



# SPEC® CPU2017 Integer Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Dell Inc.

PowerEdge R340 (Intel Xeon E-2144G, 3.60GHz)

SPECspeed2017\_int\_base = 9.87

SPECspeed2017\_int\_peak = 9.75

CPU2017 License: 55

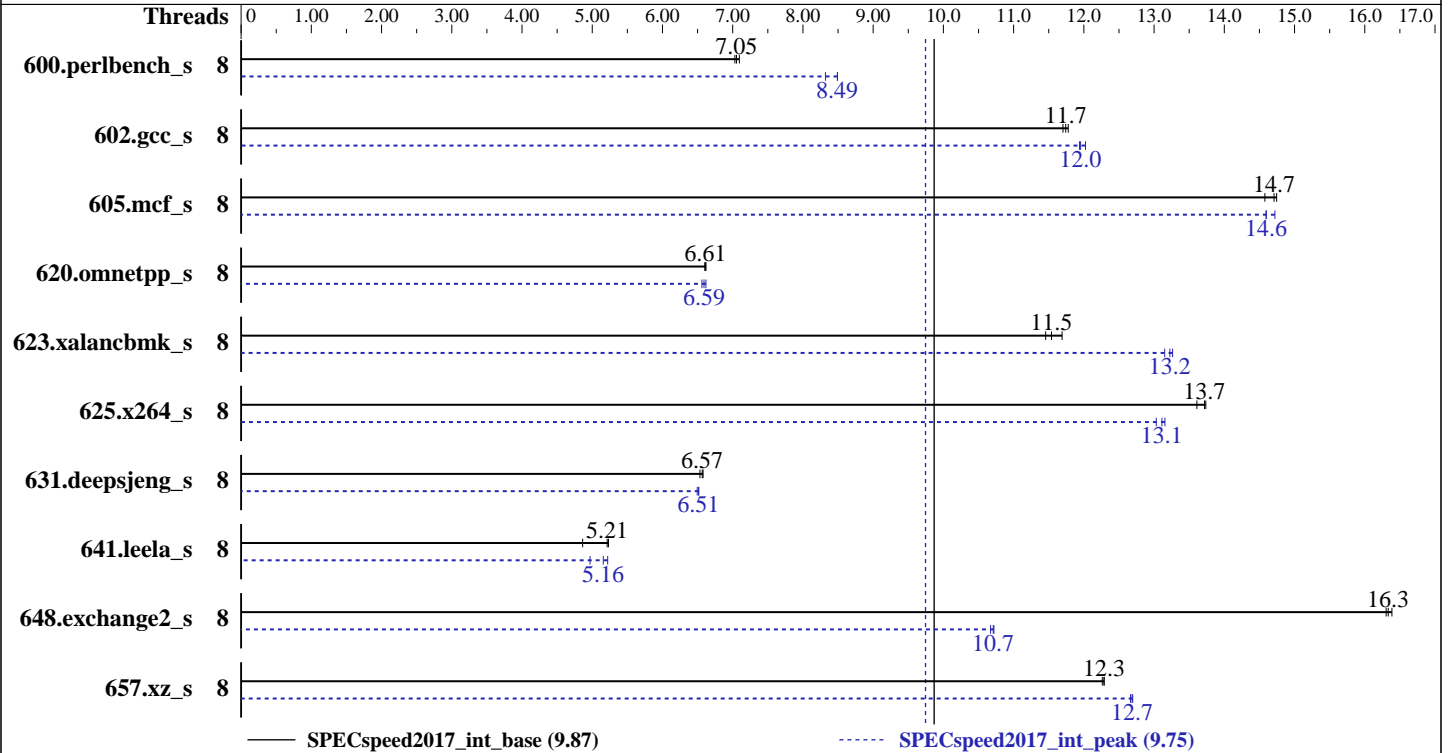
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2019

Hardware Availability: Dec-2018

Software Availability: Apr-2018



### Hardware

CPU Name: Intel Xeon E-2144G  
 Max MHz.: 4500  
 Nominal: 3600  
 Enabled: 4 cores, 1 chip, 2 threads/core  
 Orderable: 1 chip  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 256 KB I+D on chip per core  
 L3: 8 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 12 SP3  
 4.4.126-94.22-default  
 Compiler: C/C++: Version 18.0.2.20180210 of Intel C/C++  
 Compiler for Linux;  
 Fortran: Version 18.0.2.20180210 of Intel Fortran  
 Compiler for Linux  
 Parallel: Yes  
 Firmware: Version 1.0.1 released Oct-2018  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit  
 Other: jemalloc memory allocator v5.0.1



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## Results Table

Benchmark	Base						Peak							
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	8	252	7.03	250	7.09	<b><u>252</u></b>	<b><u>7.05</u></b>	8	209	8.49	213	8.32	<b><u>209</u></b>	<b><u>8.49</u></b>
602.gcc_s	8	340	11.7	338	11.8	<b><u>339</u></b>	<b><u>11.7</u></b>	8	334	11.9	<b><u>333</u></b>	<b><u>12.0</u></b>	331	12.0
605.mcf_s	8	320	14.7	<b><u>321</u></b>	<b><u>14.7</u></b>	324	14.6	8	321	14.7	323	14.6	<b><u>323</u></b>	<b><u>14.6</u></b>
620.omnetpp_s	8	246	6.62	<b><u>247</u></b>	<b><u>6.61</u></b>	247	6.60	8	249	6.56	246	6.62	<b><u>247</u></b>	<b><u>6.59</u></b>
623.xalancbmk_s	8	121	11.7	124	11.5	<b><u>123</u></b>	<b><u>11.5</u></b>	8	107	13.3	108	13.2	<b><u>107</u></b>	<b><u>13.2</u></b>
625.x264_s	8	128	13.7	<b><u>129</u></b>	<b><u>13.7</u></b>	130	13.6	8	135	13.0	<b><u>135</u></b>	<b><u>13.1</u></b>	134	13.2
631.deepsjeng_s	8	<b><u>218</u></b>	<b><u>6.57</u></b>	218	6.58	219	6.53	8	220	6.52	221	6.49	<b><u>220</u></b>	<b><u>6.51</u></b>
641.leela_s	8	326	5.23	<b><u>327</u></b>	<b><u>5.21</u></b>	351	4.86	8	343	4.97	327	5.22	<b><u>331</u></b>	<b><u>5.16</u></b>
648.exchange2_s	8	180	16.3	<b><u>180</u></b>	<b><u>16.3</u></b>	179	16.4	8	<b><u>275</u></b>	<b><u>10.7</u></b>	275	10.7	274	10.7
657.xz_s	8	504	12.3	<b><u>503</u></b>	<b><u>12.3</u></b>	503	12.3	8	487	12.7	488	12.7	<b><u>487</u></b>	<b><u>12.7</u></b>

SPECspeed2017\_int\_base = 9.87

SPECspeed2017\_int\_peak = 9.75

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"

## General Notes

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

KMP\_AFFINITY = "granularity=fine,scatter"

LD\_LIBRARY\_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

OMP\_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM  
memory using Redhat Enterprise Linux 7.4

Yes: 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
```

jemalloc, a general purpose malloc implementation

built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5

sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>



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## Platform Notes

BIOS settings:

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 disabled

Logical Processor enabled

CPU Interconnect Bus Link Power Management disabled

PCI ASPM L1 Link Power Management disabled

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

running on linux-bx7m Thu Jan 3 05:35:24 2019

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-2144G CPU @ 3.60GHz

1 "physical id"s (chips)

8 "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 : 4

siblings : 8

physical 0: cores 0 1 2 3

From lscpu:

Architecture: x86\_64

CPU op-mode(s): 32-bit, 64-bit

Byte Order: Little Endian

CPU(s): 8

On-line CPU(s) list: 0-7

Thread(s) per core: 2

Core(s) per socket: 4

Socket(s): 1

NUMA node(s): 1

Vendor ID: GenuineIntel

CPU family: 6

Model: 158

Model name: Intel(R) Xeon(R) E-2144G CPU @ 3.60GHz

Stepping: 10

CPU MHz: 4361.101

CPU max MHz: 4500.0000

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## Platform Notes (Continued)

```

CPU min MHz:      800.0000
BogoMIPS:         7199.98
Virtualization:   VT-x
L1d cache:        32K
L1i cache:        32K
L2 cache:         256K
L3 cache:         8192K
NUMA node0 CPU(s): 0-7

```

```

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
aperfmpperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtherm hwp hwp_act_window hwp_epp intel_pt rsb_ctxsw spec_ctrl stibp retpoline
kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep
bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1

```

```

/proc/cpuinfo cache data
cache size : 8192 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
node 0 size: 64277 MB
node 0 free: 63671 MB
node distances:
node    0
0:     10

```

```

From /proc/meminfo

```

```

MemTotal:        65820248 kB
HugePages_Total: 0
Hugepagesize:    2048 kB

```

```

/usr/bin/lsb_release -d

```

```

SUSE Linux Enterprise Server 12 SP3

```

```

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

```

```

SuSE-release:

```

```

SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 3

```

```

# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.

```

```

os-release:

```

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## Platform Notes (Continued)

```

NAME="SLES"
VERSION="12-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"

```

uname -a:

```

Linux linux-bx7m 4.4.126-94.22-default #1 SMP Wed Apr 11 07:45:03 UTC 2018 (9649989)
x86_64 x86_64 x86_64 GNU/Linux

```

Kernel self-reported vulnerability status:

```

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

```

run-level 3 Jan 3 05:35 last=5

SPEC is set to: /home/cpu2017

```

Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2        xfs   300G   16G  285G   6% /

```

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.

BIOS Dell Inc. 1.0.1 10/19/2018

Memory:

```

3x 00AD00000A02 HMA82GU7CJR8N-VK 16 GB 2 rank 2666
1x 00AD00000A07 HMA82GU7CJR8N-VK 16 GB 2 rank 2666

```

(End of data from sysinfo program)

## Compiler Version Notes

```

=====
CC 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)
657.xz_s(base)
=====

```

icc (ICC) 18.0.2 20180210

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## Compiler Version Notes (Continued)

CC 600.perlbench\_s(peak) 602.gcc\_s(peak) 605.mcf\_s(peak) 625.x264\_s(peak)  
657.xz\_s(peak)

-----  
icc (ICC) 18.0.2 20180210

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-----

=====  
CXXC 620.omnetpp\_s(base) 623.xalanbmk\_s(base) 631.deepsjeng\_s(base)  
641.leela\_s(base)

-----  
icpc (ICC) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

=====  
CXXC 620.omnetpp\_s(peak) 623.xalanbmk\_s(peak) 631.deepsjeng\_s(peak)  
641.leela\_s(peak)

-----  
icpc (ICC) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

=====  
FC 648.exchange2\_s(base)

-----  
ifort (IFORT) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

=====  
FC 648.exchange2\_s(peak)

-----  
ifort (IFORT) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

## Base Compiler Invocation

C benchmarks:

icc -m64 -std=c11

C++ benchmarks:

icpc -m64

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## Base Compiler Invocation (Continued)

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=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

C++ benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc
```

Fortran benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

## Peak Compiler Invocation

C benchmarks:

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

C++ benchmarks (except as noted below):

```
icpc -m64
```

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## Peak Compiler Invocation (Continued)

```
623.xalancbmk_s: icpc -m32 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin
```

Fortran benchmarks:

```
ifort -m64
```

## Peak 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: -D_FILE_OFFSET_BITS=64 -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
```

## Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX2 -qopt-prefetch -ipo -O3
-qopt-mem-layout-trans=3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib
-ljemalloc
```

```
602.gcc_s: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX2 -qopt-prefetch -ipo -O3
-qopt-mem-layout-trans=3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
605.mcf_s: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
625.x264_s: Same as 602.gcc_s
```

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## Peak Optimization Flags (Continued)

657.xz\_s: Same as 602.gcc\_s

C++ benchmarks:

```
620.omnetpp_s: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
623.xalancbmk_s: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-32/lib -ljemalloc
```

631.deepsjeng\_s: Same as 620.omnetpp\_s

641.leela\_s: Same as 620.omnetpp\_s

Fortran benchmarks:

```
-w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revC.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revC.xml>

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Tested with SPEC CPU2017 v1.0.5 on 2019-01-03 06:35:23-0500.

Report generated on 2019-01-22 16:45:50 by CPU2017 PDF formatter v6067.

Originally published on 2019-01-22.