### Dell Inc.

**PowerEdge R640** (Intel Xeon Gold 6240R, 2.40 GHz)

**SPECspeed®2017_int_base = 10.1**

**SPECspeed®2017_int_peak = 10.3**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_int_base (10.1)</th>
<th>SPECspeed®2017_int_peak (10.3)</th>
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<tr>
<td>48</td>
<td>6.68</td>
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<tr>
<td>600.perlbench_s</td>
<td>7.53</td>
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<tr>
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<td>605.mcf_s</td>
<td>9.07</td>
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<tr>
<td>620.omnetpp_s</td>
<td>9.23</td>
<td>14.6</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>5.51</td>
<td>5.70</td>
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<tr>
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<tr>
<td>648.exchange2_s</td>
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</tr>
<tr>
<td>657.xz_s</td>
<td>15.7</td>
<td>23.6</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6240R
- **Max MHz:** 4000
- **Nominal:** 2400
- **Enabled:** 48 cores, 2 chips
- **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 (24 x 16 GB 2Rx8 PC4-2933V-R, running at 2933)
- **Storage:** 1 x 1.92 TB SATA SSD
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux 8.1
  - kernel 4.18.0-147.el8.x86_64
- **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 2.5.4 released Jan-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
SPEC CPU®2017 Integer Speed Result

Dell Inc.

PowerEdge R640 (Intel Xeon Gold 6240R, 2.40 GHz)

SPECspeed®2017_int_base = 10.1
SPECspeed®2017_int_peak = 10.3

Results Table

<table>
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</tbody>
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SPECspeed®2017_int_base = 10.1
SPECspeed®2017_int_peak = 10.3

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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 = "/mnt/ramdisk/cpu2017/lib/intel64:/mnt/ramdisk/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-9900K CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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
Benchmark run from a 225 GB ramdisk created with the cmd; "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk" jemalloc, a general purpose malloc implementation

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

### Dell Inc.

**PowerEdge R640 (Intel Xeon Gold 6240R, 2.40 GHz)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPECspeed®2017_int_base</strong></td>
<td>10.1</td>
</tr>
<tr>
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<td>CPU2017 License</td>
<td>55</td>
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<td>Test Sponsor</td>
<td>Dell Inc.</td>
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<td>Tested by</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Test Date</td>
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<td>Feb-2020</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Nov-2019</td>
</tr>
</tbody>
</table>

### General Notes (Continued)

- Built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

### Platform Notes

- BIOS settings:
  - Sub NUMA Cluster disabled
  - 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 disabled
  - CPU Interconnect Bus Link Power Management disabled
  - PCI ASPM L1 Link Power Management disabled
  - UPI Prefetch enabled
  - LLC Prefetch disabled
  - Dead Line LLC Alloc enabled
  - Directory AtoS disabled

- Sysinfo program /mnt/ramdisk/cpu2017/bin/sysinfo
  - Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011
  - Running on rhel-8-1-sut Thu Apr 23 11:42:16 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](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)`
  - `48 "processors"`
  - Core, 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 : 24`
    - `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 25 26 27 28 29`

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

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

**Dell Inc.**

PowerEdge R640 (Intel Xeon Gold 6240R, 2.40 GHz)

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<tr>
<th>CPU2017 License: 55</th>
<th>Test Date: Apr-2020</th>
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</table>

**SPECspeed®2017_int_base = 10.1**

**SPECspeed®2017_int_peak = 10.3**

---

**Platform Notes (Continued)**

- CPU(s): 48
- On-line CPU(s) list: 0-47
- Thread(s) per core: 1
- Core(s) per socket: 24
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6240R CPU @ 2.40GHz
- Stepping: 7
- CPU MHz: 3500.166
- 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): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46
- NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47
- 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 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 avx f16c rdrand lahf_lm ablp abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d arch_capabilities

```
proc/cpuinfo cache data
cache size : 36608 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 36 38 40 42 44 46
  - node 0 size: 192072 MB
  - node 0 free: 176184 MB
  - node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47

(Continued on next page)
Dell Inc.

PowerEdge R640 (Intel Xeon Gold 6240R, 2.40 GHz)

SPECspeed®2017_int_base = 10.1
SPECspeed®2017_int_peak = 10.3

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Apr-2020
Tested by: Dell Inc.
Hardware Availability: Feb-2020
Software Availability: Nov-2019

Platform Notes (Continued)

node 1 size: 193505 MB
node 1 free: 192435 MB
node distances:
node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
MemTotal: 394831808 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 rhel-8-1-sut 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:
    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 swapping barriers and __user
      pointer sanitization
    CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional,
      RSB filling

    run-level 3 Apr 23 11:34 last=5

    SPEC is set to: /mnt/ramdisk/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 225G 7.5G 218G 4% /mnt/ramdisk

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

Dell Inc.  
PowerEdge R640 (Intel Xeon Gold 6240R, 2.40 GHz)  

SPECspeed®2017_int_base = 10.1  
SPECspeed®2017_int_peak = 10.3

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

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

Platform Notes (Continued)

From /sys/devices/virtual/dmi/id  
BIOS: Dell Inc. 2.5.4 01/13/2020  
Vendor: Dell Inc.  
Product: PowerEdge R640  
Product Family: PowerEdge  
Serial: FPFXCH2  

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:  
10x 002C069D002C 18ASF2G72PDZ-2G9E1 16 GB 2 rank 2933  
4x 00AD00B300AD HMA82GR7CJR8N-WM 16 GB 2 rank 2933  
8x 00AD00B300AD HMA82GR7CJR8N-XN 16 GB 2 rank 3200  
2x 00AD063200AD HMA82GR7CJR8N-WM 16 GB 2 rank 2933  

(End of data from dmesg program)

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.  
-----------------------------------------------------------------------------  

==============================================================================  
| C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_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.  

(Continued on next page)
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CPU2017 License: 55
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Compiler Version Notes (Continued)

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

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

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

Dell Inc.

PowerEdge R640 (Intel Xeon Gold 6240R, 2.40 GHz)

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- 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

602.gcc_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: basepeak = yes

625.x264_s: basepeak = yes

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

**PowerEdge R640 (Intel Xeon Gold 6240R, 2.40 GHz)**

<table>
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#### SPECspeed®2017_int_base = 10.1

#### SPECspeed®2017_int_peak = 10.3

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### Peak Optimization Flags (Continued)

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 -gopenmp -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

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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: