## SPEC CPU®2017 Integer Rate Result

### Dell Inc.
PowerEdge R640 (Intel Xeon Gold 6250, 3.90 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 153</th>
<th>SPECrate®2017_int_peak = 158</th>
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<tr>
<td>520.omnetpp_r 32</td>
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</tr>
<tr>
<td>557.xz_r 32</td>
<td>87.6</td>
<td></td>
</tr>
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</table>

### Software

| OS: Red Hat Enterprise Linux 8.1 |
| Parallel: No |
| Firmware: Version 2.7.7 released May-2020 |
| File System: tmpfs |
| 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 |

### Hardware

| CPU Name: Intel Xeon Gold 6250 |
| Max MHz: 4500 |
| Nominal: 3900 |
| Enabled: 16 cores, 2 chips, 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: 35.75 MB I+D on chip per chip |
| Other: None |
| Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933V-R, running at 2933) |
| Storage: 1 x 1.92 TB SATA SSD |
| Other: None |

| Power Management: BIOS set to prefer performance at the cost of additional power usage |
# SPEC CPU®2017 Integer Rate Result

Dell Inc.  

PowerEdge R640 (Intel Xeon Gold 6250, 3.90 GHz)

**SPECrate®2017_int_base = 153**

**SPECrate®2017_int_peak = 158**

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**Results Table**

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</tbody>
</table>

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

---

**Compiler Notes**

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. 
The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

---

**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 = "/mnt/ramdisk/cpu2017-ic19.1u1/lib/intel64:/mnt/ramdisk/cpu2017-ic19.1u1/lib/ia32:/mnt/ramdisk/cpu2017-ic19.1u1/je5.0.1-32"
MALLOCONF = "retain:true"
```
SPEC CPU®2017 Integer Rate Result

Dell Inc.

PowerEdge R640 (Intel Xeon Gold 6250, 3.90 GHz)

SPEC®2017_int_base = 153
SPEC®2017_int_peak = 158

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

Test Date: Jun-2020
Hardware Availability: Jul-2020
Software Availability: Apr-2020

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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.:
  numactl --interleave=all runcpu <etc>
Benchmark run from a 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk"
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 /mnt/ramdisk/cpu2017-ic19.1u1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbe6e46a485a0011
running on rhel-8-1-sut Mon Jun 1 14:41:50 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

(Continued on next page)
Dell Inc. PowerEdge R640 (Intel Xeon Gold 6250, 3.90 GHz)

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

SPECrater®2017_int_base = 153
SPECrater®2017_int_peak = 158

Platform Notes (Continued)

From /proc/cpuinfo
---
model name : Intel(R) Xeon(R) Gold 6250 CPU @ 3.90GHz
2 "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 : 8
siblings : 16
physical 0: cores 3 6 10 12 13 21 24
physical 1: cores 1 2 10 12 13 17 19 29
---

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: 8
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6250 CPU @ 3.90GHz
Stepping: 7
CPU MHz: 4477.325
CPU max MHz: 4500.0000
CPU min MHz: 1200.0000
BogoMIPS: 7800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0,4,8,14,16,20,24,30
NUMA node1 CPU(s): 1,3,5,13,17,19,21,29
NUMA node2 CPU(s): 2,6,10,12,18,22,26,28
NUMA node3 CPU(s): 7,9,11,15,23,25,27,31
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 rdtsscp
lm constant_tsc art 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
xtr蹊 pdc lid cce sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
---

(Continued on next page)
Dell Inc.

PowerEdge R640 (Intel Xeon Gold 6250, 3.90 GHz)

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Test Date: Jun-2020
Hardware Availability: Jul-2020
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Platform Notes (Continued)

flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx rdt_a avx512f avx512dq rdseed adx smo smc clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 xsaveavx cqm llc cqm_occ I llc cqm_mbm_local
cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pkp ospke avx512_vnni md_clear flush_lld
arch_capabilities

/platform/cpuinfo cache data
cache size: 36608 KB

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

available: 4 nodes (0-3)
node 0 cpus: 0 4 8 14 16 20 24 30
node 0 size: 95282 MB
node 0 free: 94910 MB
node 1 cpus: 1 3 5 13 17 19 21 29
node 1 size: 96766 MB
node 1 free: 96618 MB
node 2 cpus: 2 6 10 12 18 22 26 28
node 2 size: 96766 MB
node 2 free: 87636 MB
node 3 cpus: 7 9 11 15 23 25 27 31
node 3 size: 96765 MB
node 3 free: 96593 MB
node distances:
node 0 1 2 3
0: 10 21 11 21
1: 21 10 21 11
2: 11 21 10 21
3: 21 11 21 10

From /proc/meminfo
MemTotal: 394834152 KB
HugePages_Total: 0
Hugepagesize: 2048 KB

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

os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.1 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.1"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.1 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.1 (Ootpa)

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

**Dell Inc.**

**PowerEdge R640 (Intel Xeon Gold 6250, 3.90 GHz)**

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

**Test Date:** Jun-2020  
**Hardware Availability:** Jul-2020  
**Software Availability:** Apr-2020

### Platform Notes (Continued)

- system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
- system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga

```
uname -a:
    Linux rhel-8-1-sut 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019 x86_64
    x86_64 x86_64 GNU/Linux
```

**Kernel self-reported vulnerability status:**

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

**run-level 3 Jun 1 14:36 last=5**

**SPEC is set to:** /mnt/ramdisk/cpu2017-ic19.1u1

```
Filesystem     Type   Size  Used Avail Use% Mounted on
tmpfs          tmpfs  150G  4.2G  146G   3% /mnt/ramdisk
```

From /sys/devices/virtual/dmi/id
- BIOS: Dell Inc. 2.7.7 05/04/2020
- Vendor: Dell Inc.
- Product: PowerEdge R640
- Product Family: PowerEdge
- Serial: FPFXCH2

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:**
- 10x 002C069D0002C 18ASF2G72PDZ-2G9E1 16 GB 2 rank 2933
- 4x 00AD00B300AD HMA82GR7CJR8N-WM 16 GB 2 rank 2933
- 8x 00AD00B300AD HMA82GR7CJR8N-XN 16 GB 2 rank 3200
- 2x 00AD063200AD HMA82GR7CJR8N-WM 16 GB 2 rank 2933

(End of data from sysinfo program)
## SPEC CPU®2017 Integer Rate Result

**Dell Inc.**

### PowerEdge R640 (Intel Xeon Gold 6250, 3.90 GHz)

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| SPECrate®2017_int_peak = 158 |

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### Compiler Version Notes

```
C    | 502.gcc_r(peak)
-----------------------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on IA-32, Version 2021.1 NextGen Build 20200304
Copyright (C) 1985-2020 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)
-----------------------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------------------------
C    | 500.perlbench_r(peak) 557.xz_r(peak)
-----------------------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------------------------
C    | 502.gcc_r(peak)
-----------------------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on IA-32, Version 2021.1 NextGen Build 20200304
Copyright (C) 1985-2020 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 2021.1 NextGen Build 20200304
Copyright (C) 1985-2020 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 19.1.1.217 Build 20200306
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### Compiler Version Notes (Continued)

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### C

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Intel(R) C Compiler for applications running on IA-32, Version 2021.1 NextGen Build 20200304

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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### C

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Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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### C++

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Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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### Fortran

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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306

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**CPU2017 License:** 55  
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**Test Sponsor:** Dell Inc.  
**Hardware Availability:** Jul-2020  
**Tested by:** Dell Inc.  
**Software Availability:** Apr-2020

### Base Compiler Invocation

**C benchmarks:**
- `icc`

**C++ benchmarks:**
- `icpc`

**Fortran benchmarks:**
- `ifort`

### 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`

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

Dell Inc. PowerEdge R640 (Intel Xeon Gold 6250, 3.90 GHz)

SPECrater®2017_int_base = 153
SPECrater®2017_int_peak = 158

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

Test Date: Jun-2020
Hardware Availability: Jul-2020
Software Availability: Apr-2020

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- nostandard-realloc-lhs -align array32byte -auto
- mbranches-within-32B-boundaries
- L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
  lqkmalloc

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

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
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
  lqkmalloc

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

502.gcc_r: -m32
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/ia32_lin
-std=gnu89
-WL,-plugin-opt=-x86-branches-within-32B-boundaries
-WL,-z,muldefs -fprofile-generate
-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/jemalloc32-5.0.1/lib
-ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -m64 -qnextgen -std=c11
-WL,-plugin-opt=-x86-branches-within-32B-boundaries
-WL,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math
-fuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

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
SPEC CPU®2017 Integer Rate Result

Dell Inc.

PowerEdge R640 (Intel Xeon Gold 6250, 3.90 GHz)

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml

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

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