Dell Inc.

PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

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

SPECrate®2017_int_base = 315
SPECrate®2017_int_peak = 326

Test Date: May-2021
Hardware Availability: Apr-2021
Software Availability: Dec-2020

Hardware
CPU Name: Intel Xeon Gold 5318Y
Max MHz: 3400
Nominal: 2100
Enabled: 48 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: 36 MB I+D on chip per chip
Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)
Storage: 125 GB on tmpfs
Other: None

Software
OS: Red Hat Enterprise Linux 8.2 (Ootpa)
4.18.0-193.el8.x86_64
Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;
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 1.1.3 released Apr-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.
SPEC CPU®2017 Integer Rate Result

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Results Table

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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<td>523.xalancbmk_r</td>
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<td>548.exchange2_r</td>
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<td>557.xz_r</td>
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<td>178</td>
<td>582</td>
</tr>
</tbody>
</table>

SPECrate®2017_int_base = 315
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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/cpu2017-1.1.7-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.7-ic2021.1/lib/ia32:/mnt/ramdisk/cpu2017-1.1.7-ic2021.1/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

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)
Dell Inc.
PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

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

SPECrate®2017_int_base = 315
SPECrate®2017_int_peak = 326

General Notes (Continued)

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>
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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

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/cpu2017-1.1.7-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Fri May 14 18:16:17 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 5318Y CPU @ 2.10GHz
  2  "physical id"'s (chips)
  96 "processors"
  cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

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

Dell Inc.

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CPU2017 License: 55
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Test Date: May-2021
Hardware Availability: Apr-2021
Software Availability: Dec-2020

Platform Notes (Continued)

cpu cores : 24
siblings : 48
physical 0: cores 0 1 10 11 12 13 14 15 16 17 18 19 20 21 22 23
physical 1: cores 0 1 10 11 12 13 14 15 16 17 18 19 20 21 22 23

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: 106
Model name: Intel(R) Xeon(R) Gold 5318Y CPU @ 2.10GHz
Stepping: 6
CPU MHz: 2912.024
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 36864K
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):
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 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
NUMA node3 CPU(s):
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 xrompage Nonstop_tsc cpuid
aperfmpref 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
avx f16c rdrand lahf_lm ablm 3nowprefetch cpuid_fault epb cat_13 invvpidd_single ssbd
msra ibrs ibpb stibp ibrs_enhanced tpr_shadow vmi flexpriority ept vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a arat pln pts avx512fd mbx
avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw
avx512vl xsaveopt xsavec xflip bv1 xsaves cqm_llc cqm_occup_l1c cqm_mbb_total
avx512_pack_local wboinv dtherm ida arat pln pts avx512vmbi umip pku ospke
avx512_vmbi2 gfnia vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq

(Continued on next page)
## Dell Inc. PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

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</table>

### SPEC CPU®2017 Integer Rate Result

**SPECrate®2017_int_base = 315**

**SPECrate®2017_int_peak = 326**

### Platform Notes (Continued)

```
la57 rdpid md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data
    cache size : 36864 KB
```

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

<table>
<thead>
<tr>
<th>Available</th>
<th>Nodes (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 0 cpus:</td>
<td>0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92</td>
</tr>
<tr>
<td>node 1 cpus:</td>
<td>2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 66 70 74 78 82 86 90 94</td>
</tr>
<tr>
<td>node 1 size:</td>
<td>128919 MB</td>
</tr>
<tr>
<td>node 1 free:</td>
<td>118852 MB</td>
</tr>
<tr>
<td>node 2 cpus:</td>
<td>1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89 93</td>
</tr>
<tr>
<td>node 2 size:</td>
<td>129018 MB</td>
</tr>
<tr>
<td>node 2 free:</td>
<td>128836 MB</td>
</tr>
<tr>
<td>node 3 cpus:</td>
<td>3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67 71 75 79 83 87 91 95</td>
</tr>
<tr>
<td>node 3 size:</td>
<td>129016 MB</td>
</tr>
<tr>
<td>node 3 free:</td>
<td>128843 MB</td>
</tr>
</tbody>
</table>

```
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:       527808956 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

```
/sbin/tuned-adm active
    Current active profile: throughput-performance
```

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)
```

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

```
    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:

    CVE-2018-12207 (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
   -sanitization
    CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB:
    conditional, RSB filling
    CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
    CVE-2019-11135 (TSX Asynchronous Abort): Not affected

    run-level 3 May 14 18:14

    SPEC is set to: /mnt/ramdisk/cpu2017-1.1.7-ic2021.1
    Filesystem     Type     Size  Used  Avail  Use% Mounted on
    tmpfs          tmpfs    125G   4.4G  121G   4%  /mnt/ramdisk

    From /sys/devices/virtual/dmi/id
    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:
    1x 002C00B3002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200, configured at 2933
    15x 00AD063200AD HMMA4GR7AJR8N-XN 32 GB 2 rank 3200, configured at 2933
    16x Not Specified Not Specified

    BIOS:
    BIOS Vendor: Dell Inc.
    BIOS Version: 1.1.3
```

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

**PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)**

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<thead>
<tr>
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### Platform Notes (Continued)

- **BIOS Date:** 04/27/2021
- **BIOS Revision:** 1.1

(End of data from sysinfo program)

### Compiler Version Notes

```
<table>
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<tr>
<th>C</th>
<th>500.perlbench_r(peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
<td></td>
</tr>
<tr>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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<tbody>
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<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113</td>
<td></td>
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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, peak)</th>
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```

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

| C     | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) |
|       | 525.x264_r(base, peak) 557.xz_r(base, peak) |

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

| C     | 500.perlbench_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, peak) |

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
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SPECRate®2017_int_base = 315
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Dell Inc.
PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:
icx

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
Base Optimization Flags (Continued)

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

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

Peak Compiler Invocation

C benchmarks (except as noted below):
\texttt{icx}

\texttt{500.perlbench} \texttt{r: icc}

C++ benchmarks:
\texttt{icpx}

Fortran benchmarks:
\texttt{ifort}

Peak Portability Flags

\texttt{500.perlbench} \texttt{r: -DSPEC_LP64 -DSPEC_LINUX_X64}
\texttt{502.gcc} \texttt{r: -D_FILE_OFFSET_BITS=64}
\texttt{505.mcf} \texttt{r: -DSPEC_LP64}
\texttt{520.omnetpp} \texttt{r: -DSPEC_LP64}
\texttt{523.xalancbmk} \texttt{r: -DSPEC_LP64 -DSPEC_LINUX}
\texttt{525.x264} \texttt{r: -DSPEC_LP64}
\texttt{531.deepsjeng} \texttt{r: -DSPEC_LP64}
\texttt{541.leela} \texttt{r: -DSPEC_LP64}
\texttt{548.exchange2} \texttt{r: -DSPEC_LP64}
\texttt{557.xz} \texttt{r: -DSPEC_LP64}
SPEC CPU®2017 Integer Rate Result

Dell Inc.
PowerEdge MX750c (Intel Xeon Gold 5318Y, 2.10 GHz)

SPECrate®2017_int_base = 315
SPECrate®2017_int_peak = 326

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

Test Date: May-2021
Hardware Availability: Apr-2021
Software Availability: Dec-2020

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

557.xz_r: basepeak = yes

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

<table>
<thead>
<tr>
<th>Dell Inc.</th>
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#### CPU2017 Details:
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You can also download the XML flags sources by saving the following links:

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