**SPEC CPU®2017 Integer Speed Result**

**Dell Inc.**

PowerEdge T340 (Intel Xeon E-2288G, 3.70 GHz)

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Nov-2019</th>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Dec-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Aug-2019</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**CPU Name:** Intel Xeon E-2288G

**Max MHz:** 5000

**Nominal:** 3700

Enabled: 8 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: 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 Nov-2019

**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

**SPECspeed®2017_int_base = 11.4**

**SPECspeed®2017_int_peak = 11.6**

<table>
<thead>
<tr>
<th>Test</th>
<th>Base</th>
<th>Peak</th>
<th>Speedup</th>
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</thead>
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<tr>
<td>perlbench_s</td>
<td>600</td>
<td>7.99</td>
<td>9.03</td>
</tr>
<tr>
<td>gcc_s</td>
<td>602</td>
<td>12.8</td>
<td>15.6</td>
</tr>
<tr>
<td>mcf_s</td>
<td>605</td>
<td>15.9</td>
<td>15.2</td>
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<tr>
<td>omnetpp_s</td>
<td>620</td>
<td>8.19</td>
<td>15.2</td>
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<tr>
<td>xalancbmk_s</td>
<td>623</td>
<td>18.1</td>
<td>18.1</td>
</tr>
<tr>
<td>x264_s</td>
<td>625</td>
<td>15.2</td>
<td>15.4</td>
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<tr>
<td>deepsjeng_s</td>
<td>631</td>
<td>19.4</td>
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<tr>
<td>leela_s</td>
<td>641</td>
<td>5.56</td>
<td>5.56</td>
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<tr>
<td>exchange2_s</td>
<td>648</td>
<td>14.7</td>
<td>15.1</td>
</tr>
<tr>
<td>xz_s</td>
<td>657</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Threads:**

- **Thread Count:** 8

**Specspeed®2017_int_base (11.4)**

**Specspeed®2017_int_peak (11.6)**
# SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge T340 (Intel Xeon E-2288G, 3.70 GHz)

**SPECspeed®2017_int_base = 11.4**

**SPECspeed®2017_int_peak = 11.6**

**CPU2017 License:** 55
**Test Date:** Nov-2019
**Test Sponsor:** Dell Inc.
**Hardware Availability:** Dec-2019
**Tested by:** Dell Inc.
**Software Availability:** Aug-2019

## Results Table

<table>
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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
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<td>657.xz_s</td>
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<td>411</td>
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**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 i9-799X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

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.

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

**SPEC CPU®2017 Integer Speed Result**

**Dell Inc.**

PowerEdge T340 (Intel Xeon E-2288G, 3.70 GHz)

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</table>

Dell Inc.

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

**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 enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed8e6e46a485a0011
running on linux-g3ob Thu Nov 21 15:27:54 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-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
```

(Continued on next page)
Dell Inc.  

PowerEdge T340 (Intel Xeon E-2288G, 3.70 GHz) 

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

SPECspeed®2017_int_base = 11.4  
SPECspeed®2017_int_peak = 11.6  

Platform Notes (Continued)

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 cmov  
pat pse36 clflush dts 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 ssbd ibrs ibpb stibp ibrs_enabled tpr_shadow vnmi flexpriority ept vpd 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

/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)  
ode 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
ode 0 size: 64131 MB  
ode 0 free: 63332 MB  
ode distances:  
ode 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"

(Continued on next page)
Dell Inc.
PowerEdge T340 (Intel Xeon E-2288G, 3.70 GHz)

SPEC CPU®2017 Integer Speed Result

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SPECspeed®2017_int_base = 11.4
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date:
Hardware Availability:
Software Availability:

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

run-level 3 Nov 21 15:27 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

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Dell Inc.  
PowerEdge T340 (Intel Xeon E-2288G, 3.70 GHz)

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CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Test Date: Nov-2019  
Hardware Availability: Dec-2019  
Tested by: Dell Inc.  
Software Availability: Aug-2019

Compiler Version Notes (Continued)

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
<table>
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<th>C++</th>
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<tbody>
<tr>
<td>620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)</td>
</tr>
<tr>
<td>631.deepsjeng_s(base, peak) 641.leela_s(base, peak)</td>
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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.

------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>Fortran</th>
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<tr>
<td>648.exchange2_s(base, peak)</td>
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</table>

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:  
```bash  
icc -m64 -std=c11  
```

C++ benchmarks:  
```bash  
icpc -m64  
```

Fortran benchmarks:  
```bash  
ifort -m64  
```

Base Portability Flags

```bash  
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  
```
Dell Inc.  
PowerEdge T340 (Intel Xeon E-2288G, 3.70 GHz)  

**SPEC CPU®2017 Integer Speed Result**  
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**Dell Inc.**

PowerEdge T340 (Intel Xeon E-2288G, 3.70 GHz)

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

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

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Dell Inc.  

PowerEdge T340 (Intel Xeon E-2288G, 3.70 GHz)  

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**Software Availability:** Aug-2019

**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 -qopt-mem-layout-trans=4 -qopenmp -DSPEC_SUPPRESS_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`
- `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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### Dell Inc.

**PowerEdge T340 (Intel Xeon E-2288G, 3.70 GHz)**

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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Nov-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 2019-11-21 16:27:54-0500.  
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