# SPEC CPU®2017 Integer Rate Result

## Dell Inc.

PowerEdge R640 (Intel Xeon Gold 5222, 3.80GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>31.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

### Hardware

- **CPU Name:** Intel Xeon Gold 5222  
- **Max MHz:** 3900  
- **Nominal:** 3800  
- **Enabled:** 4 cores, 1 chip, 2 threads/core  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 16.5 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 96 GB (6 x 16 GB 2Rx8 PC4-2933Y-R)  
- **Storage:** 1 x 460 GB SATA SSD  
- **Other:** None

### Software

- **OS:** Ubuntu 18.04.2 LTS  
- **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 2.1.8 released Apr-2019  
- **File System:** ext4  
- **System State:** Run level 5 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None  
- **Power Management:** --

### SPEC Benchmarks

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>8</td>
<td>23.6</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>8</td>
<td>26.4</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>8</td>
<td>42.1</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>8</td>
<td>17.8</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>8</td>
<td>42.0</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>8</td>
<td>66.6</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>8</td>
<td>25.4</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>8</td>
<td>23.7</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>8</td>
<td>65.0</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>8</td>
<td>18.6</td>
</tr>
</tbody>
</table>

---

Software Availability: May-2019
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>8</td>
<td>539</td>
<td>23.6</td>
<td>539</td>
<td>23.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>8</td>
<td>429</td>
<td>26.4</td>
<td>427</td>
<td>26.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>8</td>
<td>307</td>
<td>42.1</td>
<td>306</td>
<td>42.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>8</td>
<td>590</td>
<td>17.8</td>
<td>590</td>
<td>17.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>523.xalanbmk_r</td>
<td>8</td>
<td>201</td>
<td>42.0</td>
<td>201</td>
<td>42.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>525.x264_r</td>
<td>8</td>
<td>209</td>
<td>66.9</td>
<td>210</td>
<td>66.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>8</td>
<td>362</td>
<td>25.4</td>
<td>360</td>
<td>25.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>541.leela_r</td>
<td>8</td>
<td>560</td>
<td>23.7</td>
<td>560</td>
<td>23.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>8</td>
<td>322</td>
<td>65.0</td>
<td>314</td>
<td>66.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>8</td>
<td>463</td>
<td>18.6</td>
<td>464</td>
<td>18.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SPECrate®2017_int_base** = 31.5

**SPECrate®2017_int_peak** = Not Run

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/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"

Binaries compiled on a system with 1x Intel Core i9-799X 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) 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.:

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

**Dell Inc.**

PowerEdge R640 (Intel Xeon Gold 5222, 3.80GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>31.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

**Test Date:** Jul-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** May-2019

---

### General Notes (Continued)

numactl --interleave=all runcpu <etc>

### Platform Notes

- BIOS settings:
  - 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 disabled
  - Logical Processor enabled
  - CPU Interconnect Bus Link Power Management enabled
  - PCI ASPM L1 Link Power Management enabled
  - Sysinfo program /home/cpu2017/bin/sysinfo
  - Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
  - running on intel-sut Wed Jul 10 16:41:10 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 5222 CPU @ 3.80GHz
- 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 5 8 9 12

From lscpu:

- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- 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

*(Continued on next page)*
Dell Inc. PowerEdge R640 (Intel Xeon Gold 5222, 3.80GHz)

SPECrate®2017_int_base = 31.5
SPECrate®2017_int_peak = Not Run

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

Platform Notes (Continued)

Model: 85
Model name: Intel(R) Xeon(R) Gold 5222 CPU @ 3.80GHz
Stepping: 6
CPU MHz: 2671.409
BogoMIPS: 7600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0-7
Flags: fpul 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
aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt aes f16c rdrand
lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs
ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust
bmi1 hle avx2 smep bmi2 erva mrs invpcid rtm cm mpx rd_a avx512f avx512dq rdseed
adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves cqm_llc
xcm_occup_l1c cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pk save
ospke avx512_vnni flush_l1d arch_capabilities

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: 95148 MB
node 0 free: 94562 MB
node distances:
node 0
0: 10

From /proc/meminfo
MemTotal: 97431996 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /usr/bin/lsb_release -d
Ubuntu 18.04.2 LTS

From /etc/*release* /etc/*version*
debian_version: buster/sid
os-release:

(Continued on next page)
Dell Inc.
PowerEdge R640 (Intel Xeon Gold 5222, 3.80GHz)

SPEC CPU®2017 Integer Rate Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECrates®2017_int_base = 31.5
SPECrates®2017_int_peak = Not Run

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

SPEC is set to: /home/cpu2017

uname -a:
Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64
ox86_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 Jul 10 16:16

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. 2.1.8 04/30/2019
Memory:
3x 002C0632002C 18ASF2G72PDZ-2G9E1 16 GB 2 rank 2933
3x 002C069D002C 18ASF2G72PDZ-2G9E1 16 GB 2 rank 2933
18x Not Specified Not Specified

Compiler Version Notes

(Continued on next page)
### Dell Inc.

**PowerEdge R640 (Intel Xeon Gold 5222, 3.80GHz)**

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>31.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Jul-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>May-2019</td>
</tr>
</tbody>
</table>

#### Compiler Version Notes (Continued)

C++

<table>
<thead>
<tr>
<th>520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>541.leela_r(base)</td>
</tr>
</tbody>
</table>

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) |

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

- `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`
Dell Inc.
PowerEdge R640 (Intel Xeon Gold 5222, 3.80GHz)

SPECrate®2017_int_base = 31.5
SPECrate®2017_int_peak = Not Run

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

Test Date: Jul-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmallocc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmallocc

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_2019.4.227/linux/compiler/lib/intel64
-lqkmallocc

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:

SPEC CPU and SPECrate are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.0.5 on 2019-07-10 12:41:09-0400.
Report generated on 2019-09-17 16:06:44 by CPU2017 PDF formatter v6255.
Originally published on 2019-09-17.