# SPEC CPU®2017 Integer Speed Result

## Dell Inc.

**PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)**

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Dell Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor</td>
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<td>Tested by</td>
<td>Dell Inc.</td>
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<td>Dec-2019</td>
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<td>Dec-2019</td>
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<tr>
<td>Software Availability</td>
<td>Aug-2019</td>
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</tbody>
</table>

### SPECspeed®2017_int_base = 8.20

### SPECspeed®2017_int_peak = 8.87

<table>
<thead>
<tr>
<th>SPECbench</th>
<th>Threads</th>
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<tr>
<td>perlbench</td>
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<td>gcc</td>
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<td>mcf</td>
<td>6</td>
<td>7.84</td>
<td>8.20</td>
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<tr>
<td>omnetpp</td>
<td>6</td>
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<td>xalancbmk</td>
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<tr>
<td>x264</td>
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<td>6.06</td>
<td>6.07</td>
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<tr>
<td>deepsjeng</td>
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<td>leela</td>
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<td>4.74</td>
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<tr>
<td>exchange2</td>
<td>6</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>xz</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Hardware

- **CPU Name:** Intel Xeon E-2246G
- **Max MHz:** 4800
- **Nominal:** 3600
- **Enabled:** 12 cores, 1 chip
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 256 KB I+D on chip per core
- **Cache L3:** 12 MB I+D on chip per chip
- **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 Nov-2019
- **File System:** xfs
- **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
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
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<tr>
<td>600.perlbench_s</td>
<td>6</td>
<td>534</td>
<td>3.32</td>
<td>535</td>
<td>3.32</td>
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<td>4.36</td>
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<tr>
<td>602.gcc_s</td>
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<td>421</td>
<td>9.45</td>
<td>424</td>
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<td>620.omnetpp_s</td>
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<td>6.06</td>
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<td></td>
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<td>6.07</td>
</tr>
<tr>
<td>641.leeuwa_s</td>
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<td>4.75</td>
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<td>648.exchange2_s</td>
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<td>18.7</td>
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<td>18.7</td>
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<tr>
<td>657.xz_s</td>
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<td></td>
<td>6</td>
<td>529</td>
<td>11.7</td>
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</table>

**SPECspeed®2017_int_base = 8.20**

**SPECspeed®2017_int_peak = 8.87**

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 i9-799X 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
```

Dell Inc.  
PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)  

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| Dell Inc.  
PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)  

**Platform Notes**

BIOS settings:
Virtualization Technology disabled  
DCU Streamer Prefetcher 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  
PCI ASPM L1 Link Power Management disabled  
Logical Processor disabled  

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7edbble6e46a485a0011  
running on linux-g3ob Mon Dec 2 16:00:50 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-2246G CPU @ 3.60GHz
  1 "physical id"s (chips)
  12 "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 : 6
    siblings : 12
    physical 0: cores 0 1 2 3 4 5
```

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): 12  
On-line CPU(s) list: 0-11  
Thread(s) per core: 2  
Core(s) per socket: 6  
Socket(s): 1  
NUMA node(s): 1  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 158  
Model name: Intel(R) Xeon(R) E-2246G CPU @ 3.60GHz  
Stepping: 10
```
### Dell Inc.

**PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)**

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

**CPU MHz:** 3600.000  
**BogoMIPS:** 7200.00  
**Virtualization:** VT-x  
**L1d cache:** 32K  
**L1i cache:** 32K  
**L2 cache:** 256K  
**L3 cache:** 12288K  
**NUMA node0 CPU(s):** 0-11  
**Flags:** fpu vme de pse tsc msr pae 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 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 cpuid_fault epb invpcid_single pti ssbd ibrs ibpb stibp 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_l1d

/proc/cpuinfo cache data  
```plaintext```
cache size : 12288 KB
```

From numactl --hardware  
```plaintext```
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  
node 0 size: 64257 MB  
node 0 free: 63471 MB  
node distances:  
node 0  
  0: 10
```

From /proc/meminfo  
```plaintext```
MemTotal: 65800056 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB
```

From /etc/*release* /etc/*version*  
```plaintext```
os-release:  
```plaintext```
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
```

(Continued on next page)
Dell Inc. PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)

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

Platform Notes (Continued)

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): Mitigation: PTE Inversion
Microarchitectural Data Sampling: Mitigation: Clear CPU buffers; SMT vulnerable
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

run-level 3 Dec 2 16:00 last=5

SPEC is set to: /home/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda2      xfs   440G   36G  405G   9% /

From /sys/devices/virtual/dmi/id
    BIOS:    Dell Inc. 2.1.6 09/27/2018
    Vendor:  Dell Inc.
    Product: PowerEdge T340
    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 00AD00000A02 HMA82GU7CJR8N-VK 16 GB 2 rank 2666
    2x 00AD00000A07 HMA82GU7CJR8N-VK 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

(Continued on next page)
SPEC CPU®2017 Integer Speed Result

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PowerEdge T340 (Intel Xeon E-2246G, 3.60 GHz)

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| Test Date:          | Dec-2019 |
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Compiler Version Notes (Continued)

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 19.0.4.227 Build 20190416
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 19.0.4.227 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`  
  - `-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`  
  - `-fno-strict-overflow`  
  - `-L/usr/local/je5.0.1-64/lib -ljemalloc`

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

**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`

**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:

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**Test Date:** Dec-2019  
**Hardware Availability:** Dec-2019  
**Software Availability:** Aug-2019

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

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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 2019-12-02 17:00:49-0500.  
Report generated on 2019-12-26 11:38:56 by CPU2017 PDF formatter v6255.  
Originally published on 2019-12-24.