



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 9.81

PowerEdge C6420 (Intel Xeon Gold 6248R, 3.00 GHz)

SPECspeed®2017_int_peak = 9.95

CPU2017 License: 55

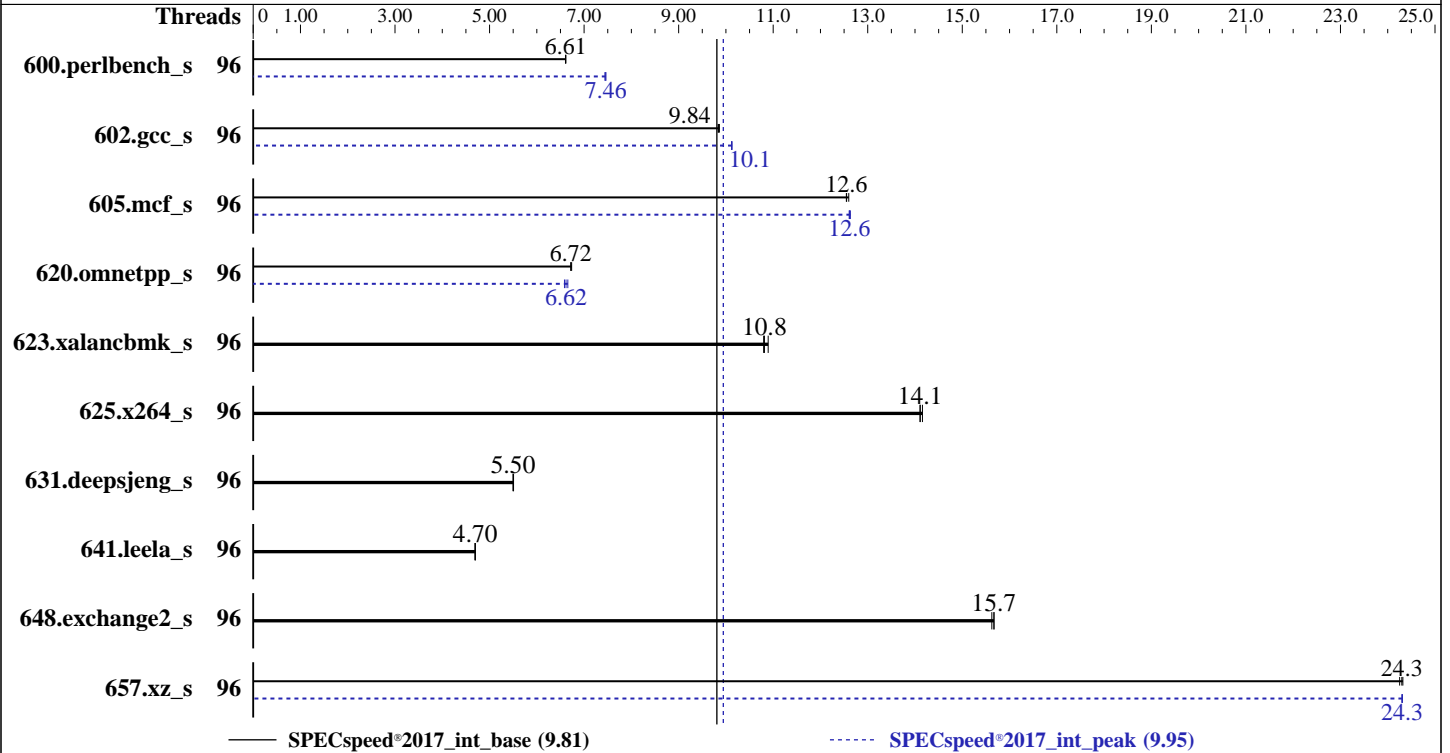
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2020

Hardware Availability: Feb-2020

Software Availability: Nov-2019



Hardware

CPU Name: Intel Xeon Gold 6248R
 Max MHz: 4000
 Nominal: 3000
 Enabled: 48 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chips
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 35.75 MB I+D on chip per chip
 Other: None
 Memory: 384 GB (12 x 32 GB 2Rx8 PC4-2933V-R, running at 2666)
 Storage: 1 x 960GB SATA SSD
 Other: None

Software

OS: Red Hat Enterprise Linux 8.1
 kernel 4.18.0-147.el8.x86_64
 Compiler: C/C++: Version 19.0.5.281 of Intel C/C++ Compiler for Linux;
 Fortran: Version 19.0.5.281 of Intel Fortran Compiler for Linux
 Parallel: Yes
 Firmware: Version 2.7.3 released Mar-2020
 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 set to prefer performance at the cost of additional power usage.



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 9.81

PowerEdge C6420 (Intel Xeon Gold 6248R, 3.00 GHz)

SPECspeed®2017_int_peak = 9.95

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2020

Hardware Availability: Feb-2020

Software Availability: Nov-2019

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	96	268	6.61	269	6.61	268	6.61	96	239	7.44	238	7.46	238	7.46
602.gcc_s	96	405	9.84	405	9.84	404	9.86	96	394	10.1	393	10.1	393	10.1
605.mcf_s	96	375	12.6	376	12.6	376	12.5	96	374	12.6	374	12.6	374	12.6
620.omnetpp_s	96	242	6.74	243	6.72	243	6.72	96	248	6.59	245	6.66	246	6.62
623.xalancbmk_s	96	131	10.8	130	10.9	131	10.8	96	131	10.8	130	10.9	131	10.8
625.x264_s	96	125	14.1	125	14.1	125	14.2	96	125	14.1	125	14.1	125	14.2
631.deepsjeng_s	96	260	5.51	261	5.50	261	5.50	96	260	5.51	261	5.50	261	5.50
641.leela_s	96	363	4.70	363	4.70	364	4.69	96	363	4.70	363	4.70	364	4.69
648.exchange2_s	96	188	15.7	188	15.7	188	15.6	96	188	15.7	188	15.7	188	15.6
657.xz_s	96	255	24.3	254	24.3	254	24.3	96	254	24.3	254	24.3	254	24.3

SPECspeed®2017_int_base = **9.81**

SPECspeed®2017_int_peak = **9.95**

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:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/dev/shm/cpu2017/lib/intel64:/dev/shm/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-9900K 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.

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 9.81

PowerEdge C6420 (Intel Xeon Gold 6248R, 3.00 GHz)

SPECspeed®2017_int_peak = 9.95

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2020

Hardware Availability: Feb-2020

Software Availability: Nov-2019

General Notes (Continued)

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>`
 Benchmark run from a 225 GB ramdisk created with the cmd; "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk"
 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>

Platform Notes

BIOS settings:
 Sub NUMA Cluster enabled
 Virtualization Technology disabled
 System Profile set to Custom
 CPU Performance set to Maximum Performance
 C States set to Autonomous
 C1E disabled
 Uncore Frequency set to Dynamic
 Energy Efficiency Policy set to Performance
 Memory Patrol Scrub set to standard
 Logical Processor enabled
 CPU Interconnect Bus Link Power Management disabled
 PCI ASPM L1 Link Power Management disabled
 UPI Prefetch enabled
 LLC Prefetch disabled
 Dead Line LLC Alloc enabled
 Directory AtoS disabled

Sysinfo program /dev/shm/cpu2017/bin/sysinfo
 Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
 running on localhost.localdomain Tue May 12 09:21:18 2020

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 6248R CPU @ 3.00GHz
 2 "physical id"s (chips)
 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

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 9.81

PowerEdge C6420 (Intel Xeon Gold 6248R, 3.00 GHz)

SPECspeed®2017_int_peak = 9.95

CPU2017 License: 55

Test Date: May-2020

Test Sponsor: Dell Inc.

Hardware Availability: Feb-2020

Tested by: Dell Inc.

Software Availability: Nov-2019

Platform Notes (Continued)

```

siblings : 48
physical 0: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29

```

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:            85
Model name:       Intel(R) Xeon(R) Gold 6248R CPU @ 3.00GHz
Stepping:         7
CPU MHz:          1200.000
CPU max MHz:      4000.0000
CPU min MHz:      1200.0000
BogoMIPS:         6000.00
Virtualization:   VT-x
L1d cache:        32K
L1i cache:        32K
L2 cache:         1024K
L3 cache:         36608K
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):
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 node2 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 node3 CPU(s):
3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63,67,71,75,79,83,87,91,95
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
aperfperf 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 fl6c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_lld

```

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 9.81

PowerEdge C6420 (Intel Xeon Gold 6248R, 3.00 GHz)

SPECspeed®2017_int_peak = 9.95

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2020

Hardware Availability: Feb-2020

Software Availability: Nov-2019

Platform Notes (Continued)

arch_capabilities

/proc/cpuinfo cache data
cache size : 36608 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: 95304 MB
node 0 free: 61411 MB
node 1 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 1 size: 96763 MB
node 1 free: 83203 MB
node 2 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 2 size: 96737 MB
node 2 free: 83483 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: 96762 MB
node 3 free: 83302 MB
node distances:
node  0  1  2  3
  0:  10  21  11  21
  1:  21  10  21  11
  2:  11  21  10  21
  3:  21  11  21  10

```

```

From /proc/meminfo
MemTotal:      394821696 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.1 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.1"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.1 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga

```

uname -a:

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 9.81

PowerEdge C6420 (Intel Xeon Gold 6248R, 3.00 GHz)

SPECspeed®2017_int_peak = 9.95

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2020

Hardware Availability: Feb-2020

Software Availability: Nov-2019

Platform Notes (Continued)

Linux localhost.localdomain 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

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/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 May 10 16:56

SPEC is set to: /dev/shm/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
tmpfs	tmpfs	189G	62G	127G	33%	/dev/shm

From /sys/devices/virtual/dmi/id

```

BIOS:      Dell Inc.  2.7.3 03/25/2020
Vendor:    Dell Inc.
Product:   PowerEdge C6420
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 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
1x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
2x 00AD063200AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
3x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
4x Not Specified Not Specified

```

(End of data from sysinfo program)

Compiler Version Notes

```

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

```

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 9.81

PowerEdge C6420 (Intel Xeon Gold 6248R, 3.00 GHz)

SPECspeed®2017_int_peak = 9.95

CPU2017 License: 55

Test Date: May-2020

Test Sponsor: Dell Inc.

Hardware Availability: Feb-2020

Tested by: Dell Inc.

Software Availability: Nov-2019

Compiler Version Notes (Continued)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

```
=====  
C++      | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)  
          | 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)  
-----
```

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

```
=====  
Fortran  | 648.exchange2_s(base, peak)  
-----
```

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

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
```

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 9.81

PowerEdge C6420 (Intel Xeon Gold 6248R, 3.00 GHz)

SPECspeed®2017_int_peak = 9.95

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2020

Hardware Availability: Feb-2020

Software Availability: Nov-2019

Base Portability Flags (Continued)

648.exchange2_s: -DSPEC_LP64

657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

```
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

C++ benchmarks:

```
-m64 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin  
-lqkmallo
```

Fortran benchmarks:

```
-m64 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4  
-nostandard-realloc-lhs
```

Peak Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Peak Portability Flags

Same as Base Portability Flags



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 9.81

PowerEdge C6420 (Intel Xeon Gold 6248R, 3.00 GHz)

SPECspeed®2017_int_peak = 9.95

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2020

Hardware Availability: Feb-2020

Software Availability: Nov-2019

Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
-prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib
-ljemalloc
```

```
602.gcc_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
-prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -L/usr/local/je5.0.1-64/lib
-ljemalloc
```

```
605.mcf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
-prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div
-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc
```

625.x264_s: basepeak = yes

```
657.xz_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
-prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

C++ benchmarks:

```
620.omnetpp_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-ipo -xCORE-AVX512 -O3 -no-prec-div
-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
-lqkmallocc
```

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: basepeak = yes



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 9.81

PowerEdge C6420 (Intel Xeon Gold 6248R, 3.00 GHz)

SPECspeed®2017_int_peak = 9.95

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2020

Hardware Availability: Feb-2020

Software Availability: Nov-2019

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

http://www.spec.org/cpu2017/flags/Intel-ic19.0u5-official-linux64_revD.html

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE10.html>

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

http://www.spec.org/cpu2017/flags/Intel-ic19.0u5-official-linux64_revD.xml

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE10.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 v1.1.0 on 2020-05-12 09:21:17-0400.

Report generated on 2020-06-09 16:06:01 by CPU2017 PDF formatter v6255.

Originally published on 2020-06-09.