Dell Inc.  
PowerEdge R640 (Intel Xeon Gold 6210U, 2.50GHz)  

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Apr-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Feb-2019

### Copies

<table>
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<tr>
<th>Benchmark</th>
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<th>SPECrate2017_int_peak</th>
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### Hardware

- **CPU Name:** Intel Xeon Gold 6210U  
- **Max MHz.:** 3900  
- **Nominal:** 2500  
- **Enabled:** 20 cores, 1 chip, 2 threads/core  
- **Orderable:** 1 chip  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 27.5 MB I+D on chip per chip  
- **Memory:** 192 GB (6 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage:** 1 x 480 GB SATA SSD  
- **Other:** None

### Software

- **OS:** Ubuntu 18.04.2 LTS  
- **Compiler:** C/C++: Version 19.0.1.144 of Intel C/C++  
- **Fortran:** Version 19.0.1.144 of Intel Fortran  
- **Firmware:** Version 2.1.7 released Apr-2019  
- **File System:** ext4  
- **System State:** Run level 5 (multi user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 32/64-bit  
- **Other:** jemalloc memory allocator V5.0.1
Dell Inc.

PowerEdge R640 (Intel Xeon Gold 6210U, 2.50GHz)

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Results Table

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SPECrate2017_int_base = 119
SPECrate2017_int_peak = 124

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"

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

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) 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.
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>

(Continued on next page)
### SPEC CPU2017 Integer Rate Result

**Dell Inc.**

**PowerEdge R640 (Intel Xeon Gold 6210U, 2.50GHz)**

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---

### General Notes (Continued)

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:
  - ADDDC setting disabled
  - 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 enabled
  - CPU Interconnect Bus Link Power Management disabled
  - PCI ASPM L1 Link Power Management disabled
  - Sysinfo program /home/cpu2017/bin/sysinfo
  - Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
  - running on intel-sut Mon Apr 15 13:40:00 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) Gold 6210U CPU @ 2.50GHz
  1 "physical id"s (chips)
  40 "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 : 20
siblings : 40
  physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
```

(Continued on next page)
Dell Inc.

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Platform Notes (Continued)

Core(s) per socket: 20
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6210U CPU @ 2.50GHz
Stepping: 6
CPU MHz: 2620.034
BogoMIPS: 5000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts aclflush ds cpl tsc nht tm pbe syscall nx pdflush dts npg
lm constant tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop tsc cpuid
aperfmpref fpi pslabs dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand
lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 dcd_l3 invpcid_single ssbd mba
ibrs ibpb stibp ibrs_enabled tpr_shadow vmi flexpriority ept vpid fsgsbase tsc_adjust
bmi1 hle avx2 smep bmi2 erms invpcid rtm cmq mpx rdt_a avx512f avx512d qd
rdseed adx smap ciflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt
xsaveopt xsaves cmq_llc cmq_occopi_llc cmq_mbb_total cmq_mbb_local dtherm ida
arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

From /proc/cpuinfo cache size: 28160 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38
node 0 size: 95167 MB
node 0 free: 94730 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39
node 1 size: 96742 MB
node 1 free: 96393 MB
node distances:
node 0:
0: 10 11
1: 11 10

From /proc/meminfo
SPEC CPU2017 Integer Rate Result

Dell Inc.
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Platform Notes (Continued)

MemTotal: 196515800 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
Ubuntu 18.04.2 LTS

From /etc/*release* /etc/*version*
debian_version: buster/sid
os-release:
    NAME="Ubuntu"
    VERSION="18.04.2 LTS (Bionic Beaver)"
    ID=ubuntu
    ID LIKE=debian
    PRETTY_NAME="Ubuntu 18.04.2 LTS"
    VERSION_ID="18.04"
    HOME_URL="https://www.ubuntu.com/"
    SUPPORT_URL="https://help.ubuntu.com/"

uname -a:
    Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64
    x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB

run-level 5 Apr 15 13:33

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 439G 19G 398G 5% /

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.

BIOS Dell Inc. 2.1.7 04/03/2019
Memory:
    6x 002C069D002C 36ASF4G72FZ-2G9E2 32 GB 2 rank 2933
    18x Not Specified Not Specified

(End of data from sysinfo program)
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Compiler Version Notes

==============================================================================
CC   502.gcc_r(peak)
Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
   525.x264_r(base, peak) 557.xz_r(base, peak)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
CC   500.perlbench_r(peak)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
CXXC 523.xalancbmk_r(peak)
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
CXXC 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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
FC  548.exchange2_r(base, peak)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
(Continued on next page)
SPEC CPU2017 Integer Rate Result

Dell Inc.
PowerEdge R640 (Intel Xeon Gold 6210U, 2.50GHz)

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Compiler Version Notes (Continued)
Copyright (C) 1985-2018 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

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-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-1qkmalloc

C++ benchmarks:
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
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Base Optimization Flags (Continued)

Fortran benchmarks:  
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div 
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte 
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/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_2019.1.144/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-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4

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

500.perlbench_r (continued):
-fno-strict-overflow  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc

502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -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-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc

525.x264_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -fno-alias  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc

523.xalancbmk_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -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-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc

The flags files that were used to format this result can be browsed at
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You can also download the XML flags sources by saving the following links:


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