## Dell Inc.

**PowerEdge MX840c (Intel Xeon Gold 6238L, 2.10GHz)**

| SPECspeed2017_int_base | 9.50 |
| SPECspeed2017_int_peak | 9.70 |

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

### Threads

<table>
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<tr>
<th>SPECspeed2017_int_base (9.50)</th>
<th>SPECspeed2017_int_peak (9.70)</th>
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<tbody>
<tr>
<td>600.perlbench_s 88</td>
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<tr>
<td>602.gcc_s 88</td>
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<tr>
<td>620.omnetpp_s 88</td>
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<tr>
<td>623.xalancbmk_s 88</td>
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<td>625.x264_s 88</td>
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<tr>
<td>631.deepsjeng_s 88</td>
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<tr>
<td>641.leela_s 88</td>
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<tr>
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<tr>
<td>657.xz_s 88</td>
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</tbody>
</table>

### Hardware

**CPU Name:** Intel Xeon Gold 6238L  
**Max MHz.:** 3700  
**Nominal:** 2100  
**Enabled:** 88 cores, 4 chips  
**Orderable:** 2,4 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**L2:** 1 MB I+D on chip per core  
**L3:** 30.25 MB I+D on chip per chip  
**Memory:** 768 GB (48 x 16 GB 2Rx4 PC4-2933Y-R)  
**Storage:** 1 x 480 GB SATA SSD  
**Other:** None

### Software

**OS:** Ubuntu 18.04.2 LTS  
**Compiler:** C/C++: Version 19.0.1.144 of Intel C/C++  
**Parallel:** Yes  
**Firmware:** Version 2.2.1 released Feb-2019  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** jemalloc memory allocator V5.0.1
## Dell Inc.
PowerEdge MX840c (Intel Xeon Gold 6238L, 2.10GHz)

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Ratio</th>
<th>Seconds</th>
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<td>280</td>
<td>22.0</td>
<td>280</td>
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<td>279</td>
<td>22.2</td>
<td>283</td>
<td>21.9</td>
</tr>
</tbody>
</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"

### General Notes
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

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>

(Continued on next page)
SPEC CPU2017 Integer Speed Result

Dell Inc.

PowerEdge MX840c (Intel Xeon Gold 6238L, 2.10GHz)

SPECspeed2017_int_base = 9.50
SPECspeed2017_int_peak = 9.70

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Mar-2019
Tested by: Dell Inc.
Tested by: Dell Inc.

General Notes (Continued)

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:
ADDDC setting disabled
Sub NUMA Cluster enabled
Virtualization Technology disabled
DCU Streamer Prefetcher enabled
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 disabled
Logical Processor disabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bce8f2999c33d61f64985e45859ea9
running on intel-sut Thu May 2 15:49:32 2019

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 6238L CPU @ 2.10GHz
  4 "physical id"s (chips)
  88 "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 : 22
siblings : 22
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian

(Continued on next page)
SPEC CPU2017 Integer Speed Result

Dell Inc.

PowerEdge MX840c (Intel Xeon Gold 6238L, 2.10GHz)

CPU2017 License: 55
Test Sponsor: Dell Inc.
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SPECspeed2017_int_base = 9.50
SPECspeed2017_int_peak = 9.70

CPU(s): 88
On-line CPU(s) list: 0-87
Thread(s) per core: 1
Core(s) per socket: 22
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6238L CPU @ 2.10GHz
Stepping: 7
CPU MHz: 1884.153
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 30976K
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
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
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

Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 cife flush 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 aperffmpref 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 aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb stibp ibrs enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap ciflshopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

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
node 0 size: 191913 MB
node 0 free: 191649 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
node 1 size: 193531 MB
node 1 free: 192981 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

(Continued on next page)
SPEC CPU2017 Integer Speed Result

Dell Inc.  
PowerEdge MX840c (Intel Xeon Gold 6238L, 2.10GHz)  

SPECspeed2017_int_peak = 9.70  
SPECspeed2017_int_base = 9.50

Platform Notes (Continued)

node 2 size: 193531 MB  
node 2 free: 193263 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  
node 3 size: 193530 MB  
node 3 free: 193212 MB

node distances:

node 0 1 2 3  
0:  10  21  21  21  
1:  21  10  21  21  
2:  21  21  10  21  
3:  21  21  21  10

From /proc/meminfo

MemTotal:       791047496 kB  
HugePages_Total:       0  
Hugepagesize:       2048 kB

From /usr/bin/lsb_release -d  
Ubuntu 18.04.2 LTS

From /etc/*release* /etc/*version*

debian_version: buster/sid  
os-release:  
  NAME="Ubuntu"  
  VERSION="18.04.2 LTS (Bionic Beaver)"  
  ID=ubuntu  
  IDLIKE=debian  
  PRETTY_NAME="Ubuntu 18.04.2 LTS"  
  VERSION_ID="18.04"  
  HOME_URL="https://www.ubuntu.com/"  
  SUPPORT_URL="https://help.ubuntu.com/"

uname -a:

Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64  
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Not affected  
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization  
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB

run-level 3 May 2 15:44

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 439G 19G 398G 5% /

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

**PowerEdge MX840c (Intel Xeon Gold 6238L, 2.10GHz)**

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| CPU2017 License: | 55                      |
| Test Sponsor:   | Dell Inc.               |
| Tested by:      | Dell Inc.               |
| Test Date:      | Mar-2019                |
| Hardware Availability: | Apr-2019            |
| Software Availability: | Feb-2019            |

### Platform Notes (Continued)

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.

- **BIOS**: Dell Inc. 2.2.1 02/19/2019
- **Memory**:
  - 26x 002C00B30002C 18ASF2G72PD2-2G6D1 16 GB 2 rank 2666
  - 2x 00AD00B300AD HMA82GR7AF8N-VK 16 GB 2 rank 2666
  - 1x 00AD063200AD HMA82GR7AF8N-VK 16 GB 2 rank 2666
  - 19x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666

(End of data from sysinfo program)

### Compiler Version Notes

```plaintext
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base, peak) 657.xz_s(base)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

--------------------------------------------------------

CC  600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

--------------------------------------------------------

CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

--------------------------------------------------------

CXXC 620.omnetpp_s(peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,

(Continued on next page)
# SPEC CPU2017 Integer Speed Result

**Dell Inc.**

**PowerEdge MX840c (Intel Xeon Gold 6238L, 2.10GHz)**

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**CPU2017 License:** 55  
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**Tested by:** Dell Inc.  
**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Feb-2019

## Compiler Version Notes (Continued)

Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
FC  648.exchange2_s(base, peak)
------------------------------------------------------------------------------

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---

## Base Compiler Invocation

**C benchmarks:**

icc -m64 -std=c11

**C++ benchmarks:**

icpc -m64

**Fortran benchmarks:**

ifort -m64

---

## Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64  
602.gcc_s: -DSPEC_LP64  
605.mcf_s: -DSPEC_LP64  
620.omnetpp_s: -DSPEC_LP64  
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX  
625.x264_s: -DSPEC_LP64  
631.deepsjeng_s: -DSPEC_LP64  
641.leela_s: -DSPEC_LP64  
648.exchange2_s: -DSPEC_LP64  
657.xz_s: -DSPEC_LP64

---

## Base Optimization Flags

**C benchmarks:**

-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

(Continued on next page)
Dell Inc.  
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CPU2017 License: 55  
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### Base Optimization Flags (Continued)

C benchmarks (continued):
- `-L/usr/local/je5.0.1-64/lib -ljemalloc`

C++ benchmarks:
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64 -lqkmalloc`

Fortran benchmarks:
- `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -nostandard-realloc-lhs`

### Peak Compiler Invocation

C benchmarks:
- `icc -m64 -std=c11`

C++ benchmarks:
- `icpc -m64`

Fortran benchmarks:
- `ifort -m64`

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

C benchmarks:
- `600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2`  
- `-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3`  
- `-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp`  
- `-DSPEC_OPENMP -fno-strict-overflow`  
- `-L/usr/local/je5.0.1-64/lib -ljemalloc`

- `602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2`  
- `-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3`

(Continued on next page)
Dell Inc. PowerEdge MX840c (Intel Xeon Gold 6238L, 2.10GHz)  

| SPECspeed2017_int_base | 9.50 |
| SPECspeed2017_int_peak | 9.70 |

CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.  
Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: Feb-2019

Peak Optimization Flags (Continued)

602.gcc_s (continued):
-no-prec-div -DSPEC_SUPPRESS_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:

620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

623.xalancbmk_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

631.deepsjeng_s: Same as 623.xalancbmk_s

641.leela_s: Same as 623.xalancbmk_s

Fortran benchmarks:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

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:
## SPEC CPU2017 Integer Speed Result

### Dell Inc.

**PowerEdge MX840c (Intel Xeon Gold 6238L, 2.10GHz)**

<table>
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<td>Dell Inc.</td>
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<td>Tested by:</td>
<td>Dell Inc.</td>
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### SPECspeed2017_int_base = 9.50

### SPECspeed2017_int_peak = 9.70

**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Feb-2019

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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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