



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 11.4

PowerEdge R340 (Intel Xeon E-2288G, 3.70 GHz)

SPECspeed®2017_int_peak = 11.6

CPU2017 License: 55

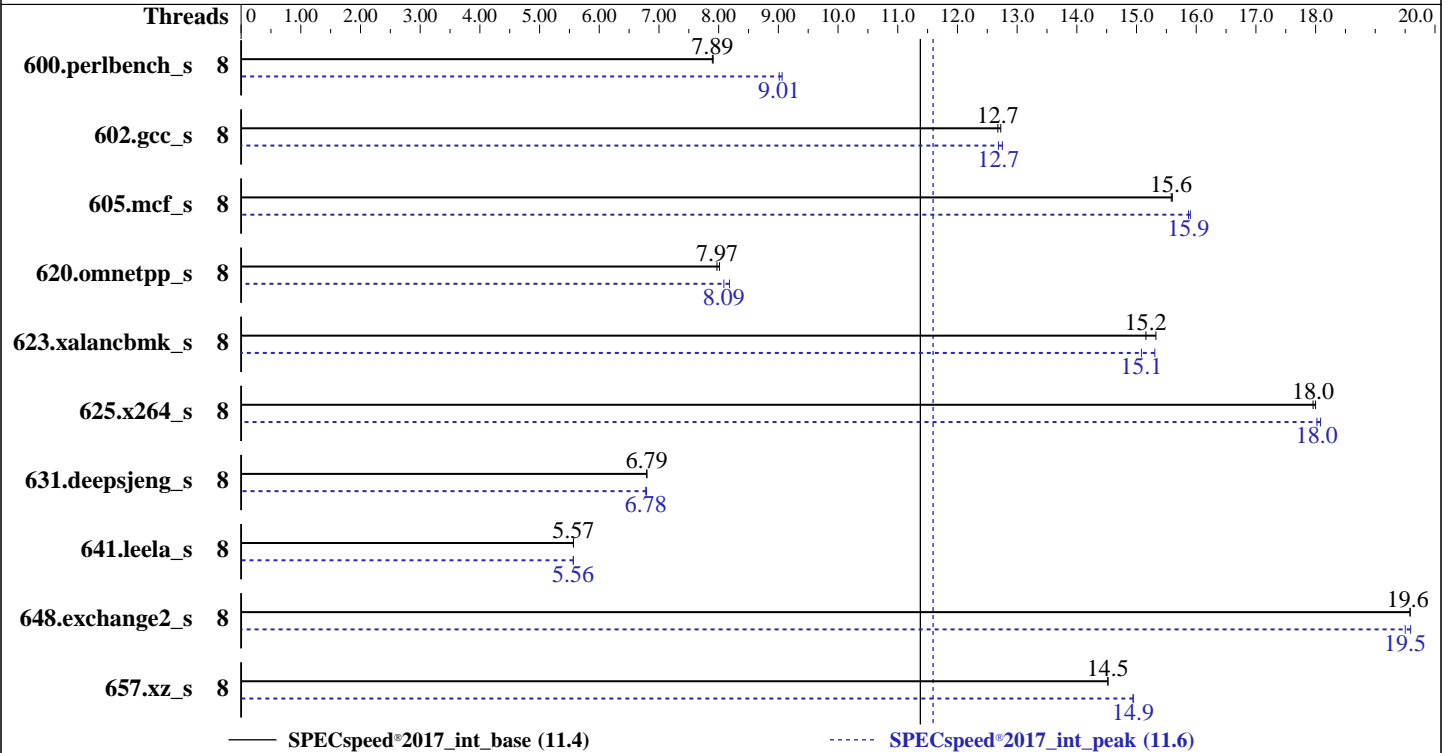
Test Date: Jan-2020

Test Sponsor: Dell Inc.

Hardware Availability: Dec-2018

Tested by: Dell Inc.

Software Availability: Jun-2019



Hardware

CPU Name: Intel Xeon E-2288G
 Max MHz: 5000
 Nominal: 3700
 Enabled: 8 cores, 1 chip, 2 threads/core
 Orderable: 1 chips
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 256 KB I+D on chip per core
 L3: 16 MB I+D on chip per chip
 Other: None
 Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-R)
 Storage: 1 x 960 GB SATA SSD
 Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP1
 Kernel 4.12.14-195-default
 Compiler: C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux;
 Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux
 Parallel: Yes
 Firmware: Version 2.1.6 released Sep-2018
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 Other: None
 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 = 11.4

PowerEdge R340 (Intel Xeon E-2288G, 3.70 GHz)

SPECspeed®2017_int_peak = 11.6

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

Test Date: Jan-2020
Hardware Availability: Dec-2018
Software Availability: Jun-2019

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	8	225	7.89	224	7.91			8	196	9.06	197	9.01		
602.gcc_s	8	314	12.7	313	12.7			8	312	12.8	314	12.7		
605.mcf_s	8	303	15.6	303	15.6			8	297	15.9	297	15.9		
620.omnetpp_s	8	205	7.97	204	8.01			8	199	8.18	202	8.09		
623.xalancbmk_s	8	92.5	15.3	93.5	15.2			8	92.6	15.3	93.9	15.1		
625.x264_s	8	98.0	18.0	98.2	18.0			8	97.6	18.1	97.9	18.0		
631.deepsjeng_s	8	211	6.80	211	6.79			8	211	6.79	211	6.78		
641.leela_s	8	306	5.57	306	5.57			8	306	5.57	307	5.56		
648.exchange2_s	8	150	19.6	150	19.6			8	150	19.6	151	19.5		
657.xz_s	8	426	14.5	426	14.5			8	414	14.9	414	14.9		

SPECspeed®2017_int_base = **11.4**

SPECspeed®2017_int_peak = **11.6**

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 = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
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
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.
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>



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 11.4

PowerEdge R340 (Intel Xeon E-2288G, 3.70 GHz)

SPECspeed®2017_int_peak = 11.6

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2020

Hardware Availability: Dec-2018

Software Availability: Jun-2019

Platform Notes

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on linux-g3ob Tue Jan 28 12:18:36 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) E-2288G CPU @ 3.70GHz
1 "physical id"s (chips)
16 "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 : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 39 bits physical, 48 bits virtual
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2288G CPU @ 3.70GHz
Stepping: 13
CPU MHz: 3700.000
BogoMIPS: 7392.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 16384K
NUMA node0 CPU(s): 0-15
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 aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 11.4

PowerEdge R340 (Intel Xeon E-2288G, 3.70 GHz)

SPECspeed®2017_int_peak = 11.6

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2020

Hardware Availability: Dec-2018

Software Availability: Jun-2019

Platform Notes (Continued)

sdbg fma cx16 xtpr pdcn pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single
ssbd ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt
intel_pt xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts md_clear flush_lld
arch_capabilities

```
/proc/cpuinfo cache data
cache size : 16384 KB
```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

```
available: 1 nodes (0)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
node 0 size: 64131 MB
node 0 free: 63347 MB
node distances:
node    0
0:     10
```

From /proc/meminfo

```
MemTotal:      65670280 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

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

```
os-release:
NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"
```

uname -a:

```
Linux linux-g3ob 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
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
```

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 11.4

PowerEdge R340 (Intel Xeon E-2288G, 3.70 GHz)

SPECspeed®2017_int_peak = 11.6

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2020

Hardware Availability: Dec-2018

Software Availability: Jun-2019

Platform Notes (Continued)

CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
 CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Jan 28 12:15 last=5

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda2	xfs	440G	30G	411G	7%	/

From /sys/devices/virtual/dmi/id
 BIOS: Dell Inc. 2.1.6 09/27/2018
 Vendor: Dell Inc.
 Product: PowerEdge R340
 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:
 2x 00CE00000A02 M391A2K43BB1-CTD 16 GB 2 rank 2666
 2x 00CE00000A07 M391A2K43BB1-CTD 16 GB 2 rank 2666

(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)
-----
```

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
 Version 19.0.4.227 Build 20190416
 Copyright (C) 1985-2019 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) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
 Version 19.0.4.227 Build 20190416
 Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 11.4

PowerEdge R340 (Intel Xeon E-2288G, 3.70 GHz)

SPECspeed®2017_int_peak = 11.6

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2020

Hardware Availability: Dec-2018

Software Availability: Jun-2019

Compiler Version Notes (Continued)

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

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
=====

Base Compiler Invocation

C benchmarks:

icc -m64 -std=c11

C++ benchmarks:

icpc -m64

Fortran benchmarks:

ifort -m64

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:

-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:

-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 11.4

PowerEdge R340 (Intel Xeon E-2288G, 3.70 GHz)

SPECspeed®2017_int_peak = 11.6

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2020

Hardware Availability: Dec-2018

Software Availability: Jun-2019

Base Optimization Flags (Continued)

C++ benchmarks (continued):

```
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs
```

Peak Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

C++ benchmarks:

```
icpc -m64
```

Fortran benchmarks:

```
ifort -m64
```

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) -O2
-xCORE-AVX2 -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: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 11.4

PowerEdge R340 (Intel Xeon E-2288G, 3.70 GHz)

SPECspeed®2017_int_peak = 11.6

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2020

Hardware Availability: Dec-2018

Software Availability: Jun-2019

Peak Optimization Flags (Continued)

```
605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -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: -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
657.xz_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX2 -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: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

```
623.xalancbmk_s: -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

631.deepsjeng_s: Same as 623.xalancbmk_s

641.leela_s: Same as 623.xalancbmk_s

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE9.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE9.xml>



SPEC CPU[®]2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed[®]2017_int_base = 11.4

PowerEdge R340 (Intel Xeon E-2288G, 3.70 GHz)

SPECspeed[®]2017_int_peak = 11.6

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2020

Hardware Availability: Dec-2018

Software Availability: Jun-2019

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 2020-01-28 13:18:36-0500.
Report generated on 2020-03-02 11:51:13 by CPU2017 PDF formatter v6255.
Originally published on 2020-02-29.