Dell Inc.

PowerEdge M640 (Intel Xeon Gold 6240R, 2.40 GHz)

| SPECspeed®2017_int_base = 9.80 |
| SPECspeed®2017_int_peak = 9.93 |

| Test Date: | May-2020 |
| Hardware Availability: | Feb-2020 |
| Software Availability: | Nov-2019 |

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**Software**

- OS: Red Hat Enterprise Linux 8.1
- Compiler: C/C++: Version 19.0.5.281 of Intel C/C++ Compiler for Linux;
  Fortran: Version 19.0.5.281 of Intel Fortran Compiler for Linux
- Parallel: Yes
- Firmware: Version 2.6.3 released Feb-2020
- File System: tmpfs
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: 64-bit
- Other: jemalloc memory allocator V5.0.1
- Power Management: BIOS set to prefer performance at the cost of additional power usage

**Hardware**

- CPU Name: Intel Xeon Gold 6240R
- Max MHz: 4000
- Nominal: 2400
- Enabled: 48 cores, 2 chips, 2 threads/core
- Orderable: 1.2 chips
- Cache L1: 32 KB I + 32 KB D on chip per core
- L2: 1 MB I+D on chip per core
- L3: 35.75 MB I+D on chip per chip
- Other: None
- Memory: 384 GB (12 x 32 GB 2Rx8 PC4-2933V-R, running at 2933)
- Storage: 1 x 480 GB SATA SSD
- Other: None
Dell Inc.

PowerEdge M640 (Intel Xeon Gold 6240R, 2.40 GHz)  

**SPECspeed®2017_int_base = 9.80**  
**SPECspeed®2017_int_peak = 9.93**

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**SPECspeed®2017_int_base = 9.80**  
**SPECspeed®2017_int_peak = 9.93**

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:

- KMP_AFFINITY = "granularity=fine,scatter"
- LD_LIBRARY_PATH = "/dev/shm/cpu2017/lib/intel64:/dev/shm/cpu2017/je5.0.1-64"
- OMP_STACKSIZE = "192M"

### General Notes

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.

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

**Dell Inc.**

PowerEdge M640 (Intel Xeon Gold 6240R, 2.40 GHz)

**SPECspeed®2017_int_base = 9.80**

**SPECspeed®2017_int_peak = 9.93**

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</tr>
</tbody>
</table>

---

**General Notes (Continued)**

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

---

**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

Sysinfo program /dev/shm/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbl6e646a485a0011
running on localhost.localdomain Wed May 6 15:17:31 2020

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 6240R CPU @ 2.40GHz
    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.)
    cpu cores : 24
    siblings : 48
    physical 0: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
    physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:

(Continued on next page)
Dell Inc.

PowerEdge M640 (Intel Xeon Gold 6240R, 2.40 GHz)

SPECspeed\textsuperscript{\textregistered}2017\_int\_base = 9.80

SPECspeed\textsuperscript{\textregistered}2017\_int\_peak = 9.93

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

Test Date: May-2020
Hardware Availability: Feb-2020
Software Availability: Nov-2019

Platform Notes (Continued)

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: 85
Model name: Intel(R) Xeon(R) Gold 6240R CPU @ 2.40GHz
Stepping: 7
CPU MHz: 1917.552
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
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):
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 node2 CPU(s):
2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94
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 rdtsscp
  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
  xtr Wich dca pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
  avx f16c rdrand lahf_lm ablm ab3 3nowprefetch cpuid fault ebcat_l3 cdp_l3
  invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs\_enhanced tpr\_shadow vmni
  flexpriority ept vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2 erms invpcid rtm
  cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel\_pt avx512cd
  avx512bw avx512vl xsaves xsaveopt xsave xsetbv xsaves cqm\_llc cqm\_occup\_llc cqm\_mbm\_total
  cqm\_mbm\_local dtherm ida arat pln pts pku ospke avx512\_vnmi md\_clear flush\_lld
  arch\_capabilities

/proc/cpuinfo cache data
  cache size : 36608 KB

(Continued on next page)
Dell Inc.

PowerEdge M640 (Intel Xeon Gold 6240R, 2.40 GHz)

**SPEC CPU®2017 Integer Speed Result**

**SPECCPU2017_int_base = 9.80**

**SPECCPU2017_int_peak = 9.93**

---

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

**Hardware Availability:** Feb-2020
**Software Availability:** Nov-2019

---

**Platform Notes (Continued)**

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
  - node 0 size: 95304 MB
  - node 0 free: 61256 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 89 93
  - node 1 size: 96737 MB
  - node 1 free: 83416 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 90 94
  - node 2 size: 96763 MB
  - node 2 free: 83577 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
  - node 3 size: 96762 MB
  - node 3 free: 82945 MB

- **Node distances:**
  - node 0: 10 21 11 21
  - node 1: 21 10 21 11
  - node 2: 11 21 10 21
  - node 3: 21 11 21 10

From `/proc/meminfo`
- MemTotal: 394821904 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From `/etc/*release* /etc/*version*`
- os-release:
  - NAME="Red Hat Enterprise Linux"
  - VERSION="8.1 (Ootpa)"
  - ID="rhel"
  - ID_LIKE="fedora"
  - VERSION_ID="8.1"
  - PLATFORM_ID="platform:el8"
  - PRETTY_NAME="Red Hat Enterprise Linux 8.1 (Ootpa)"
  - ANSI_COLOR="0;31"

- redhat-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
- system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
- system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga

- uname -a:
  - Linux localhost.localdomain 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019
  - x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

(Continued on next page)
Dell Inc.  
PowerEdge M640 (Intel Xeon Gold 6240R, 2.40 GHz)

**SPEC CPU®2017 Integer Speed Result**

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---

### Platform Notes (Continued)

**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

---

**run-level 3 May 4 13:17**

**SPEC is set to:** /dev/shm/cpu2017

**Filesystem** | **Type** | **Size** | **Used** | **Avail** | **Use%** | **Mounted on**
--- | --- | --- | --- | --- | --- | ---
tmpfs | tmpfs | 189G | 62G | 127G | 33% | /dev/shm

---

**From /sys/devices/virtual/dmi/id**

**BIOS:** Dell Inc. 2.6.3 02/03/2020  
**Vendor:** Dell Inc.  
**Product:** PowerEdge M640  
**Product Family:** PowerEdge

---

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:**

- 5x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
- 4x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
- 3x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
- 4x Not Specified Not Specified

---

**Compiler Version Notes**

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

---

**Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.5.281 Build 20190815  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.**

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(Continued on next page)
Dell Inc.  
PowerEdge M640 (Intel Xeon Gold 6240R, 2.40 GHz)  

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**Compiler Version Notes (Continued)**

C++      |
| 620.omnetpp_s(base, peak) 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 19.0.5.281 Build 20190815  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran |
| 648.exchange2_s(base, peak)  

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.5.281 Build 20190815  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

---

**Base Compiler Invocation**

C benchmarks:  
`icc`

C++ benchmarks:  
`icpc`

Fortran benchmarks:  
`ifort`

---

**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 |  

### SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge M640 (Intel Xeon Gold 6240R, 2.40 GHz)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base = 9.80</th>
<th>SPECspeed®2017_int_peak = 9.93</th>
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- **CPU2017 License:** 55
- **Test Sponsor:** Dell Inc.
- **Tested by:** Dell Inc.
- **Test Date:** May-2020
- **Hardware Availability:** Feb-2020
- **Software Availability:** Nov-2019

### Base Optimization Flags

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

C++ benchmarks:
- `-m64 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin -lqkmalloc`

Fortran benchmarks:
- `-m64 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -nostandard-realloc-lhs`

### Peak Compiler Invocation

C benchmarks:
- `icc`

C++ benchmarks:
- `icpc`

Fortran benchmarks:
- `ifort`

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

C benchmarks:
- `600.perlbench_s: -m64 -std=c11 -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`

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

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PowerEdge M640 (Intel Xeon Gold 6240R, 2.40 GHz)

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Peak Optimization Flags (Continued)

602gcc_s: -m64 -std=c11 -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: -m64 -std=c11 -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: basepeak = yes

657.xz_s: -m64 -std=c11 -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: -m64 -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_2019.5.281/linux/compiler/lib/intel64_lin
-lqkmalloc

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: 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:
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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.0 on 2020-05-06 15:17:31-0400.