# SPEC CPU®2017 Integer Rate Result

**Dell Inc.**

PowerEdge MX740c (Intel Xeon Gold 6252N, 2.30GHz)

<table>
<thead>
<tr>
<th>Spec CPU®2017_Int_Base</th>
<th>293</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spec CPU®2017_Int_Peak</td>
<td>305</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Jun-2020  
**Hardware Availability:** Apr-2019  
**Software Availability:** Apr-2020

<table>
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<tr>
<th>Benchmark</th>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
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<tbody>
<tr>
<td>perlbench_8</td>
<td>243</td>
<td>287</td>
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<tr>
<td>gcc_8</td>
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<tr>
<td>mcf_8</td>
<td>289</td>
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<tr>
<td>omnetpp_8</td>
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<td>xalancbmk_8</td>
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<tr>
<td>x264_8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>deepsjeng_8</td>
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<td>233</td>
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<tr>
<td>leela_8</td>
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<td>exchange2_8</td>
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<td>595</td>
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<tr>
<td>xz_8</td>
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<tr>
<th>SPECrate®2017_int_base (293)</th>
<th>SPECrate®2017_int_peak (305)</th>
</tr>
</thead>
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## Hardware

- **CPU Name:** Intel Xeon Gold 6252N  
  - Max MHz: 3600  
  - Nominal: 2300  
  - Enabled: 48 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 960 GB 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 2.7.1 released Feb-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
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**Copyright 2017-2020 Standard Performance Evaluation Corporation**

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**SPECrate®2017_int_base = 293**

**SPECrate®2017_int_peak = 305**

## Results Table

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<th>Benchmark</th>
<th>Copies</th>
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<td>548.exchange2_r</td>
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<td>557.xz_r</td>
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<td>567</td>
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</tr>
</tbody>
</table>

**SPECrate®2017_int_base = 293**

**SPECrate®2017_int_peak = 305**

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 config file option 'submit' was used.

## 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-ic19.1u1/lib/intel64:/dev/shm/cpu2017-ic19.1u1/lib/ia32:/dev/shm/cpu2017-ic19.1u1/je5.0.1-32"
MALLOCONF = "retain:true"
```

## General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0

(Continued on next page)
Dell Inc.

PowerEdge MX740c (Intel Xeon Gold 6252N, 2.30GHz)

**General Notes (Continued)**

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
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:
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 disabled
LLC Prefetch disabled
Dead Line LLC Alloc enabled
Directory AtoS disabled

Sysinfo program /dev/shm/cpu2017-ic19.1u1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed81e6e46a46a485a0011
running on localhost.localdomain Thu Jun 11 12:21:40 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 6252N CPU @ 2.30GHz
  2 "physical id"s (chips)
  96 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following

(Continued on next page)
Platform Notes (Continued)

excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 24
siblings : 48
physical 0: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29

From lscpu:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                96
On-line CPU(s) list:   0-95
Thread(s) per core:    2
Core(s) per socket:    24
Socket(s):             2
NUMA node(s):          4
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 6252N CPU @ 2.30GHz
Stepping:              7
CPU MHz:               2121.478
CPU max MHz:           3600.0000
CPU min MHz:           1000.0000
BogoMIPS:              4600.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              36608K
NUMA node0 CPU(s):
0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92
NUMA node1 CPU(s):
1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93
NUMA node2 CPU(s):
2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94
NUMA node3 CPU(s):
Flags:                 fpu vme de pse tsc msr pae mce cmov cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpte1gb 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
xtrm 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 cdp l3
invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmvi
flexpriority ept 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

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| SPECrate®2017_int_peak | 305  

**Platform Notes (Continued)**

avx512bw avx512vl xsaveopt xsavex xgetbv1 xsaves cqm_llc cqm_occult_llc cqm_mbm_total  
cqm_mbm_local dtherm ida arat pln pts pkuch spke avx512_vnni md_clear flush_lld  
arch_capabilities

/proc/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 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92  
node 0 size: 192070 MB  
node 0 free: 191556 MB  
node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89 93  
node 1 size: 193531 MB  
node 1 free: 193172 MB  
node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 66 70 74 78 82 86 90 94  
node 2 size: 193531 MB  
node 2 free: 193303 MB  
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67 71 75 79 83 87 91 95  
node 3 size: 193505 MB  
node 3 free: 183545 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: 791181552 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)  
system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)  
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga  

(Continued on next page)
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**Software Availability:** Apr-2020

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**Platform Notes (Continued)**

```
uname -a:
Linux localhost.localdomain 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 11 12:16

SPEC is set to: /dev/shm/cpu2017-ic19.1u1
Filesystem Type Size Used Avail Use% Mounted on
  tmpfs tmpfs 378G 4.3G 374G 2% /dev/shm

From /sys/devices/virtual/dmi/id
  BIOS: Dell Inc. 2.7.1 02/14/2020
  Vendor: Dell Inc.
  Product: PowerEdge MX740c
  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:
  21x 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

(End of data from sysinfo program)
```

---

**Compiler Version Notes**

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

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

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.

<table>
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<tr>
<th>C</th>
<th>500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base)</th>
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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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Base Compiler Invocation

C benchmarks:

icc

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**Base Compiler Invocation (Continued)**

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 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
- -xCORE-AVX512 -O3 -ffast-math -flto -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 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
- -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -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
- -nostandard-realloc-lhs -align array32byte -auto
SPEC CPU®2017 Integer Rate Result

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Test Date: Jun-2020
Hardware Availability: Apr-2019
Software Availability: Apr-2020

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-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.**

PowerEdge MX740c (Intel Xeon Gold 6252N, 2.30GHz)

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**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
-W1,-plugin-opt=-x86-branches-within-32B-boundaries
-W1,-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/jemalloc32-5.0.1.1/lib
-ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -m64 -qnextgen -std=c11
-W1,-plugin-opt=-x86-branches-within-32B-boundaries
-W1,-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: -W1,-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


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.

Originally published on 2020-07-07.