## SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge T140 (Intel Xeon E-2224, 3.40 GHz)  

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<thead>
<tr>
<th>Test Sponsor: Dell Inc.</th>
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<tbody>
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<table>
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<th>CPU2017 License: 55</th>
<th>Software Availability: Jun-2019</th>
</tr>
</thead>
</table>

### Hardware

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s 4</td>
<td>6.70</td>
<td>7.62</td>
</tr>
<tr>
<td>602.gcc_s 4</td>
<td>11.0</td>
<td>13.7</td>
</tr>
<tr>
<td>605.mcf_s 4</td>
<td>6.80</td>
<td>6.80</td>
</tr>
<tr>
<td>620.omnetpp_s 4</td>
<td>13.1</td>
<td>13.2</td>
</tr>
<tr>
<td>623.xalancbmk_s 4</td>
<td>15.9</td>
<td>15.9</td>
</tr>
<tr>
<td>625.x264_s 4</td>
<td>6.92</td>
<td>6.92</td>
</tr>
<tr>
<td>631.deepsjeng_s 4</td>
<td>4.86</td>
<td>4.86</td>
</tr>
<tr>
<td>641.leela_s 4</td>
<td>17.1</td>
<td>17.1</td>
</tr>
<tr>
<td>648.exchange2_s 4</td>
<td>8.68</td>
<td>8.90</td>
</tr>
<tr>
<td>657.xz_s 4</td>
<td>8.50</td>
<td>8.50</td>
</tr>
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</table>

### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>Suse Linux Enterprise Server 15 SP1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>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</td>
</tr>
<tr>
<td>Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 2.1.6 released Sep-2018</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

### Power Management

BIOS set to prefer performance at the cost of additional power usage

| Other: | jemalloc memory allocator V5.0.1 |

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SPECspeed®2017_int_base = 9.53
SPECspeed®2017_int_peak = 9.70

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base Seconds</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Base Seconds</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Seconds</th>
<th>Peak Seconds</th>
<th>Peak Seconds</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>4</td>
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<td>264</td>
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<td>602.gcc_s</td>
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<td>363</td>
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<td>363</td>
<td>11.0</td>
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<tr>
<td>605.mcf_s</td>
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<td>334</td>
<td>338</td>
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<tr>
<td>620.omnetpp_s</td>
<td>4</td>
<td>239</td>
<td>240</td>
<td>6.81</td>
<td>240</td>
<td>240</td>
<td>6.80</td>
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<td>238</td>
<td>238</td>
<td>6.85</td>
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<tr>
<td>625.x264_s</td>
<td>4</td>
<td>111</td>
<td>111</td>
<td>15.9</td>
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<td>111</td>
<td>15.9</td>
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<td>111</td>
<td>15.9</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>4</td>
<td>238</td>
<td>238</td>
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<td>238</td>
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<td>6.02</td>
<td>238</td>
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<tr>
<td>641.leela_s</td>
<td>4</td>
<td>351</td>
<td>351</td>
<td>4.86</td>
<td>351</td>
<td>351</td>
<td>4.87</td>
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<td>4.86</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>4</td>
<td>172</td>
<td>172</td>
<td>17.1</td>
<td>172</td>
<td>172</td>
<td>17.1</td>
<td>172</td>
<td>172</td>
<td>172</td>
<td>17.1</td>
<td></td>
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<tr>
<td>657.xz_s</td>
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<td>712</td>
<td>8.68</td>
<td>712</td>
<td>712</td>
<td>8.68</td>
<td>695</td>
<td>694</td>
<td>694</td>
<td>8.90</td>
<td></td>
</tr>
</tbody>
</table>

SPECspeed®2017_int_base = 9.53
SPECspeed®2017_int_peak = 9.70

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/ODM-SPECcpu2017-194/cpu2017/lib/intel64:/home/cpu2017/ODM
-SPECcpu2017-194/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
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
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)
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)
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

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

**Dell Inc.**

PowerEdge T140 (Intel Xeon E-2224, 3.40 GHz)

**SPECspeed®2017_int_base = 9.53**

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</tr>
</tbody>
</table>

---

### General Notes (Continued)

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

---

### Platform Notes

BIOS settings:
- Sub NUMA Cluster enabled
- 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
- Logical Processor disabled
- CPU Interconnect Bus Link Power Management enabled
- PCI ASPM L1 Link Power Management enabled

Sysinfo program /home/cpu2017/ODM-SPECcpu2017-194/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on linux-g3ob Tue Jan 28 06:21:04 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-2224 CPU @ 3.40GHz
- 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
- Address sizes: 39 bits physical, 48 bits virtual
- CPU(s): 4
- On-line CPU(s) list: 0-3
- Thread(s) per core: 1

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

- 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-2224 CPU @ 3.40GHz
- Stepping: 10
- CPU MHz: 3400.000
- BogoMIPS: 6816.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 256K
- L3 cache: 8192K
- NUMA node0 CPU(s): 0-3
- 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
- Querying /proc/cpuinfo cache data
- cache size: 8192 KB

From numactl --hardware

<table>
<thead>
<tr>
<th>Available</th>
<th>Nodes</th>
<th>Node Size (MB)</th>
<th>Node Free (MB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>64259</td>
<td>63471</td>
</tr>
<tr>
<td>0: 10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From /proc/meminfo

<table>
<thead>
<tr>
<th>MemTotal</th>
<th>65801564 KB</th>
</tr>
</thead>
<tbody>
<tr>
<td>HugePages_Total</td>
<td>0</td>
</tr>
<tr>
<td>Hugepagesize</td>
<td>2048 KB</td>
</tr>
</tbody>
</table>

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

| os-release*
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME=&quot;SLES&quot;</td>
</tr>
</tbody>
</table>

(Continued on next page)
Dell Inc.  
PowerEdge T140 (Intel Xeon E-2224, 3.40 GHz)

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CPU2017 License: 55
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Hardware Availability: Dec-2019
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Platform Notes (Continued)

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): Mitigation: PTE Inversion
Microarchitectural Data Sampling: Mitigation: Clear CPU buffers; SMT disabled
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, IBFP: conditional, IBRS_FW, STIBP: disabled, RSB filling

run-level 3 Jan 28 06:20 last=5

SPEC is set to: /home/cpu2017/ODM-SPECcpu2017-194/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 T140
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)
Dell Inc.

PowerEdge T140 (Intel Xeon E-2224, 3.40 GHz)

**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.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

(Continued on next page)
## Dell Inc.

**PowerEdge T140 (Intel Xeon E-2224, 3.40 GHz)**

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| Hardware Availability: Dec-2019 |
| Software Availability: Jun-2019 |

### Base Portability Flags (Continued)

- 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
Dell Inc.

PowerEdge T140 (Intel Xeon E-2224, 3.40 GHz)

CPU2017 License: 55
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Dell Inc.

PowerEdge T140 (Intel Xeon E-2224, 3.40 GHz)

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Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX2 -gopt-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 -gopt-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 -gopt-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
-gopt-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 -gopt-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 -gopt-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
-gopt-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 -gopt-mem-layout-trans=4

(Continued on next page)
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Peak Optimization Flags (Continued)
Fortran benchmarks (continued):
-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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