SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

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

Dell Inc.

SPECraten®2017_fp_base = 198
SPECraten®2017_fp_peak = 204

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 (16 x 32 GB 2Rx8 PC4-3200AA-R, running at 2666)
Storage: 125 GB on tmpfs
Other: None

Software

OS: Red Hat Enterprise Linux 8.3 (Ootpa)
4.18.0-240.el8.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
Parallel: No
Firmware: Version 1.1.3 released Apr-2021
File System: tmpfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.

Test Date: May-2021
Hardware Availability: Apr-2021
Software Availability: Dec-2020

<table>
<thead>
<tr>
<th>Copy</th>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>48</td>
<td>253</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>48</td>
<td>121</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>48</td>
<td>197</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>24</td>
<td>177</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>48</td>
<td>175</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>48</td>
<td>183</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>48</td>
<td>172</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>48</td>
<td>171</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>48</td>
<td>435</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>48</td>
<td>280</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>48</td>
<td>284</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>48</td>
<td>166</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>24</td>
<td>97.2</td>
</tr>
</tbody>
</table>

SPECraten®2017_fp_base (198) — SPECrate®2017_fp_peak (204)
**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>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>48</td>
<td>926</td>
<td>520</td>
<td>928</td>
<td>519</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>48</td>
<td>240</td>
<td>253</td>
<td>240</td>
<td>253</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>48</td>
<td>377</td>
<td>121</td>
<td>376</td>
<td>121</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>48</td>
<td>1054</td>
<td>119</td>
<td>1054</td>
<td>119</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>48</td>
<td>611</td>
<td>184</td>
<td>611</td>
<td>183</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>48</td>
<td>288</td>
<td>175</td>
<td>288</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>48</td>
<td>543</td>
<td>198</td>
<td>546</td>
<td>197</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>48</td>
<td>425</td>
<td>172</td>
<td>425</td>
<td>172</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>48</td>
<td>463</td>
<td>181</td>
<td>473</td>
<td>177</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>48</td>
<td>274</td>
<td>435</td>
<td>275</td>
<td>435</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>544.nab_r</td>
<td>48</td>
<td>288</td>
<td>280</td>
<td>287</td>
<td>281</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>48</td>
<td>1127</td>
<td>166</td>
<td>1126</td>
<td>166</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>48</td>
<td>785</td>
<td>97.2</td>
<td>785</td>
<td>97.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Submit Notes**

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

**Operating System Notes**

Stack size set to unlimited using "ulimit -s unlimited"

**Environment Variables Notes**

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH = "/mnt/ramdisk/cpu2017-1.1.7-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.7-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
Dell Inc. PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

**SPEC CPU®2017 Floating Point Rate Result**

**SPECrate®2017_fp_peak = 204**

**SPECrate®2017_fp_base = 198**

---

**General Notes (Continued)**

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.

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
```

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 : 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/cpu2017-1.1.7-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Sun May 23 15:33:00 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
  2 "physical id"s (chips)
```

(Continued on next page)
Dell Inc.

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

**SPEC CPU®2017 Floating Point Rate Result**

**SPECrante®2017_fp_base** = 198

**SPECrante®2017_fp_peak** = 204

**CPU2017 License**: 55

**Test Sponsor**: Dell Inc.

**Tested by**: Dell Inc.

**Test Date**: May-2021

**Hardware Availability**: Apr-2021

**Software Availability**: Dec-2020

---

**Platform Notes (Continued)**

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:
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
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Silver 4310 CPU @ 2.10GHz
Stepping: 6
CPU MHz: 2700.844
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 18432K
NUMA node0 CPU(s): 0-5,24-29
NUMA node1 CPU(s): 6-11,30-35
NUMA node2 CPU(s): 12-17,36-41
NUMA node3 CPU(s): 18-23,42-47
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pamo idle cpuid mxr rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperffmpref 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 crypto popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs enhanced fsgrbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512fma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsave xsetbv1 xsaves cqm_llc cqm_occucp_llc cqm_mbb_total cqm_mbb_local split_lock_detect webnoinvd dtherm ida arat pln pts avx512v bmi umip pku ospke avx512v bmi2 gfni vaes vprcmulqdq avx512_vnni avx512_vbitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

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

Dell Inc.

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Test Date:</td>
<td>May-2021</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

SPECrate®2017_fp_base = 198
SPECrate®2017_fp_peak = 204

---

**Platform Notes (Continued)**

/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 1 2 3 4 5 24 25 26 27 28 29
node 0 size: 127109 MB
node 0 free: 119083 MB
node 1 cpus: 6 7 8 9 10 11 30 31 32 33 34 35
node 1 size: 127731 MB
node 1 free: 124106 MB
node 2 cpus: 12 13 14 15 16 17 36 37 38 39 40 41
node 2 size: 127706 MB
node 2 free: 114984 MB
node 3 cpus: 18 19 20 21 22 23 42 43 44 45 46 47
node 3 size: 127564 MB
node 3 free: 124044 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:       527808976 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

/sbin/tuned-adm active

```
Current active profile: throughput-performance
```

From /etc/*release* /etc/*version*

```
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
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
```

(Continued on next page)
Dell Inc.

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)  SPECrate®2017_fp_base = 198
SPECrate®2017_fp_peak = 204

CPU2017 License: 55  Test Date: May-2021
Test Sponsor: Dell Inc.  Hardware Availability: Apr-2021
Tested by: Dell Inc.  Software Availability: Dec-2020

Platform Notes (Continued)

uname -a:
    Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
    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):
    Not affected
CVE-2018-3639 (Speculative Store Bypass):
    Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):
    Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):
    Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling):
    Not affected
CVE-2019-11135 (TSX Asynchronous Abort):
    Not affected

run-level 3 May 23 10:18

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.7-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 C6520
    Product Family: PowerEdge

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:
    6x 002C00B3002C 18ASF472PD2-3G2E1 32 GB 2 rank 3200, configured at 2666
    10x 00AD063200AD HMAA4GR7AJR8N-XN 32 GB 2 rank 3200, configured at 2666

BIOS:
    BIOS Vendor: Dell Inc.
    BIOS Version: 1.1.3
    BIOS Date: 04/27/2021
    BIOS Revision: 1.1

(Continued on next page)
Dell Inc.

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECrate®2017_fp_base = 198
SPECrate®2017_fp_peak = 204

Platform Notes (Continued)
(End of data from sysinfo program)

Compiler Version Notes

C
| 519.ibm_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.

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
| 511.povray_r(peak)

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

Dell Inc.

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECrater®2017_fp_base = 198
SPECrater®2017_fp_peak = 204

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

Test Date: May-2021
Hardware Availability: Apr-2021
Software Availability: Dec-2020

Compiler Version Notes (Continued)

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) 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) 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 C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECrater®2017_fp_base = 198
SPECrater®2017_fp_peak = 204

Copyright 2017-2021 Standard Performance Evaluation Corporation

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

Test Date: May-2021
Hardware Availability: Apr-2021
Software Availability: Dec-2020

Compiler Version Notes (Continued)

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.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
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:
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 -gopt-mem-layout-trans=4
-fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:

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

### Dell Inc.

**PowerEdge C6520** (Intel Xeon Silver 4310, 2.10 GHz)  

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>198</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>204</td>
</tr>
</tbody>
</table>

- **CPU2017 License:** 55  
- **Test Sponsor:** Dell Inc.  
- **Tested by:** Dell Inc.  
- **Test Date:** May-2021  
- **Hardware Availability:** Apr-2021  
- **Software Availability:** Dec-2020

### Peak Optimization Flags (Continued)

#### Fortran benchmarks:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>508.namd_r</td>
<td><code>basepeak = yes</code></td>
</tr>
<tr>
<td>510.parest_r</td>
<td><code>-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</code></td>
</tr>
</tbody>
</table>

#### Benchmarks using both Fortran and C:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td><code>basepeak = yes</code></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td><code>basepeak = yes</code></td>
</tr>
</tbody>
</table>

#### Benchmarks using both C and C++:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>511.povray_r</td>
<td><code>-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</code></td>
</tr>
<tr>
<td>526.blender_r</td>
<td><code>basepeak = yes</code></td>
</tr>
</tbody>
</table>

#### Benchmarks using Fortran, C, and C++:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>507.cactuBSSN_r</td>
<td><code>basepeak = yes</code></td>
</tr>
</tbody>
</table>

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

### SPEC CPU®2017 Floating Point Rate Result

**Dell Inc.**

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 198</td>
<td>= 204</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** May-2021  
**Hardware Availability:** Apr-2021  
**Software Availability:** Dec-2020

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


---

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

**Tested with SPEC CPU®2017 v1.1.7 on 2021-05-23 16:32:59-0400.**

**Report generated on 2021-07-08 13:35:41 by CPU2017 PDF formatter v6442.**

**Originally published on 2021-07-06.**