# SPEC CPU®2017 Integer Rate Result

**Dell Inc.**

PowerEdge MX750c (Intel Xeon Platinum 8352Y, 2.20 GHz)

**SPECrate®2017_int_base** = 413

**SPECrate®2017_int_peak** = 427

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<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by</td>
<td>Dell Inc.</td>
</tr>
</tbody>
</table>

**Copies**

<table>
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<tr>
<th>SPECrate®2017_int_base</th>
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</tr>
</thead>
<tbody>
<tr>
<td>(413)</td>
<td>(427)</td>
</tr>
</tbody>
</table>

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### Hardware

**CPU Name:** Intel Xeon Platinum 8352Y

- **Max MHz:** 3400
- **Nominal:** 2200
- **Enabled:** 64 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 48 MB I+D on chip per chip
- **Other:** None

**Memory:** 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)

**Storage:** 125 GB on tmpfs

**Other:** None

---

### Software

**OS:** Red Hat Enterprise Linux 8.3 (Ootpa)

- **Version:** 4.18.0-240.el8.x86_64
- **Compiler:**
  - C/C++: Version 2021.1 of Intel oneAPI DPC++/C++
  - Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux
  - C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux

**Parallel:** No

**Firmware:**
- **Version:** 1.1.0 released Mar-2021

**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 and OS set to prefer performance at the cost of additional power usage.
### Dell Inc.

PowerEdge MX750c (Intel Xeon Platinum 8352Y, 2.20 GHz)

**SPEC CPU®2017 Integer Rate Result**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
<td>Base</td>
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<td>500.perlbench_r</td>
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<td>232</td>
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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 = "/mnt/ramdisk/cpu2017-ic19.1u1/lib/intel64:/mnt/ramdisk/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 Red Hat Enterprise Linux 8.1

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
```

(Continued on next page)
Dell Inc.  
PowerEdge MX750c (Intel Xeon Platinum 8352Y, 2.20 GHz)  

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

General Notes (Continued)

runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>

Benchmark run from a 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"

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.


Platform Notes

BIOS Settings:  
Sub NUMA Cluster : 2-Way Clustering  
Virtualization Technology : Disabled  

System Profile : Custom  
CPU Power Management : Maximum Performance  
C1E : Disabled  
C States : Autonomous  
Memory Patrol Scrub : Disabled  
Energy Efficiency Policy : Performance  
CPU Interconnect Bus Link  
Power Management : Disabled  

Sysinfo program /mnt/ramdisk/cpu2017-ic19.1u1/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7ed86e6e46a485a0011  
running on localhost.localdomain Sat Mar 27 07:10:45 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) Platinum 8352Y CPU @ 2.20GHz  
2 "physical id"s (chips)  
128 "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 : 32
siblings : 64
physical 0: cores 0 1 2 3 4 5 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
physical 1: cores 0 1 2 3 4 5 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 128
On-line CPU(s) list: 0-127
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8352Y CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2800.070
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,96,100,104,108,112,116,120,124
NUMA node1 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94,98,102,106,110,114,118,122,126
NUMA node2 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,97,101,105,109,113,117,121,125
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 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 tsc_deadline_timer aes xsave

(Continued on next page)
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**Tested by:** Dell Inc.  
**Test Date:** Mar-2021  
**Hardware Availability:** Apr-2021  
**Software Availability:** Mar-2021

---

**Platform Notes (Continued)**

```
avx  f16c  rdrand  lahf_lm  abm  3dnowprefetch  cpuid_fault  epb  cat_l3  invpcid_single
intel_ppin  ssbd  mba  ibrs  ibpb  stibp  ibrs_enhanced  fsgsbase  tsc_adjust  bmi1  hle  avx2
smep  bmi2  erms  invpcid  cqm  rdt_a  avx512f  avx512dq  rdseed  adx  smap  avx512ifma
clflushopt  clwb  intel_pt  avx512cd  sha_ni  avx512bw  avx512vl  xsaveopt  xsavec  xgetbv1
xsaves  cqm_llc  cqm_occup_llc  cqm_mbm_total  cqm_mbm_local  split_lock_detect  wbnoinvd
dtherm  ida  arat  pln  pts  avx512vbmi  umip  pku  ospke  avx512_vbmi2  gfni  vaes  vpclmulqdq
avx512_vnni  avx512_bitalg  tme  avx512_vpopcntdq  la57  rdpid  md_clear  pconfig  flush_l1d
arch_capabilities
```

/proc/cpuinfo cache data
---

```
cache size : 49152 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  96
 100 104 108 112 116 120 124
node 0 size: 124900 MB
node 0 free: 107935 MB
node 1 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  98
 102 106 110 114 118 122 126
node 1 size: 125721 MB
node 1 free: 128352 MB
node 2 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  97
 101 105 109 113 117 121 125
node 2 size: 125862 MB
node 2 free: 128697 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  99
 103 107 111 115 119 123 127
node 3 size: 125766 MB
node 3 free: 128653 MB
node distances:
node  0  1  2  3
 0:  10  11  20  20
 1:  11  10  20  20
 2:  20  20  10  11
 3:  20  20  11  10
```

---

From /proc/meminfo
```
MemTotal:       527792668 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

---

From /etc/*release* /etc/*version*
```
os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.3 (Ootpa)"
```

(Continued on next page)
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CPU2017 License: 55  
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Tested by: Dell Inc.

Test Date: Mar-2021  
Hardware Availability: Apr-2021  
Software Availability: Mar-2021

Platform Notes (Continued)

```bash
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.3"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga
```

```bash
uname -a:
Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- `itlb_multihit`: Not affected
- `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 sanitation
- `CVE-2017-5715 (Spectre variant 2)`: Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- `srbds`: Not affected
- `tsx_async_abort`: Not affected

```bash
run-level 3 Mar 27 07:04 last=5
```

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

```
Filesystem     Type     Size  Used Avail Use% Mounted on
tmpfs          tmpfs    125G   9.6G  116G   8%  /mnt/ramdisk
```

From /sys/devices/virtual/dmi/id
- BIOS: Dell Inc. 1.1.0 03/25/2021
- Vendor: Dell Inc.
- Product: PowerEdge MX750c
- 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:

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

16x 002C0632002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200
16x Not Specified Not Specified

(End of data from sysinfo program)

**Compiler Version Notes**

```
C       | 500.perlbench_r(peak) 557.xz_r(peak)
```

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version
2021.1 Build 20201113
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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
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### Compiler Version Notes (Continued)

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<th>Applications</th>
<th>Compiler Information</th>
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Compiler Version Notes (Continued)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpx

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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-1qkmalloc

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto

(Continued on next page)
## Base Optimization Flags (Continued)

C++ benchmarks (continued):
- `-mfpmath=sse`  
- `-funroll-loops`  
- `-qopt-mem-layout-trans=4`  
- `-mbranches-within-32B-boundaries`  
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`  
- `-lqkmalloc`

Fortran benchmarks:
- `-w`  
- `-m64`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-O3`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs`  
- `-align array32byte`  
- `-mbranches-within-32B-boundaries`  
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`  
- `-lqkmalloc`

## Peak Compiler Invocation

C benchmarks (except as noted below):
- `icx`
- `500.perlbench_r: icc`
- `557.xz_r: icc`

C++ benchmarks:
- `icpx`

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`
SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.
PowerEdge MX750c (Intel Xeon Platinum 8352Y, 2.20 GHz)

<table>
<thead>
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<th>SPECrate®2017_int_base = 413</th>
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<tbody>
<tr>
<td>SPECrate®2017_int_peak = 427</td>
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Mar-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

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/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z, muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z, muldefs -xCORE-AVX512 -flto
-O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalanchmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes
### SPEC CPU®2017 Integer Rate Result

**Dell Inc.**  
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