = 226

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>48</td>
<td>899</td>
<td>535</td>
<td>900</td>
<td>535</td>
<td>48</td>
<td>899</td>
<td>535</td>
<td>900</td>
<td>535</td>
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<td></td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>48</td>
<td>218</td>
<td>279</td>
<td>219</td>
<td>278</td>
<td>48</td>
<td>218</td>
<td>279</td>
<td>219</td>
<td>278</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>48</td>
<td>310</td>
<td>147</td>
<td>310</td>
<td>147</td>
<td>48</td>
<td>310</td>
<td>147</td>
<td>310</td>
<td>147</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>48</td>
<td>1022</td>
<td>123</td>
<td>1023</td>
<td>123</td>
<td>24</td>
<td>451</td>
<td>139</td>
<td>452</td>
<td>139</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
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<td>504</td>
<td>222</td>
<td>504</td>
<td>222</td>
<td>48</td>
<td>453</td>
<td>248</td>
<td>448</td>
<td>250</td>
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<td>519.lbm_r</td>
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<td>292</td>
<td>173</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>48</td>
<td>505</td>
<td>213</td>
<td>508</td>
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<td>48</td>
<td>505</td>
<td>213</td>
<td>508</td>
<td>212</td>
<td></td>
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<tr>
<td>526.blender_r</td>
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<tr>
<td>527.cam4_r</td>
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<td>48</td>
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<tr>
<td>538.imagick_r</td>
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<td>226</td>
<td>529</td>
<td>48</td>
<td>225</td>
<td>531</td>
<td>226</td>
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</tr>
<tr>
<td>544.nab_r</td>
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<td>234</td>
<td>346</td>
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<tr>
<td>549.fotonik3d_r</td>
<td>48</td>
<td>1079</td>
<td>173</td>
<td>1077</td>
<td>174</td>
<td>48</td>
<td>1079</td>
<td>173</td>
<td>1077</td>
<td>174</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>48</td>
<td>765</td>
<td>99.6</td>
<td>764</td>
<td>99.8</td>
<td>24</td>
<td>335</td>
<td>114</td>
<td>335</td>
<td>114</td>
<td></td>
<td></td>
<td></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/cpu2017-1.1.8-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-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 R450 (Intel Xeon Gold 5317, 3.00 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 219</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak = 226</td>
</tr>
</tbody>
</table>

Prior to runcpu invocation
Filesistem page cache synced and cleared with:
 sync; echo 3 > /proc/sys/vm/drop_caches
runcpu command invoked through numacll i.e.:
numacll --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 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"

Platform Notes

BIOS settings:
- Sub NUMA Cluster : 2-Way Clustering
- Virtualization Technology : Enabled
- System Profile : Custom
- CPU Power Management : Maximum Performance
- C1E : Enabled
- C States : Autonomous
- Memory Patrol Scrub : Enabled
- Energy Efficiency Policy : Performance
- CPU Interconnect Bus Link
  - Power Management : Disabled
- PCI ASPM L1 Link
  - Power Management : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-ic2021.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d
running on localhost.localdomain Tue Dec 7 15:36:24 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 5317 CPU @ 3.00GHz

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

- 2 "physical id"s (chips)
- 48 "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 : 12
    siblings : 24
    physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11
    physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11

From lscpu from util-linux 2.32.1:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 48
- On-line CPU(s) list: 0-47
- Thread(s) per core: 2
- Core(s) per socket: 12
- Socket(s): 2
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- BIOS Vendor ID: Intel
- CPU family: 6
- Model: 106
- Model name: Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz
- BIOS Model name: Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz
- Stepping: 6
- CPU MHz: 2477.992
- BogoMIPS: 6000.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 18432K
- NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,44
- NUMA node1 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46
- NUMA node2 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,45
- NUMA node3 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,47
- 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_l3 invpcid_single intel_pppin ssbd mba ibrs ibpb ibrs_enabled fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx amap avx512ifma clfushopt clwb intel_pt avx512cd sha_hni avx512bw avx512vl xsaves xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local splitlock_detect wbnoinvd

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

Dell Inc. PowerEdge R450 (Intel Xeon Gold 5317, 3.00 GHz)

SPECCrate®2017_fp_base = 219
SPECCrate®2017_fp_peak = 226

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

Test Date: Dec-2021
Hardware Availability: Oct-2021
Software Availability: May-2021

Platform Notes (Continued)

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

/proc/cpuinfo cache data
 cache size : 18432 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
 node 0 size: 128159 MB
 node 0 free: 118517 MB
 node 1 cpus: 2 6 10 14 18 22 26 30 34 38 42 46
 node 1 size: 128984 MB
 node 1 free: 115716 MB
 node 2 cpus: 1 5 9 13 17 21 25 29 33 37 41 45
 node 2 size: 129021 MB
 node 2 free: 124007 MB
 node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47
 node 3 size: 129018 MB
 node 3 free: 123998 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:       527548264 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="8.4 (Ootpa)"
 ID="rhel"
 ID_LIKE="fedora"
 VERSION_ID="8.4"
 PLATFORM_ID="platform:el8"
 PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"
 ANSI_COLOR="0;31"

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

Dell Inc. PowerEdge R450 (Intel Xeon Gold 5317, 3.00 GHz)

Dell Inc.

SPECrade®2017_fp_base = 219
SPECrade®2017_fp_peak = 226

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

Test Date: Dec-2021
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Software Availability: May-2021

Platform Notes (Continued)

redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga

uname -a:
Linux localhost.localdomain 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30 EDT 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): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitation
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 3 Dec 7 11:05

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2021.1
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 125G 27G 99G 22% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R450
Product Family: PowerEdge
Serial: 1S31501

Additional information from dmidecode 3.2 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 002C00B3002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200, configured at 2933

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 1.3.8

(Continued on next page)
Dell Inc.  

**PowerEdge R450 (Intel Xeon Gold 5317, 3.00 GHz)**

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

**Platform Notes (Continued)**

BIOS Date: 08/31/2021
BIOS Revision: 1.3

(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 |
| 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. |
==============================================================================

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

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.

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.

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
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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 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)

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Test Date: Dec-2021  
Hardware Availability: Oct-2021  
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------Compiler Version Notes (Continued)------

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:  
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 parsef_r: -DSPEC_LP64  
511 povray_r: -DSPEC_LP64  
519 ibm_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  

(Continued on next page)
Dell Inc.  
PowerEdge R450 (Intel Xeon Gold 5317, 3.00 GHz)

SPECrate®2017_fp_base = 219  
SPECrate®2017_fp_peak = 226

CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.  
Test Date: Dec-2021  
Hardware Availability: Oct-2021  
Software Availability: May-2021

**Base Portability Flags (Continued)**

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`
- `-no-prec-div -qopt-prefetch -ffinite-math-only`
- `-qopt-multiple-gather-scatter-by-shuffles`
- `-mbranches-within-32B-boundaries -nostandard-realloc-lhs`

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Dell Inc.  
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### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- `-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: 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`
- `544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto -Ofast -qopt-mem-layout-trans=4`

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

544.nab_r (continued):
-fimf-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
-f1to -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: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_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

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

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
SPEC CPU®2017 Floating Point Rate Result

Dell Inc. PowerEdge R450 (Intel Xeon Gold 5317, 3.00 GHz)

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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
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.5.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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