**SPEC CPU®2017 Integer Rate Result**

**Dell Inc.**

PowerEdge T140 (Intel Core i3-9100, 3.60 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
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**CPU2017 License:** 55  
**Test Date:** Nov-2019  
**Test Sponsor:** Dell Inc.  
**Hardware Availability:** Dec-2019  
**Tested by:** Dell Inc.  
**Software Availability:** Jun-2019

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**Specifications:**

**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  
**Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-R)  
**Storage:** 1 x 960 GB SATA SSD  
**Other:** None

**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:** No  
**Firmware:** Version 2.1.6 released Nov-2019  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 32/64-bit  
**Other:** None  
**Power Management:** jemalloc memory allocator V5.0.1  
**BIOS set to prefer performance at the cost of additional power usage.**
## Dell Inc.

PowerEdge T140 (Intel Core i3-9100, 3.60 GHz)

### Results Table

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**Submit Notes**

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

**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:

```
LD_LIBRARY_PATH = 
"/home/cpu2017/ODM-SPECcpu2017-194/cpu2017/lib/intel64:/home/cpu2017/ODM
-SPECcpu2017-194/cpu2017/lib/ia32:/home/cpu2017/ODM-SPECcpu2017-194/cpu2
017/je5.0.1-32"
```

**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.
Dell Inc.
PowerEdge T140 (Intel Core i3-9100, 3.60 GHz)

Specrate®2017_int_base = 25.6
Specrate®2017_int_peak = 26.3

General Notes (Continued)

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
runcpu command invoked through numactl i.e.:
    numactl --interleave=all runcpu <etc>
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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

Sysinfo program /home/cpu2017/ODM-SPECcpu2017-194/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011
running on linux-g3ob Wed Nov 20 07:57:39 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
Dell Inc.

PowerEdge T140 (Intel Core i3-9100, 3.60 GHz)

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

Test Date: Nov-2019
Hardware Availability: Dec-2019
Software Availability: Jun-2019

Platform Notes (Continued)

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
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: 3600.000
BogoMIPS: 7200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 6144K
NUMA node0 CPU(s): 0-3

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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
 aperfmpref tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 sse3 sdbg
 fma cx16 xtpre pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
 xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invvpclid_single pti
 ssbd ibrs ibpb tpr_shadow vmi flexpriority ept vpid fsgsbase tsc_adjust bmi1
 avx2 smep bmi2 ibrms invpcid mpx rdseed adx smap clflushopt intel_pt xsaveopt xsavec
 xgetbv1 xsaves dtherm ida arat pln pts md_clear flush_lld

/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: 64259 MB
node 0 free: 63403 MB
node distances:
node 0
0: 10

From /proc/meminfo
MemTotal: 65801564 kB

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

**Dell Inc.**

**PowerEdge T140 (Intel Core i3-9100, 3.60 GHz)**

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<th>SPECrate®2017_int_base = 25.6</th>
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</table>

#### Platform Notes (Continued)

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"

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, IBPB: conditional, IBRS_FW, STIBF: disabled, RSB filling

run-level 3 Nov 20 07:57 last=5

SPEC is set to: /home/cpu2017/ODM-SPECcpu2017-194/cpu2017

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:

(Continued on next page)
Dell Inc.

PowerEdge T140 (Intel Core i3-9100, 3.60 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: Jun-2019

Platform Notes (Continued)

2x 0OAD00000A02 HMA82GU7CJR8N-VK 16 GB 2 rank 2666
2x 0OAD00000A06 HMA82GU7CJR8N-VK 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

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<table>
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<tr>
<th>C</th>
<th>502.gcc_r(peak)</th>
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**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.

**Compiler Version Notes (Continued)**

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

```
==============================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)  
        | 531.deepsjeng_r(base, peak) 541.leela_r(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++     | 523.xalancbmk_r(peak)
---
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version  
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Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)  
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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.

==============================================================================
Fortran | 548.exchange2_r(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

(Continued on next page)
## Dell Inc.

**PowerEdge T140 (Intel Core i3-9100, 3.60 GHz)**

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**SPECrate®2017_int_base = 25.6**

**SPECrate®2017_int_peak = 26.3**

---

### Base Compiler Invocation (Continued)

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

---

### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
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<tbody>
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<td>perlbench_r</td>
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<tr>
<td>gcc_r</td>
<td>-DSPEC_LP64</td>
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<td>-DSPEC_LP64</td>
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<tr>
<td>xz_r</td>
<td>-DSPEC_LP64</td>
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</tbody>
</table>

---

### Base Optimization Flags

**C benchmarks**:
```bash
-W1,-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
```

**C++ benchmarks**:
```bash
-W1,-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**:
```bash
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

---

### Peak Compiler Invocation

**C benchmarks (except as noted below):**
```bash
icc -m64 -std=c11
```

(Continued on next page)
Peak Compiler Invocation (Continued)


C++ benchmarks (except as noted below):
icpc -m64

523.xalancbmk_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64 -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4
-fno-strict-overflow
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/usr/local/jvm5.0.1-32/lib -ljemalloc

505.mcf_r: -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

(Continued on next page)
Dell Inc.  

PowerEdge T140 (Intel Core i3-9100, 3.60 GHz)

**SPECrate®2017_int_base = 25.6**  
**SPECrate®2017_int_peak = 26.3**

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

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**Peak Optimization Flags (Continued)**

505.mcf_r (continued):
- -lqkmalloc

525.x264_r: -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -fno-alias  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-lqkmalloc

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: -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

523.xalancbmk_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4  
-L/usr/local/je5.0.1-32/lib -ljemalloc

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

Fortran benchmarks:

-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-lqkmalloc

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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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Tested with SPEC CPU®2017 v1.1.0 on 2019-11-20 08:57:39-0500.  
Originally published on 2019-12-12.