### SPEC CPU®2017 Integer Rate Result

**Dell Inc.**

**PowerEdge C6420 (Intel Xeon Gold 6208U, 2.90 GHz)**

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** May-2020  
**Hardware Availability:** Feb-2020

<table>
<thead>
<tr>
<th>Spec benchmark</th>
<th>Copies</th>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
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<tr>
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<td>64.7</td>
<td>66.3</td>
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**Hardware**

- **CPU Name:** Intel Xeon Gold 6208U  
- **Max MHz:** 3900  
- **Nominal:** 2900  
- **Enabled:** 16 cores, 1 chip, 2 threads/core  
- **Orderable:** 1 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 22 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 192 GB (6 x 32 GB 2Rx8 PC4-2933V-R, running at 2933)  
- **Storage:** 1 x 480 GB SATA SSD  
- **Other:** None

**Software**

- **OS:** CentOS Linux 8.1.1911  
- **Compiler:** C/C++: Version 19.0.5.281 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.5.281 of Intel Fortran Compiler for Linux
- **Parallel:** No  
- **Firmware:** Version 2.7.3 released Mar-2020  
- **File System:** tmpfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 32/64-bit  
- **Other:** jemalloc memory allocator V5.0.1  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
Dell Inc.

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Results Table

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<td>524</td>
<td>66.3</td>
<td>520</td>
<td>66.4</td>
</tr>
</tbody>
</table>

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 = 
"/dev/shm/cpu2017/lib/intel64:/dev/shm/cpu2017/lib/ia32:/dev/shm/cpu2017
/je5.0.1-32"
MALLOCC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X 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)
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**CPU2017 License:** 55  
**Test Date:** May-2020  
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**Software Availability:** Feb-2020

**Tested by:** Dell Inc.

---

**General Notes (Continued)**

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.:  
umactl --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:
Sub NUMA Cluster enabled  
Virtualization Technology 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 set to standard  
Logical Processor enabled  
CPU Interconnect Bus Link Power Management disabled  
PCI ASPM L1 Link Power Management disabled  
UPI Prefetch enabled  
LLC Prefetch disabled  
Dead Line LLC Alloc enabled  
Directory AtoS disabled

Sysinfo program /dev/shm/cpu2017/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7edeb1e6e46a485a0011  
running on localhost.localdomain Mon May 4 16:13:40 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) Gold 6208U CPU @ 2.90GHz
  1 "physical id"s (chips)
  32 "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 : 16
```

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

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Software Availability: Feb-2020

Platform Notes (Continued)

siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6208U CPU @ 2.90GHz
Stepping: 7
CPU MHz: 3590.275
CPU max MHz: 3900.0000
CPU min MHz: 1200.0000
BogoMIPS: 5800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31
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 pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdg_l3
invpcid_single intel_ppnin ssbd mba ibrs ibbp stibp ibrs_enhanced tpr_shadow vnmi
flexpriority ert vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsaveprec xsaves cqm_llc cqm_occap_llc cqm_mbb_total
cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_lld
arch_capabilities

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.

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

available: 2 nodes (0-1)
node 0 cpus: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
node 0 size: 95280 MB
node 0 free: 94564 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
node 1 size: 96764 MB
node 1 free: 80726 MB
node distances:
node 0: 10 11
node 1: 11 10

From `/proc/meminfo`

```
MemTotal:       196653716 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

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

```
centos-release: CentOS Linux release 8.1.1911 (Core)
centos-release-upstream: Derived from Red Hat Enterprise Linux 8.1 (Source)
```

```
NAME="CentOS Linux"
VERSION="8 (Core)"
ID="centos"
ID_LIKE="rhel fedora"
VERSION_ID="8"
PLATFORM_ID="platform:el8"
PRETTY_NAME="CentOS Linux 8 (Core)"
ANSI_COLOR="0;31"
redhat-release: CentOS Linux release 8.1.1911 (Core)
system-release: CentOS Linux release 8.1.1911 (Core)
system-release-cpe: cpe:/o:centos:centos:8
```

```
uname -a:
Linux localhost.localdomain 4.18.0-147.5.1.el8_1.x86_64 #1 SMP Wed Feb 5 02:00:39 UTC 2020 x86_64 x86_64 x86_64 GNU/Linux
```

**Kernel self-reported vulnerability status:**

```
itlb_multihit:                       Processor vulnerable
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: usercopy/swapgs barriers and __user pointer sanitation
```

(Continued on next page)
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Platform Notes (Continued)

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

tsx_async_abort:
Mitigation: Clear CPU buffers; SMT vulnerable

run-level 3 May 4 16:09

SPEC is set to: /dev/shm/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 94G 7.6G 87G 9% /dev/shm

From /sys/devices/virtual/dmi/id
BIOS: Dell Inc. 2.7.3 03/25/2020
Vendor: Dell Inc.
Product: PowerEdge C6420
Product Family: PowerEdge
Serial: 1234567

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:
3x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
1x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
2x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
10x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C | 502.gcc_r(peak)
==============================================================================

Intel(R) C Compiler for applications running on IA-32, Version 19.0.5 NextGen Technology Build 20190729
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base)
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Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.0.5 NextGen Technology Build 20190729
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

(Continued on next page)
Compiler Version Notes (Continued)

-----------------------------------------------------------------------------------------------
C   | 500.perlbench_r(peak) 557.xz_r(peak)
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Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------------------------
C   | 502.gcc_r(peak)
-----------------------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on IA-32, Version 19.0.5 NextGen Technology Build 20190729
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------------------------
C   | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
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C   | 502.gcc_r(peak)
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Feb-2020

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### Compiler Version Notes (Continued)

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NextGen Technology Build 20190729
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C       | 500.perlbench_r(peak) 557.xz_r(peak)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak)
         | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
---------|---------------------------------------------------

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 19.0.5
NextGen Technology Build 20190729
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 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

### Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort
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Base Portability Flags

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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.leea_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -flto
-mfpmath=sse -funroll-loops -qnextgen -fuse-ld=gold
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -flto -mfpmath=sse
-funroll-loops -qnextgen -fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
-lqkmalloc

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort
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**Test Date:** May-2020

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### 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: -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

---

### Peak Optimization Flags

**C benchmarks:**

- 500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
  -xCORE-AVX512 -ipo -O3 -no-prec-div
  -gopt-mem-layout-trans=4 -fno-strict-overflow
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
  -lqkmalloc

- 502.gcc_r: -m32
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/ia32_lin
  -std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
  -fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
  -Ofast(pass 1) -O3 -ffast-math -qnextgen -fuse-ld=gold
  -gopt-mem-layout-trans=4 -L/usr/local/je5.0.1-32/lib
  -ljemalloc

- 505.mcf_r: basepeak = yes

- 525.x264_r: -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -flto -O3
  -ffast-math -qnextgen -fuse-ld=gold
  -gopt-mem-layout-trans=4 -fno-alias
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
  -lqkmalloc

- 557.xz_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
  -gopt-mem-layout-trans=4
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
  -lqkmalloc

**C++ benchmarks:**

(Continued on next page)
Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6208U, 2.90 GHz)

SPECrate®2017_int_base = 106
SPECrate®2017_int_peak = 110

Table:

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<td>Software Availability: Feb-2020</td>
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Peak Optimization Flags (Continued)

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: -m64 -Wl,-z,muldefs -fprofile-generate(pass 1) -fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto -Ofast(pass 1) -O3 -ffast-math -qnextgen -fuse-ld=gold -qopt-mem-layout-trans=4 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin -lqkmalloc

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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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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 2020-05-04 16:13:40-0400.