## SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

**PowerEdge T40 (Intel Core i3-9100, 3.60GHz)**

### SPECspeed®2017_int_base = 9.28
### SPECspeed®2017_int_peak = 9.43

<table>
<thead>
<tr>
<th>Threads</th>
<th>600.perlbench_s</th>
<th>602.gcc_s</th>
<th>605.mcf_s</th>
<th>620.omnetpp_s</th>
<th>623.xalancbmk_s</th>
<th>625.x264_s</th>
<th>631.deepsjeng_s</th>
<th>641.leela_s</th>
<th>648.exchange2_s</th>
<th>657.xz_s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
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<td>10.5</td>
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<td>13.9</td>
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<td>15.8</td>
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<td>13.0</td>
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</tbody>
</table>

### Software

**OS:** Ubuntu 18.04.2 LTS

**Compiler:** C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux;

**Fortran:** Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux

**Parallel:** Yes

**Compiler Build:** 20181018

**System State:** Run level 5 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** 64-bit

**Power Management:** --

---

**Hardware**

**CPU Name:** Intel Core i3-9100

**Max MHz:** 4200

**Nominal:** 3600

**Enabled:** 4 cores, 1 chip

**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:** 6 MB I+D on chip per chip

**Other:** None

**Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)

**Storage:** 1 x 960 GB SATA SSD

**Other:** None
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
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<td>13.4</td>
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<tr>
<td>625.x264_s</td>
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<td>648.exchange2_s</td>
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<td></td>
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<td>810</td>
<td>7.63</td>
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<td>7.63</td>
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</tbody>
</table>

SPECspeed®2017_int_base = 9.28
SPECspeed®2017_int_peak = 9.43

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 i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
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 7.5, and the system compiler gcc 4.8.5
Dell Inc.
PowerEdge T40 (Intel Core i3-9100, 3.60GHz)  

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

Test Date: Apr-2019  
Hardware Availability: Apr-2019  
Software Availability: Feb-2019

Platform Notes

BIOS settings:
CPU Performance set to Maximum Performance
C States set to Autonomous
C1E disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on intel-sut Fri Apr 26 22:19:14 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) Core(TM) i3-9100 CPU @ 3.60GHz
  1 "physical id"s (chips)
  4 "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 : 4
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): 4
On-line CPU(s) list: 0-3
Core(s) per core: 1
Core(s) per socket: 4
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Core(TM) i3-9100 CPU @ 3.60GHz
Stepping: 11
CPU MHz: 4183.482
CPU max MHz: 4200.0000
CPU min MHz: 800.0000
BogoMIPS: 7200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 6144K
NUMA node0 CPU(s): 0-3
```

(Continued on next page)
### Platform Notes (Continued)

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  
aperfmon perf gravel tc2 mk0009 dts pmmu dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg  
fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes  
xbmc axf f16c rdrand lahf_lm abd 3mowprefetch cpuid_fault epb invpcid_single pti  
ssbd ibrs ibpb stibp tpr_shadow vmi flexpriority ept vpid fsgsbase tsc_adjust bmi1  
avx2 smep bmi2 erms invpcid mxr rdseed adx smap clflushopt intel_pt xsaveopt xsavec  
xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp  
flush_l1d`

```
/proc/cpuinfo cache data
  cache size: 6144 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
  node 0 size: 64255 MB
  node 0 free: 50642 MB
  node distances:
    node 0
    0: 10
```

From `/proc/meminfo`

```
MemTotal:       65797688 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

From `/usr/bin/lsb_release -d`

```
Ubuntu 18.04.2 LTS
```

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

```
debian_version: buster/sid
os-release:  
  NAME=Ubuntu
  VERSION="18.04.2 LTS (Bionic Beaver)"
  ID=ubuntu
  ID_LIKE=debian
  PRETTY_NAME="Ubuntu 18.04.2 LTS"
  VERSION_ID="18.04"
  HOME_URL="https://www.ubuntu.com/"
  SUPPORT_URL="https://help.ubuntu.com/"
```

```
uname -a:
  Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64
  x86_64 x86_64 GNU/Linux
```
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Dell Inc.
PowerEdge T40 (Intel Core i3-9100, 3.60GHz)

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

Test Date: Apr-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Platform Notes (Continued)

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: Full generic retpoline, IBPB, IBRS_FW

run-level 5 Apr 26 13:32
SPEC is set to: /home/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda2      ext4  439G   30G  388G   8% /

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. 0.1.3 04/22/2019
Memory:
4x 80CE000080CE M391A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

(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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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

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Compiler Version Notes (Continued)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 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:
-W1,-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:
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

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Spec CPU®2017 Integer Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

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Base Optimization Flags (Continued)

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
-DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/je5.0.1-64/lib -ljemalloc

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

(Continued on next page)
## Peak Optimization Flags (Continued)

### C++ benchmarks:

- 625.x264_s: `-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -openmp -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 -openmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc`

### 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:


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

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