Dell Inc.

PowerEdge T140 (Intel Xeon E-2244G, 3.80 GHz)

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

SPECr@te®2017_int_base = 34.7
SPECr@te®2017_int_peak = 36.2

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

Hardware

CPU Name: Intel Xeon E-2244G
Max MHz: 4800
Nominal: 3800
Enabled: 4 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: 8 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: No
Firmware: Version 2.1.3 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
Dell Inc.

PowerEdge T140 (Intel Xeon E-2244G, 3.80 GHz)

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Results Table

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<td>287</td>
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<td>412</td>
<td>21.0</td>
</tr>
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</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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

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.

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

Dell Inc.  
PowerEdge T140 (Intel Xeon E-2244G, 3.80 GHz)  

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## 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:

```bash
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
Logical Processor enabled
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 295195f888a3d7ed6e6e646a485a0011
running on linux-g3ob Tue Oct 29 05:40:06 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-2244G CPU @ 3.80GHz
    1 "physical id"s (chips)
    8 "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 : 8
physical 0: cores 0 1 2 3
```

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

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Platform Notes (Continued)

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): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 2
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-2244G CPU @ 3.80GHz
Stepping: 10
CPU MHz: 3800.000
BogoMIPS: 7584.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 8192K
NUMA node0 CPU(s): 0-7
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
aperfmerge tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdmb 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
pni ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust
bm1 hle avx2 smep bmi2 ersedn invpcid rtm mpx rdseed adx smap clflushopt intel_pt
xsaveopt xsave xgetbv1 xsavec dtherm ida arat pni pts md_clear flush_l1d

/proc/cpuinfo cache data
cache size : 8192 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 4 5 6 7
node 0 size: 64258 MB
node 0 free: 63482 MB
node distances:
node 0
0: 10

(Continued on next page)
Dell Inc.

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CPU2017 License: 55
Test Sponsor: Dell Inc.
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From /proc/meminfo
MemTotal: 65800812 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
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; VMX: conditional cache flushes, SMT vulnerable
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 Oct 29 04:55 last=5

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

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 440G 28G 413G 7% /

From /sys/devices/virtual/dmi/id
BIOS: Dell Inc. 2.1.3 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

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

## Dell Inc.

### PowerEdge T140 (Intel Xeon E-2244G, 3.80 GHz)

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

### Platform Notes (Continued)

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

```
<table>
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<tr>
<th>C</th>
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Compiler Version Notes (Continued)

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==============================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
| 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
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Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
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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

(Continued on next page)
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**Base Compiler Invocation (Continued)**

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

**Base Portability Flags**

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -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

**Base Optimization Flags**

C benchmarks:
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

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

Fortran benchmarks:
-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):
icc -m64 -std=c11


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
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/je5.0.1-32/lib -ljemalloc

505.mcf_r: -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4

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<td>Tested by</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Test Date</td>
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<tr>
<td>Hardware Availability</td>
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<td>Software Availability</td>
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### Peak Optimization Flags (Continued)

505.mcf_r (continued):
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`
- `-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 -fno-alias`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`
- `-lqkmalloc`

523.xalanchmk_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`

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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<th>Dell Inc.</th>
<th>SPECrate®2017_int_base = 34.7</th>
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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 2019-10-29 05:40:06-0400.  