# SPEC CPU®2017 Integer Rate Result

## Dell Inc.

PowerEdge MX740c (Intel Xeon Gold 6208U, 2.90 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 115</th>
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<tbody>
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<td>SPECrate®2017_int_peak = 119</td>
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### CPU2017 License: 55

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<tr>
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<th>Test Date: Jan-2021</th>
<th>Hardware Availability: Jul-2020</th>
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### Copies

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<tr>
<th>Benchmark</th>
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<tr>
<td>perlbench_r</td>
<td>32</td>
<td>88.9</td>
<td>89.9</td>
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<tr>
<td>gcc_r</td>
<td>32</td>
<td>97.4</td>
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</tr>
<tr>
<td>mcf_r</td>
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<td>194</td>
</tr>
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<td></td>
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<tr>
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</tr>
<tr>
<td>xz_r</td>
<td>32</td>
<td>66.5</td>
<td></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:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux 8.2 (Ootpa)
- **Compiler:** C/C++: Version 19.1.2.275 of Intel C/C++; Fortran: Version 19.1.2.275 of Intel Fortran
- **Parallel:** No
- **Firmware:** Version 2.9.1 released Aug-2020
- **File System:** tmpfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** None
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage.
- **jemalloc memory allocator V5.0.1**
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Results Table

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<td>556</td>
<td>75.5</td>
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<tr>
<td>531.deepsjeng_r</td>
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<td>400</td>
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<td>401</td>
<td>91.5</td>
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<tr>
<td>541.leela_r</td>
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<td>619</td>
<td>85.6</td>
<td>619</td>
<td>85.6</td>
<td></td>
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<td>66.5</td>
<td>517</td>
<td>66.8</td>
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<td></td>
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</table>

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"

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"
MALLOC_CONF = "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
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)

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

**PowerEdge MX740c (Intel Xeon Gold 6208U, 2.90 GHz)**

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#### 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.:
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 /dev/shm/cpu2017-ic19.1ul/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f808a3d7ed1e646a485a0011
running on localhost.localdomain Sun Feb 21 14:26:49 2021

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.)
```
SPEC CPU®2017 Integer Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.
PowerEdge MX740c (Intel Xeon Gold 6208U, 2.90 GHz)

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Platform Notes (Continued)

```plaintext
cpu cores : 16
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: 3595.879
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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aarch64 kpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xptr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt pcpuid tsc_deadline_timer aes
xtune f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_pmmu ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
flexpriority ept_vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 irdt invpcid rtm
cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaves ecx xgetbv1 xsaveopt xsavec xsaveopt xsaves cqm_llc cqm_occum_llc
cqm_thm_total cqm_mbb_local dtherm ida arat pln pts pkup opioids avx512_vnni md_clear flush_lld
arch_capabilities

/proc/cpuinfo cache data
cache size : 22528 KB
```

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

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

physical chip.
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: 192046 MB
node 0 free: 178866 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
node 1 size: 193531 MB
node 1 free: 193257 MB
node distances:
node 0 1
0: 10 11
1: 11 10

From /proc/meminfo
MemTotal: 394832108 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.2 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.2"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

*itlb_multihit:*
KVM: 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 sanitization

*CVE-2017-5715 (Spectre variant 2):*
Mitigation: Enhanced IBRS, IBPB: conditional,
Dell Inc.

PowerEdge MX740c (Intel Xeon Gold 6208U, 2.90 GHz)

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Platform Notes (Continued)

tsx_async_abort:

Mitigation: Clear CPU buffers; SMT vulnerable

run-level 3 Feb 21 13:54

SPEC is set to: /dev/shm/cpu2017-ic19.1u1
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 189G 6.0G 183G 4% /dev/shm

BIOS: Dell Inc. 2.9.1 08/09/2020
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:
10x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
1x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
1x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
12x Not Specified Not Specified

Compiler Version Notes

==============================================================================
C       | 502.gcc_r(peak)
------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on IA-32, Version 19.1.2.275
Build 20200604
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

(Continued on next page)
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PowerEdge MX740c (Intel Xeon Gold 6208U, 2.90 GHz)

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**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.

### Compiler Version Notes (Continued)

19.1.2.275 Build 20200604  
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 19.1.2.275 Build 20200623  
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 19.1.2.275  
Build 20200604  
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  
19.1.2.275 Build 20200604  
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 19.1.2.275 Build 20200623  
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 19.1.2.275  
Build 20200604  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

```
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)  
```

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Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200604
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200623
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort
Dell Inc.

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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-branhes-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branhes-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-m64 -Wl,-plugin-opt=-x86-branhes-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin
-lqkmalloc

Peak Compiler Invocation

C benchmarks:
icc
Dell Inc.  

PowerEdge MX740c (Intel Xeon Gold 6208U, 2.90 GHz)  

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C++ benchmarks:  
icpc

Fortran benchmarks:  
ifort

### Peak Compiler Invocation (Continued)

### Peak Portability Flags

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<td>500.perlbench_r</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>-D_FILE_OFFSET_BITS=64</td>
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<td>505.mcf_r</td>
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<td>531.deepsjeng_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

### Peak Optimization Flags

C benchmarks:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>-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 -mbbranches-within-32B-boundaries -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin -lqkmalloc</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>-Wl,-z,muldefs -fprofile-generate(pass 1) -fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto -Ofast(pass 1) -O3 -ffast-math -qnextgen -qopt-mem-layout-trans=4 -L/usr/local/jemalloc32-5.0.1/lib -ljemalloc</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>basepeak = yes</td>
</tr>
</tbody>
</table>

(Continued on next page)
Dell Inc.
PowerEdge MX740c (Intel Xeon Gold 6208U, 2.90 GHz)

**SPECrate®2017_int_base** = 115
**SPECrate®2017_int_peak** = 119

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**Peak Optimization Flags (Continued)**

525.x264_r: -m64 -qnextgen -std=c11
-W1,-plugin-opt=-x86-branches-within-32B-boundaries
-W1,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math
-qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/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_2020.3.275/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.

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