Dell Inc. PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

SPECrater®2017_fp_base = 321
SPECrater®2017_fp_peak = 335

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<tr>
<td>554.roms_r 48</td>
<td>136</td>
<td>167</td>
</tr>
</tbody>
</table>

Hardware

- CPU Name: Intel Xeon Gold 5318Y
- Max MHz: 3400
- Nominal: 2100
- Enabled: 48 cores, 2 chips, 2 threads/core
- Orderable: 1.2 chips
- Cache L1: 32 KB I + 48 KB D on chip per core
- Cache L2: 1.25 MB I+D on chip per core
- Cache L3: 36 MB I+D on chip per core
- Other: None
- Memory: 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)
- Storage: 125 GB on tmpfs
- Other: None

Software

- OS: Red Hat Enterprise Linux 8.2 (Ootpa) 4.18.0-193.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.
Dell Inc.
PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

SPECrate®2017_fp_base = 321
SPECrate®2017_fp_peak = 335

Results Table

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</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

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

Dell Inc.
PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

SPECrate®2017_fp_base = 321
SPECrate®2017_fp_peak = 335

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 Fri May 14 23:46:47 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 5318Y CPU @ 2.10GHz
    2 "physical id"s (chips)
Platform Notes (Continued)

96 "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 : 24
siblings : 48
physical 0: cores 0 1 10 11 12 13 14 15 16 17 18 19 20 21 22 23
physical 1: cores 0 1 10 11 12 13 14 15 16 17 18 19 20 21 22 23

From lscpu:
Architecture:        x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              96
On-line CPU(s) list: 0-95
Thread(s) per core:  2
Core(s) per socket:  24
Socket(s):           2
NUMA node(s):        4
Vendor ID:           GenuineIntel
CPU family:          6
Model:               106
Model name:          Intel(R) Xeon(R) Gold 5318Y CPU @ 2.10GHz
Stepping:            6
CPU MHz:             2918.361
BogoMIPS:            4200.00
Virtualization:      VT-x
L1d cache:           48K
L1i cache:           32K
L2 cache:            1280K
L3 cache:            36864K
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
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
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
NUMA node3 CPU(s):
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
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrr 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 ssbd
mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmpreoid fxsave vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq
rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_hni avx512bw

(Continued on next page)
Dell Inc.  
PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)  

SPEC CPU®2017 Floating Point Rate Result  

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 321  
SPECrate®2017_fp_peak = 335

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)

avx512vl xsaveopt xsaves ecx xgetbv1 xsaveop cqm_llc cqm_occup_llc cqm_mbm_total  
cqm_mbm_local wboinvd dtherm ida pln pts avx512vbmi umip pku ospke  
avx512_vbmi2 gfn vaes vpclmuldq avx512_vnni avx512_bitalg tme avx512_vporntdq  
las57 rdpid md_clear pconfig flush_lld arch_capabilities

/proc/cpuinfo cache data  
cache size : 36864 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  
node 0 size: 128412 MB  
node 0 free: 114828 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  
node 1 size: 128991 MB  
node 1 free: 109832 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  
node 2 size: 129018 MB  
node 2 free: 119827 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  
node 3 size: 129016 MB  
node 3 free: 119842 MB  
node distances:
node 0 cpus: 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: 527808956 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

/sbin/tuned-adm active  
Current active profile: throughput-performance

From /etc/*release* /etc/*version*  
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)"

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

**Dell Inc.**  
PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 321</th>
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<td>SPECrate®2017_fp_peak = 335</td>
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**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)**

```
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:

CVE-2018-12207 (iTLB Multihit):
CVE-2018-3620 (L1 Terminal Fault):
Microarchitectural Data Sampling:
CVE-2017-5754 (Meltdown):
CVE-2018-3639 (Speculative Store Bypass):
CVE-2017-5753 (Spectre variant 1):
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling):
CVE-2019-11135 (TSX Asynchronous Abort):

run-level 3 May 14 18:14
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.7-ic2021.1
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 125G 44G 82G 35% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
  Vendor: Dell Inc.
  Product: PowerEdge MX750c
  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:
  1x 002C00B3002C 18ASF4G72PD2-3G2E1 32 GB 2 rank 3200, configured at 2933
  15x 00AD063200AD HMMA4GR7AJR8N-XN 32 GB 2 rank 3200, configured at 2933
  16x Not Specified Not Specified
```

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

Dell Inc.

PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

SPECrate®2017_fp_base = 321
SPECrate®2017_fp_peak = 335

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

Platform Notes (Continued)

BIOS:
- BIOS Vendor: Dell Inc.
- BIOS Version: 1.1.3
- BIOS Date: 04/27/2021
- 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
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.
Compiler Version Notes (Continued)

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

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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.

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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
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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.

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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.
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.

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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 MX750c (Intel Xeon Gold 5318Y, 2.10 GHz) Dell Inc.

SPECrate®2017_fp_base = 321
SPECrate®2017_fp_peak = 335

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

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**Compiler Version Notes (Continued)**

Fortran, C | 521.wrf_r(base, peak) 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:
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

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

**Dell Inc.**

PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>321</td>
<td>335</td>
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</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              |

**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:
- `ifort icx`

Benchmarks using both C and C++:
- `511.povray_r icpx 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`

(Continued on next page)
## Dell Inc.

### PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

<table>
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<tr>
<th>SPECrate®2017_fp_base = 321</th>
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</table>

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Computer Model:** Dell PowerEdge MX750c  
**Hardware Availability:** April 2021  
**Software Availability:** December 2020  
**Test Date:** May 2021

### Peak Optimization Flags (Continued)

538.imagick_r: basepeak = yes


**C++ benchmarks:**

508.namd_r: basepeak = yes


**Fortran benchmarks:**

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes


**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 -03 -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

(Continued on next page)
Dell Inc.
PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

SPECrate®2017_fp_base = 321
SPECrate®2017_fp_peak = 335

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

Peak Optimization Flags (Continued)

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