## Dell Inc.

**PowerEdge R750xs (Intel Xeon Silver 4310, 2.10 GHz)**

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_fp_base = 197</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>503.bwaves_r</th>
<th>507.caactuBSSN_r</th>
<th>508.namd_r</th>
<th>510.parest_r</th>
<th>511.povray_r</th>
<th>519.lbm_r</th>
<th>521.wrf_r</th>
<th>526.blender_r</th>
<th>527.cam4_r</th>
<th>538.imagick_r</th>
<th>544.nab_r</th>
<th>549.fotonik3d_r</th>
<th>554.roms_r</th>
</tr>
</thead>
<tbody>
<tr>
<td>251</td>
<td>122</td>
<td>116</td>
<td>183</td>
<td>166</td>
<td>204</td>
<td>171</td>
<td>179</td>
<td>281</td>
<td>436</td>
<td>284</td>
<td>95.5</td>
<td>106</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4310
- **Max MHz:** 3300
- **Nominal:** 2100
- **Enabled:** 24 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 18 MB I+D on chip per core
- **Other:** None
- **Memory:** 512 GB (4 x 32 GB 2Rx4 PC4-3200AA-R; 12 x 32 GB 2Rx8 PC4-3200AA-R, running at 2666)
- **Storage:** 512 GB on tmpfs
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux 8.4 (Ootpa)
  4.18.0-305.7.1.el8_4.x86_64
- **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
- **Firmware:** No
- **Parallel:** No
- **File System:** tmpfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.

---

**CPU2017 License:** 55
**Test Sponsor:** Dell Inc.
**Test Date:** Aug-2021
**Hardware Availability:** Jul-2021
**Tested by:** Dell Inc.
**Software Availability:** Jun-2021
**Software Availability:** Jun-2021

---

**SPECrate®2017_fp_peak = 199**

**Test Date:** Aug-2021
**Hardware Availability:** Jul-2021
**Software Availability:** Jun-2021

---

**SPECrate®2017_fp_base = 197**
SPEC CPU®2017 Floating Point Rate Result

Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4310, 2.10 GHz)

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

Test Date: Aug-2021
Hardware Availability: Jul-2021
Software Availability: Jun-2021

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>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>48</td>
<td>939</td>
<td>513</td>
<td>939</td>
<td>513</td>
<td>24</td>
<td>479</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>48</td>
<td>241</td>
<td>252</td>
<td>242</td>
<td>251</td>
<td>48</td>
<td>241</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>48</td>
<td>375</td>
<td>122</td>
<td>375</td>
<td>122</td>
<td>48</td>
<td>375</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>48</td>
<td>1082</td>
<td>116</td>
<td>1084</td>
<td>116</td>
<td>24</td>
<td>492</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>48</td>
<td>611</td>
<td>183</td>
<td>610</td>
<td>184</td>
<td>48</td>
<td>528</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>48</td>
<td>304</td>
<td>166</td>
<td>303</td>
<td>167</td>
<td>48</td>
<td>304</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>48</td>
<td>510</td>
<td>211</td>
<td>526</td>
<td>204</td>
<td>48</td>
<td>329</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>48</td>
<td>427</td>
<td>171</td>
<td>426</td>
<td>172</td>
<td>48</td>
<td>427</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>48</td>
<td>468</td>
<td>179</td>
<td>467</td>
<td>180</td>
<td>48</td>
<td>468</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>48</td>
<td>274</td>
<td>436</td>
<td>274</td>
<td>436</td>
<td>48</td>
<td>274</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>48</td>
<td>287</td>
<td>281</td>
<td>286</td>
<td>282</td>
<td>48</td>
<td>283</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>48</td>
<td>1127</td>
<td>166</td>
<td>1128</td>
<td>166</td>
<td>48</td>
<td>1127</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>48</td>
<td>799</td>
<td>95.5</td>
<td>798</td>
<td>95.6</td>
<td>24</td>
<td>360</td>
</tr>
</tbody>
</table>

SPECrate®2017_fp_base = 197
SPECrate®2017_fp_peak = 199

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/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

(Continued on next page)
Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4310, 2.10 GHz)

CPU2017 License: 55  Test Date: Aug-2021
Test Sponsor: Dell Inc.  Hardware Availability: Jul-2021
Tested by: Dell Inc.  Software Availability: Jun-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>
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 512 GB ramdisk created with the cmd: "mount -t tmpfs -o size=512G 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
    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 982a61ec0915b55891ef0e16aca64d4
running on R750xs.9xbzd3.inside.dell.com Mon Aug 23 14:32:14 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) Silver 4310 CPU @ 2.10GHz

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

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4310, 2.10 GHz)

SPECrate®2017_fp_base = 197
SPECrate®2017_fp_peak = 199

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

Test Date: Aug-2021
Hardware Availability: Jul-2021
Software Availability: Jun-2021

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) Silver 4310 CPU @ 2.10GHz
BIOS Model name: Intel(R) Xeon(R) Silver 4310 CPU @ 2.10GHz
Stepping: 6
CPU MHz: 2612.805
BogoMIPS: 4200.00
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
a.perfmonf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrm pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abmf 3dnowprefetch cpuid_fault epb cat_13 invpctid_single
intel_pcin ssbd mba ibrs ibpb stibp ibrs_enhanced fsbsbase tsc_adjust bmi1 hle avx2
smep bmi2 erms invpcid cmqm rdt_a avx512f avx512dq rdseed adx amap avx512ifma
clflushopt clwb intel_pt avx512vd sha_hni avx512bw avx512vl xsaves xsaveopt xsaves xgetbv1
xsaves cmq_llc cmq_occup mocker lcm mbm_total cmq_mbm_local split_lock_detect wbnoinvd

(Continued on next page)
Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4310, 2.10 GHz)

SPEC CPU®2017 Floating Point Rate Result

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

SPECrates®:
SPECrate®2017_fp_base = 197
SPECrate®2017_fp_peak = 199

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_l1d 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: 118667 MB
  node 1 cpus: 2 6 10 14 18 22 26 30 34 38 42 46
  node 1 size: 129021 MB
  node 1 free: 123866 MB
  node 2 cpus: 1 5 9 13 17 21 25 29 33 37 41 45
  node 2 size: 129021 MB
  node 2 free: 117590 MB
  node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47
  node 3 size: 128981 MB
  node 3 free: 121251 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: 527547876 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)
Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4310, 2.10 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 197</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak = 199</td>
</tr>
</tbody>
</table>

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

Test Date: Aug-2021
Hardware Availability: Jul-2021
Software Availability: Jun-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 R750xs.9xbzt3d3.inside.dell.com 4.18.0-305.7.1.el8_4.x86_64 #1 SMP Mon Jun 14 17:25:42 EDT 2021 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>Not affected</td>
</tr>
<tr>
<td>CVE-2018-3639 (Speculative Store Bypass):</td>
<td>Mitigation: Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
<tr>
<td>CVE-2017-5753 (Spectre variant 1):</td>
<td>Mitigation: speculative_store barriers and __user pointer sanitization</td>
</tr>
<tr>
<td>CVE-2017-5715 (Spectre variant 2):</td>
<td>Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling</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 Aug 23 09:12

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-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>512G</td>
<td>27G</td>
<td>486G</td>
<td>6%</td>
<td>/mnt/ramdisk</td>
</tr>
</tbody>
</table>
```

From /sys/devices/virtual/dmi/id

Vendor: Dell Inc.
Product: PowerEdge R750xs
Product Family: PowerEdge
Serial: 9XBZTD3

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:
12x 002C069D002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200, configured at 2666
4x 00AD063200AD HMA84GR7DJ4N-XN 32 GB 2 rank 3200, configured at 2666

BIOS:
BIOS Vendor: Dell Inc.
SPEC CPU®2017 Floating Point Rate Result

Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4310, 2.10 GHz)

SPECrate®2017_fp_base = 197
SPECrate®2017_fp_peak = 199

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Aug-2021
Tested by: Dell Inc.
Hardware Availability: Jul-2021
Software Availability: Jun-2021

Platform Notes (Continued)

BIOS Version: 1.2.1
BIOS Date: 05/28/2021
BIOS Revision: 1.2

(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.

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

```c
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++, 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++, 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.

```c
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.

```c
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_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.

(Continued on next page)
Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4310, 2.10 GHz)

**Compiler Version Notes (Continued)**

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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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.

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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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.
### 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`

### Base Optimization Flags

- **C benchmarks:**
  - `-w `-std=c11 -m64 -Wl,-z,strip -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`
Base Optimization Flags (Continued)

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

Fortran benchmarks:
-\texttt{-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div}
-\texttt{-qopt-prefetch -ffinite-math-only}
-\texttt{-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4}
-\texttt{-nostandard-realloc-lhs -align array32byte -auto}
-\texttt{-mbranches-within-32B-boundaries -ljemalloc}
-\texttt{-L/usr/local/jemalloc64-5.0.1/lib}

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

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

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

Peak Compiler Invocation

C benchmarks:
\texttt{icx}

C++ benchmarks:
\texttt{icpx}

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

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

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

(Continued on next page)
## Dell Inc.  
PowerEdge R750xs (Intel Xeon Silver 4310, 2.10 GHz)  

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 197</th>
<th>SPECrate®2017_fp_peak = 199</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License: 55</td>
<td>Test Date: Aug-2021</td>
</tr>
<tr>
<td>Test Sponsor: Dell Inc.</td>
<td>Hardware Availability: Jul-2021</td>
</tr>
<tr>
<td>Tested by: Dell Inc.</td>
<td>Software Availability: Jun-2021</td>
</tr>
</tbody>
</table>

### Peak Optimization Flags (Continued)

510.parest_r (continued):
- `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:
- `-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`  

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`

The flags files that were used to format this result can be browsed at:

Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4310, 2.10 GHz) | SPECrate®2017_fp_base = 197
| SPECrate®2017_fp_peak = 199

<table>
<thead>
<tr>
<th>CPU2017 License: 55</th>
<th>Test Date: Aug-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Dell Inc.</td>
<td>Hardware Availability: Jul-2021</td>
</tr>
<tr>
<td>Tested by: Dell Inc.</td>
<td>Software Availability: Jun-2021</td>
</tr>
</tbody>
</table>

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-rev1.4.xml

SPEC CPU and SPECrate are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.8 on 2021-08-23 15:32:14-0400.
Originally published on 2021-09-17.