# SPEC® CPU2017 Integer Speed Result

## Dell Inc.

**PowerEdge MX740c (Intel Xeon Gold 6240M, 2.60GHz)**

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

### SPECspeed2017_int_base = 9.73

### SPECspeed2017_int_peak = 9.94

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
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<tbody>
<tr>
<td>perlbench</td>
<td>36</td>
<td>7.72</td>
<td>9.94</td>
</tr>
<tr>
<td>gcc</td>
<td>36</td>
<td>9.37</td>
<td>11.4</td>
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<tr>
<td>mcf</td>
<td>36</td>
<td>9.88</td>
<td>12.0</td>
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<tr>
<td>omnetpp</td>
<td>36</td>
<td>7.75</td>
<td>8.5</td>
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<tr>
<td>xalancbmk</td>
<td>36</td>
<td>12.4</td>
<td>12.5</td>
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<tr>
<td>x264</td>
<td>36</td>
<td>6.60</td>
<td>7.2</td>
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<tr>
<td>deepsjeng</td>
<td>36</td>
<td>7.75</td>
<td>8.5</td>
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<tr>
<td>leela</td>
<td>36</td>
<td>4.77</td>
<td>4.77</td>
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<tr>
<td>exchange2</td>
<td>36</td>
<td>14.0</td>
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<tr>
<td>xz</td>
<td>36</td>
<td>20.9</td>
<td>21.1</td>
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### SPECspeed2017_int_base (9.73) | SPECspeed2017_int_peak (9.94)

### Hardware

- **CPU Name:** Intel Xeon Gold 6240M
- **Max MHz.:** 3900
- **Nominal:** 2600
- **Enabled:** 36 cores, 2 chips
- **Orderable:** 1,2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 24.75 MB I+D on chip per chip
- **Memory:** 384 GB (12 x 32 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++ Compiler Build 20181018 for Linux;
  Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux
- **Parallel:** Yes
- **Firmware:** Version 2.2.9 released May-2019
- **File System:** ext4
- **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 MX740c (Intel Xeon Gold 6240M, 2.60GHz)  

**SPEC CPU2017 Integer Speed Result**

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### Results Table

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<tr>
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<th>Seconds</th>
<th>Ratio</th>
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<tr>
<td>600.perlbench_s</td>
<td>36</td>
<td>267</td>
<td>6.64</td>
<td>272</td>
<td>6.52</td>
<td>269</td>
<td>6.60</td>
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<td>620.omnetpp_s</td>
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<td>623.xalanchmk_s</td>
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<td>631.deepsjeng_s</td>
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<td>262</td>
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<td><strong>5.47</strong></td>
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<td>641.leela_s</td>
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<td>358</td>
<td>4.77</td>
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<tr>
<td>657.xz_s</td>
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<td>20.9</td>
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<td><strong>20.9</strong></td>
<td>293</td>
<td>21.1</td>
<td>36</td>
<td>292</td>
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</tbody>
</table>

**SPECspeed2017_int_base = 9.73**

**SPECspeed2017_int_peak = 9.94**

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:

```bash
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:

```bash
sync; echo 3>/proc/sys/vm/drop_caches
```

runcpu command invoked through numactl i.e.:

```bash
numactl --interleave=all runcpu <etc>
```

(Continued on next page)
Dell Inc.

PowerEdge MX740c (Intel Xeon Gold 6240M, 2.60GHz)

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**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Test Date:** Mar-2019

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**Software Availability:** Mar-2019

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**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 9bcde8f2999c33d61f64985e45859ea9

running on intel-sut Fri May 17 23:40:54 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 6240M CPU @ 2.60GHz
2 "physical id"s (chips)
36 "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 : 18
siblings : 18
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:

Architecture: x86_64

CPU op-mode(s): 32-bit, 64-bit

Byte Order: Little Endian

CPU(s): 36

On-line CPU(s) list: 0-35

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

- **Thread(s) per core:** 1
- **Core(s) per socket:** 18
- **Socket(s):** 2
- **NUMA node(s):** 2
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 6240M CPU @ 2.60GHz
- **Stepping:** 7
- **CPU MHz:** 3552.322
- **BogoMIPS:** 5200.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 25344K
- **NUMA node0 CPU(s):** 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34
- **NUMA node1 CPU(s):** 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35
- **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 pppctld aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pinn ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vmmexcpior ept vpid fsgsbase tsc_adjust bmi hle avx2 smep bmi2 erts invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pfn pts pku ospke avx512_vnni flush_l1d arch_capabilities

```
//proc/cpuinfo cache data
cache size : 25344 KB
```

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a 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 32 34
node 0 size: 191915 MB
node 0 free: 191244 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35
node 1 size: 193510 MB
node 1 free: 193188 MB
node distances:
node 0: 10 21
node 1: 21 10
```

(Continued on next page)
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Hardware Availability: Apr-2019
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Platform Notes (Continued)

From /proc/meminfo
   MemTotal: 394675928 kB
   HugePages_Total: 0
   Hugepagesize: 2048 kB

/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
      ID_LIKE=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 4.15.0-46-generic #49-Ubuntu SMP Wed Feb 6 09:33:07 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 17 23:37

SPEC is set to: /home/cpu2017

   Filesystem   Type      Size  Used Avail Use% Mounted on
   /dev/sda2    ext4      439G  20G  398G   5%   /

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. 2.2.9 05/08/2019
   Memory:
      11x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
      1x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
      12x Not Specified Not Specified

(End of data from sysinfo program)
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Test Sponsor: Dell Inc.

Hardware Availability: Apr-2019

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**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
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------------------------------------------------------------------------------

CXXC 620.omnetpp_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.

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

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:**

```bash
icc -m64 -std=c11
```

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Base Compiler Invocation (Continued)

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

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

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### Dell Inc.

**PowerEdge MX740c (Intel Xeon Gold 6240M, 2.60GHz)**

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<tr>
<th>SPECs</th>
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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 | Mar-2019 |

#### Peak Optimization Flags (Continued)

**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
-1/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
-1/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: