



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 10.6

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECspeed®2017_int_peak = 10.9

CPU2017 License: 55

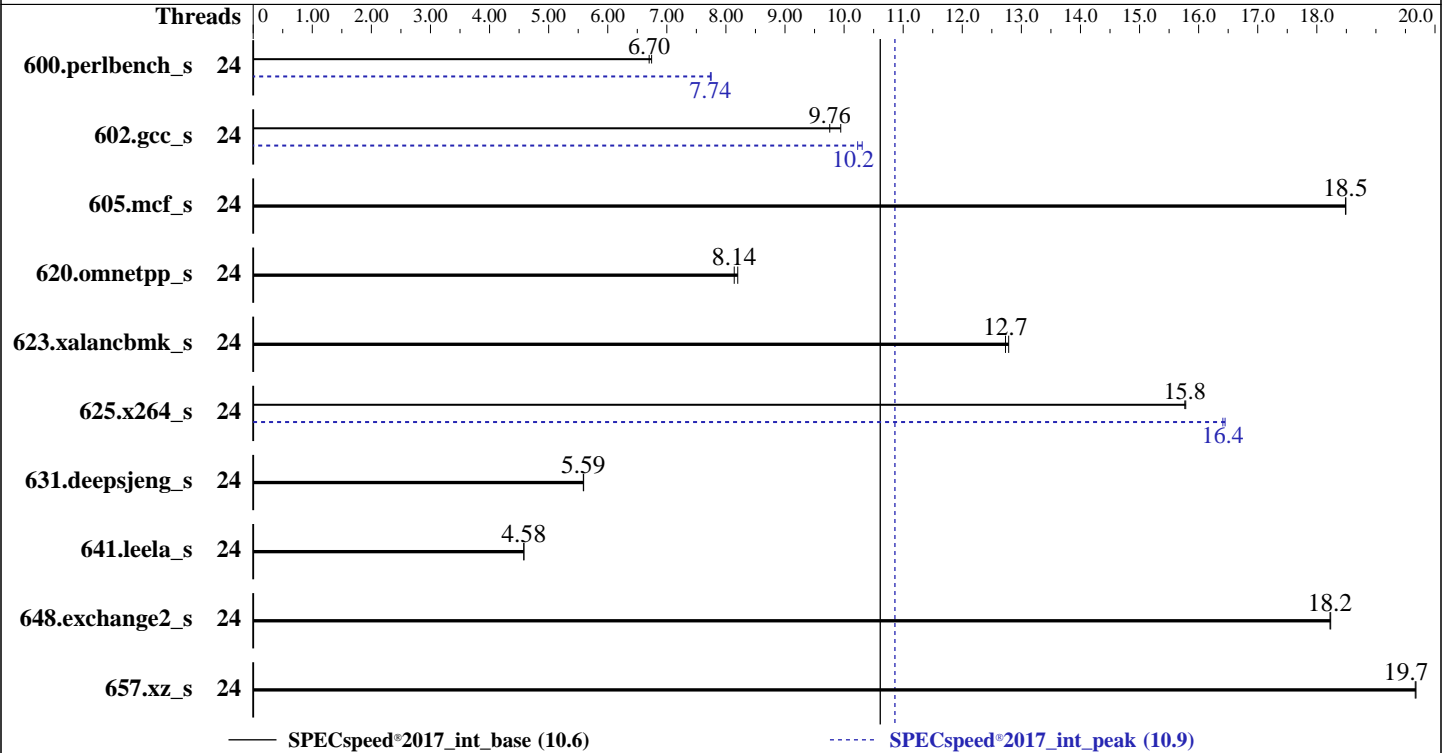
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2021

Hardware Availability: Apr-2021

Software Availability: Dec-2020



Hardware

CPU Name: Intel Xeon Silver 4310
 Max MHz: 3300
 Nominal: 2100
 Enabled: 24 cores, 2 chips
 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 chip
 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: Yes
 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.



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 10.6

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECspeed®2017_int_peak = 10.9

CPU2017 License: 55

Test Date: May-2021

Test Sponsor: Dell Inc.

Hardware Availability: Apr-2021

Tested by: Dell Inc.

Software Availability: Dec-2020

Results Table

Benchmark	Base						Peak							
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	24	<u>265</u>	<u>6.70</u>	263	6.74			24	229	7.75	<u>229</u>	<u>7.74</u>		
602.gcc_s	24	400	9.94	<u>408</u>	<u>9.76</u>			24	386	10.3	<u>389</u>	<u>10.2</u>		
605.mcf_s	24	<u>255</u>	<u>18.5</u>	255	18.5			24	<u>255</u>	<u>18.5</u>	255	18.5		
620.omnetpp_s	24	<u>200</u>	<u>8.14</u>	199	8.20			24	<u>200</u>	<u>8.14</u>	199	8.20		
623.xalancbmk_s	24	111	12.8	<u>111</u>	<u>12.7</u>			24	111	12.8	<u>111</u>	<u>12.7</u>		
625.x264_s	24	112	15.8	<u>112</u>	<u>15.8</u>			24	<u>107</u>	<u>16.4</u>	107	16.4		
631.deepsjeng_s	24	256	5.59	<u>256</u>	<u>5.59</u>			24	256	5.59	<u>256</u>	<u>5.59</u>		
641.leela_s	24	<u>372</u>	<u>4.58</u>	372	4.58			24	<u>372</u>	<u>4.58</u>	372	4.58		
648.exchange2_s	24	<u>161</u>	<u>18.2</u>	161	18.2			24	<u>161</u>	<u>18.2</u>	161	18.2		
657.xz_s	24	<u>314</u>	<u>19.7</u>	314	19.7			24	<u>314</u>	<u>19.7</u>	314	19.7		

SPECspeed®2017_int_base = **10.6**

SPECspeed®2017_int_peak = **10.9**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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:

```

KMP_AFFINITY = "granularity=fine,scatter"
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"
MALLOCONF = "retain:true"
OMP_STACKSIZE = "192M"

```

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0

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

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 10.6

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECspeed®2017_int_peak = 10.9

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2021

Hardware Availability: Apr-2021

Software Availability: Dec-2020

General Notes (Continued)

Filesystem page cache synced and cleared with:
 sync; echo 3> /proc/sys/vm/drop_caches
 jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

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

Platform Notes

BIOS Settings:

Logical Processor : Disabled

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 Mon May 24 00:11:56 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)

24 "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 : 12

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

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 10.6

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECspeed®2017_int_peak = 10.9

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)

```

Byte Order:           Little Endian
CPU(s):               24
On-line CPU(s) list: 0-23
Thread(s) per core:  1
Core(s) per socket:  12
Socket(s):            2
NUMA node(s):         2
Vendor ID:            GenuineIntel
CPU family:           6
Model:                106
Model name:           Intel(R) Xeon(R) Silver 4310 CPU @ 2.10GHz
Stepping:             6
CPU MHz:              1074.259
BogoMIPS:             4200.00
Virtualization:       VT-x
L1d cache:            48K
L1i cache:            32K
L2 cache:             1280K
L3 cache:             18432K
NUMA node0 CPU(s):   0-11
NUMA node1 CPU(s):   12-23
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
aperfmpperf 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_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2
smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1
xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect wbnoinvd
dtherm ida arat pln pts avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid 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: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
node 0 size: 253531 MB
node 0 free: 256839 MB
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
node 1 size: 254026 MB
node 1 free: 248590 MB

```

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 10.6

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECspeed®2017_int_peak = 10.9

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)

node distances:

```
node 0 1
0: 10 20
1: 20 10
```

From /proc/meminfo

```
MemTotal: 527814840 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

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
```

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 10.6

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECspeed®2017_int_peak = 10.9

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)

run-level 3 May 24 00:08

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.7-ic2021.1

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
tmpfs	tmpfs	125G	4.4G	121G	4%	/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 18ASF4G72PDZ-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

(End of data from sysinfo program)

Compiler Version Notes

```
=====
C      | 600.perlbench_s(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      | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
      | 625.x264_s(base, peak) 657.xz_s(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.

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 10.6

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECspeed®2017_int_peak = 10.9

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)

=====
C | 600.perlbench_s(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 | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
| 625.x264_s(base, peak) 657.xz_s(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++ | 620.omnetpp_s(base, peak) 623.xalanbmk_s(base, peak)
| 631.deepsjeng_s(base, peak) 641.leela_s(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.
=====

=====
Fortran | 648.exchange2_s(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



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 10.6

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECspeed®2017_int_peak = 10.9

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2021

Hardware Availability: Apr-2021

Software Availability: Dec-2020

Base Portability Flags

```
600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64
```

Base Optimization Flags

C benchmarks:

```
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX512
-O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

C++ benchmarks:

```
-DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin/
-lqkmalloc
```

Fortran benchmarks:

```
-m64 -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries
```

Peak Compiler Invocation

C benchmarks (except as noted below):

icx

600.perlbench_s: icc

C++ benchmarks:

icpx

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 10.6

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECspeed®2017_int_peak = 10.9

CPU2017 License: 55

Test Date: May-2021

Test Sponsor: Dell Inc.

Hardware Availability: Apr-2021

Tested by: Dell Inc.

Software Availability: Dec-2020

Peak Compiler Invocation (Continued)

Fortran benchmarks:

ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

```
602.gcc_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profddata(pass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

```
605.mcf_s: basepeak = yes
```

```
625.x264_s: -DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs
-xCORE-AVX512 -flto -O3 -ffast-math
-qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

```
657.xz_s: basepeak = yes
```

C++ benchmarks:

```
620.omnetpp_s: basepeak = yes
```

```
623.xalancbmk_s: basepeak = yes
```

```
631.deepsjeng_s: basepeak = yes
```

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 10.6

PowerEdge C6520 (Intel Xeon Silver 4310, 2.10 GHz)

SPECspeed®2017_int_peak = 10.9

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)

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: basepeak = yes

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

http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.html

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.1.html>

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-rev1.1.xml>

SPEC CPU and SPECspeed 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 v1.1.7 on 2021-05-24 01:11:56-0400.

Report generated on 2021-07-08 13:32:03 by CPU2017 PDF formatter v6442.

Originally published on 2021-07-06.