**SPEC CPU®2017 Integer Rate Result**

**Dell Inc.**

PowerEdge R740xd (Intel Xeon Gold 6242R, 3.10 GHz)

---

**SPECrater®2017_int_base = 296**

**SPECrater®2017_int_peak = 307**

---

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

---

### Hardware

- **CPU Name:** Intel Xeon Gold 6242R  
- **Max MHz:** 4100  
- **Nominal:** 3100  
- **Enabled:** 40 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:** 768 GB (24 x 32 GB 2Rx4 PC4-2933V-R, running at 2933)  
- **Storage:** 1 x 1.92 TB SATA SSD  
- **Other:** None

---

### Software

- **OS:** Red Hat Enterprise Linux 8.1  
  kernel 4.18.0-147.el8.x86_64  
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux;  
  Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux  
- **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:** jemalloc memory allocator V5.0.1  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
Dell Inc.  
PowerEdge R740xd (Intel Xeon Gold 6242R, 3.10 GHz)  

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

Results Table

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SPECrater2017_int_base = 296  
SPECrater2017_int_peak = 307

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"
MALLOCCONFIG = "retain:true"
```
**SPEC CPU®2017 Integer Rate Result**

**Dell Inc.**

PowerEdge R740xd (Intel Xeon Gold 6242R, 3.10 GHz)

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**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
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 295195f888a3d7edbe1e6a485a0011
running on user-pc.spa.lab Sat Jun  6 05:46:15 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)
**SPEC CPU® 2017 Integer Rate Result**

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**SPECraten® 2017_int_base = 296**

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**Platform Notes (Continued)**

From /proc/cpuinfo

```plaintext
model name : Intel(R) Xeon(R) Gold 6242R CPU @ 3.10GHz
  2 "physical id"s (chips)
  80 "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 4 5 6 8 9 10 11 12 13 16 17 18 19 21 26 28 29
physical 1: cores 0 1 3 5 6 8 10 12 13 16 17 18 19 20 21 25 26 27 28 29
```

From lscpu:

```plaintext
Architecture:        x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              80
On-line CPU(s) list: 0-79
Thread(s) per core:  2
Core(s) per socket:  20
Socket(s):           2
NUMA node(s):        4
Vendor ID:           GenuineIntel
CPU family:          6
Model:               85
Model name:          Intel(R) Xeon(R) Gold 6242R CPU @ 3.10GHz
Stepping:            7
CPU MHz:             3644.221
CPU max MHz:         4100.0000
CPU min MHz:         1200.0000
BogoMIPS:            6200.00
Virtualization:      VT-x
L1d cache:           32K
L1i cache:           32K
L2 cache:            1024K
L3 cache:            36608K
NUMA node0 CPU(s):   0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76
NUMA node1 CPU(s):   1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77
NUMA node2 CPU(s):   2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78
NUMA node3 CPU(s):   3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63,67,71,75,79
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
  aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
  xtpr pdcm 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 cdp cce
  invpcid_single intel_pni ssbd mba ibrs ibpb stibp ibrs_enabled tpr_shadow vnmi
```

(Continued on next page)
Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 6242R, 3.10 GHz)

**SPECrate®2017_int_base = 296**

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**Platform Notes (Continued)**

```
flexpriority ept vpid fsqgsbase 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 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local dtherm ida pln pts pku ospke avx512_vnni md_clear flush_l1d
arch_capabilities
```

```
/cacheinfo 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 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76
node 0 size: 192072 MB
node 0 free: 182935 MB
node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77
node 1 size: 193531 MB
node 1 free: 192669 MB
node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 66 70 74 78
node 2 size: 193531 MB
node 2 free: 193269 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67 71 75 79
node 3 size: 193505 MB
node 3 free: 193287 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: 791185300 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)
Dell Inc.  
PowerEdge R740xd (Intel Xeon Gold 6242R, 3.10 GHz)  

 SPEC CPU®2017 Integer Rate Result  
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SPECrate®2017_int_base = 296  
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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 user-pc.spa.lab 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 6 05:42 last=5

SPEC is set to: /mnt/ramdisk/cpu2017-ic19.1u1  
Filesystem Type Size Used Avail Use% Mounted on  
tmpfs tmpfs 225G 4.2G 221G 2% /mnt/ramdisk

From /sys/devices/virtual/dmi/id  
BIOS: Dell Inc. 2.7.7 05/04/2020  
Vendor: Dell Inc.  
Product: PowerEdge R740xd  
Product Family: PowerEdge  
Serial: F5BMCS2

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:  
19x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933  
1x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933  
4x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933

(End of data from sysinfo program)
Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 6242R, 3.10 GHz)

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#### Compiler Version Notes

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Dell Inc. PowerEdge R740xd (Intel Xeon Gold 6242R, 3.10 GHz)

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Compiler Version Notes (Continued)

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------------------------------------------------------------------------------
C | 502.gcc_r(peak)
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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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Copyright (C) 1985-2020 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 2021.1 NextGen Build 20200304
Copyright (C) 1985-2020 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 19.1.1.217 Build 20200306
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PowerEdge R740xd (Intel Xeon Gold 6242R, 3.10 GHz)

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### 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`

### Base Optimization Flags

- **C benchmarks:**
  ```
  -m64 -qnextgen -std=c11
  -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
  -xCORE-AVX512 -O3 -ffast-math -ftlo -mfpmath=sse -funroll-loops
  -fuse-ld=gold -qopt-mem-layout-trans=4
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
  -lqkmalloc
  ```
- **C++ benchmarks:**
  ```
  -m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
  -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -ftlo -mfpmath=sse
  -funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
  -lqkmalloc
  ```
- **Fortran benchmarks:**
  ```
  -m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
  -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
  ```

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
Dell Inc. PowerEdge R740xd (Intel Xeon Gold 6242R, 3.10 GHz)

SPECrate®2017_int_base = 296
SPECrate®2017_int_peak = 307

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)
SPEC CPU®2017 Integer Rate Result

Dell Inc.

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CPU2017 License: 55
Test Sponsor: Dell Inc.
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Test Date: Jun-2020
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Software Availability: Apr-2020

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(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/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 R740xd (Intel Xeon Gold 6242R, 3.10 GHz)

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

Test Date: Jun-2020  
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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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