### SPEC CPU®2017 Integer Speed Result

**Dell Inc.**  
(Test Sponsor: Dell Inc)  
PowerEdge R540 (Intel Xeon Silver 4214R, 2.40 GHz)  

**SPECspeed®2017_int_base = 9.56**  
**SPECspeed®2017_int_peak = 9.76**

<table>
<thead>
<tr>
<th>Test Sponsor: Dell Inc</th>
<th>Dell Inc.</th>
<th>Dell Inc.</th>
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</thead>
<tbody>
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<td>CPU2017 License: 55</td>
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<td>Tested by: Dell Inc.</td>
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<tr>
<td>Hardware Availability:</td>
<td>Apr-2020</td>
<td></td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Oct-2020</td>
<td>Jul-2020</td>
</tr>
</tbody>
</table>

#### Hardware

- **CPU Name:** Intel Xeon Silver 4214R  
- **Max MHz:** 3500  
- **Nominal:** 2400  
- **Enabled:** 24 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:** 16.5 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)  
- **Storage:** 1 x 480 GB SATA SSD  
- **Other:** None

#### Software

- **OS:** Red Hat Enterprise Linux 8.2  
  - kernel 4.18.0-193.el8.x86_64  
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux;  
  - Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux
- **Parallel:** Yes  
- **Firmware:** Version 2.8.1 released Jun-2020  
- **File System:** xfs  
- **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

#### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Value</th>
<th>Value</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
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<td>5.97</td>
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<tr>
<td>602.gcc_s</td>
<td>24</td>
<td>6.88</td>
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<td>605.mcf_s</td>
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<td>620.omnetpp_s</td>
<td>24</td>
<td>8.98</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>24</td>
<td>6.93</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>24</td>
<td>16.5</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>24</td>
<td>5.26</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>24</td>
<td>14.7</td>
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<tr>
<td>648.exchange2_s</td>
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<td>13.6</td>
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<td>657.xz_s</td>
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**SPECspeed®2017_int_base (9.56)**  
**SPECspeed®2017_int_peak (9.76)**

---

**Notes:**

- **Test Sponsor:** Dell Inc  
- **Hardware Availability:** Apr-2020  
- **Software Availability:** Oct-2020  
- **Test Date:** Oct-2020  
- **CPU Name:** Intel Xeon Silver 4214R  
- **Max MHz:** 3500  
- **Nominal:** 2400  
- **Enabled:** 24 cores, 2 chips  
- **Orderable:** 1.2 chips  
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- **L2:** 1 MB I+D on chip per core  
- **L3:** 16.5 MB I+D on chip per chip  
- **Other:** None  
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  - kernel 4.18.0-193.el8.x86_64  
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux;  
  - Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux
- **Parallel:** Yes  
- **Firmware:** Version 2.8.1 released Jun-2020  
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- **System State:** Run level 3 (multi-user)  
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- **Other:** jemalloc memory allocator V5.0.1  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
Results Table

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</table>

SPECspeed®2017_int_base = 9.56
SPECspeed®2017_int_peak = 9.76

Compiler Notes
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux. The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux.

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 = 
"/home/cpu2017-ic19.1u1/lib/intel64:/home/cpu2017-ic19.1u1/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
General Notes

Binaries compiled on a system with 1x Intel Core i9–7980XE 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
runcpu command invoked through numactl i.e.:
umactl --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:
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 /home/cpu2017-ic19.1u1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed8e6e46a485a0011
running on RHEL-8-2-SUT Thu Oct 1 04:20:51 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

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

Dell Inc.
(Test Sponsor: Dell Inc)
PowerEdge R540 (Intel Xeon Silver 4214R, 2.40 GHz)

SPECspeed®2017_int_base = 9.56
SPECspeed®2017_int_peak = 9.76

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

Platform Notes (Continued)

model name : Intel(R) Xeon(R) Silver 4214R CPU @ 2.40GHz
  2 "physical id"s (chips)
  24 "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 : 12
siblings : 12
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 24
  On-line CPU(s) list: 0-23
  Thread(s) per core: 1
  Core(s) per socket: 12
  Socket(s): 2
  NUMA node(s): 2
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 85
  Model name: Intel(R) Xeon(R) Silver 4214R CPU @ 2.40GHz
  Stepping: 7
  CPU MHz: 1000.651
  CPU max MHz: 3500.0000
  CPU min MHz: 1000.0000
  BogoMIPS: 4800.00
  Virtualization: VT-x
  L1d cache: 32K
  L1i cache: 32K
  L2 cache: 1024K
  L3 cache: 16896K
  NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22
  NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23
  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
  aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
  xtrm pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
  avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdcp_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 xsaves xsavec xsavec xsavec cqm_llc cqm_occup_llc cqm_mbm_total
  cqm_mbm_local dtherm ida arat pls pku ospke avx512_vni md_clear flush_l1d

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

Dell Inc.  
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Silver 4214R, 2.40 GHz)

SPECspeed®2017_int_base = 9.56
SPECspeed®2017_int_peak = 9.76

CPU2017 License: 55  
Test Date: Oct-2020
Test Sponsor: Dell Inc  
Hardware Availability: Jul-2020
Tested by: Dell Inc.  
Software Availability: Apr-2020

Platform Notes (Continued)

    arch_capabilities

    /proc/cpuinfo cache data
       cache size : 16896 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
    node 0 size: 192047 MB
    node 0 free: 191497 MB
    node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23
    node 1 size: 193532 MB
    node 1 free: 192600 MB
    node distances:
    node 0 1
    0: 10 21
    1: 21 10

    From /proc/meminfo
    MemTotal: 394834032 kB
    HugePages_Total: 0
    Hugepagesize: 2048 kB

    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)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

    uname -a:
    Linux RHEL-8-2-SUT 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:

    itlb_multihit: KVM: Vulnerable
    CVE-2018-3620 (L1 Terminal Fault): Not affected
    Microarchitectural Data Sampling: Not affected

    (Continued on next page)
Dell Inc.
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Silver 4214R, 2.40 GHz)

SPEC CPU®2017 Integer Speed Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

SPECspeed®2017_int_base = 9.56
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CPU2017 License: 55
Test Sponsor: Dell Inc
Test Date: Oct-2020

Software Availability: Apr-2020

Platform Notes (Continued)

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
tsx_async_abort: Mitigation: Clear CPU buffers; SMT disabled

run-level 3 Oct 1 04:19 last=5

SPEC is set to: /home/cpu2017-ic19.1u1

Filesysterm Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 392G 7.1G 385G 2% /home

From /sys/devices/virtual/dmi/id
BIOS: Dell Inc. 2.8.1 06/30/2020
Vendor: Dell Inc.
Product: PowerEdge R540
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:
1x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
6x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
5x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
4x Not Specified

Compiler Version Notes

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

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

----------------------------------------------------------
C       | 600.perlbench_s(peak)
----------------------------------------------------------
(Continued on next page)
Dell Inc.  
(Test Sponsor: Dell Inc) 

PowerEdge R540 (Intel Xeon Silver 4214R, 2.40 GHz)  

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<td>Software Availability: Apr-2020</td>
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**SPEC CPU®2017 Integer Speed Result**  
Copyright 2017-2020 Standard Performance Evaluation Corporation  

| SPECspeed®2017_int_base = 9.56 | SPECspeed®2017_int_peak = 9.76 |

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**Compiler Version Notes (Continued)**

```plaintext
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.1.1.217 Build 20200306  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

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

```
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

```
C       | 600.perlbench_s(peak)
```

```
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.1.1.217 Build 20200306  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

```
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
```

```
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304  
Copyright (C) 1985-2020 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 19.1.1.217 Build 20200306  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

---

**Base Compiler Invocation**

C benchmarks: 
```
icc
```
SPEC CPU®2017 Integer Speed Result

Dell Inc.  
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Silver 4214R, 2.40 GHz)

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SPECspeed®2017_int_base = 9.56  
SPECspeed®2017_int_peak = 9.76

Base Compiler Invocation (Continued)

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 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX512
-O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-mbranches-within-32B-boundaries
# SPEC CPU®2017 Integer Speed Result

**Dell Inc.**
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Silver 4214R, 2.40 GHz)

| SPECspeed®2017_int_base = 9.56 |
| SPECspeed®2017_int_peak = 9.76 |

| CPU2017 License: 55 | Test Date: Oct-2020 |
| Test Sponsor: Dell Inc | Hardware Availability: Jul-2020 |
| Tested by: Dell Inc. | Software Availability: Apr-2020 |

## Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

## Peak Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td><code>-DSPEC_LP64 -DSPEC_LINUX_X64</code></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td><code>-DSPEC_LP64(*) -DSPEC_LP64</code></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td><code>-DSPEC_LP64 -DSPEC_LINUX</code></td>
</tr>
<tr>
<td>625.x264_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>641.leela_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>657.xz_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
</tbody>
</table>

(*) Indicates a portability flag that was found in a non-portability variable.

## Peak Optimization Flags

C benchmarks:

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</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td><code>-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/usr/local/jemalloc64-5.0.1/lib -ljemalloc</code></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td><code>-m64 -qnextgen -std=c11 -fuse-ld=gold -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs -fprofile-generate(pass 1) -fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto -Ofast(pass1) -O3 -ffast-math -qopt-mem-layout-trans=4 -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc</code></td>
</tr>
</tbody>
</table>

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

Dell Inc.  
(Test Sponsor: Dell Inc)

PowerEdge R540 (Intel Xeon Silver 4214R, 2.40 GHz)

SPEC®2017_int_base = 9.56
SPEC®2017_int_peak = 9.76

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

Test Date: Oct-2020  
Hardware Availability: Jul-2020  
Software Availability: Apr-2020

Peak Optimization Flags (Continued)

605.mcf_s: basepeak = yes

625.x264_s: -m64 -qnextgen -std=c11
-W1, -plugin-opt=-x86-branches-within-32B-boundaries
-W1, -z, muldefs -xCORE-AVX512 -flto -O3 -ffast-math
-fuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes
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:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml

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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 2020-10-01 05:20:50-0400.
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