Dell Inc. PowerEdge R740xd (Intel Xeon Silver 4214R, 2.40 GHz)

SPECspeed®2017_int_base = 9.40
SPECspeed®2017_int_peak = 9.59

Hardware
CPU Name: Intel Xeon Silver 4214R
Max MHz: 3500
Nominal: 3500
Enabled: 24 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: 16.5 MB I+D on chip per chip
Other: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)
Storage: 1 x 960 GB SATA SSD
Other: None

Software
OS: Red Hat Enterprise Linux 8.1
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 2.7.1 released Feb-2020
File System: tmpfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Power Management: jemalloc memory allocator V5.0.1
BIOS set to prefer performance at the cost of additional power usage.
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>302</td>
<td>20.5</td>
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</table>

**SPECspeed®2017_int_base = 9.40**  
**SPECspeed®2017_int_peak = 9.59**

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

## 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 = 
    
"/dev/shm/cpu2017-ic19.1u1/lib/intel64:/dev/shm/cpu2017-ic19.1u1/je5.0.1-64"  
MALLOCP_CONF = "retain:true"  
OMP_STACKSIZE = "192M"
Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4214R, 2.40 GHz)

SPEC CPU®2017 Integer Speed Result

SPECspeed®2017_int_base = 9.40
SPECspeed®2017_int_peak = 9.59

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

Test Date: Jun-2020
Hardware Availability: Jul-2020
Software Availability: Jun-2020

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 numacl i.e.:
numacl --interleave=all runcpu <etc>
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
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 enabled
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 /dev/shm/cpu2017-ic19.1ul1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbble6e46a485a0011
running on localhost.localdomain Wed Jul 1 13:56:35 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

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

Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4214R, 2.40 GHz)

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

**SPECspeed®2017_int_base = 9.40**
**SPECspeed®2017_int_peak = 9.59**

**Test Date:** Jun-2020
**Hardware Availability:** Jul-2020
**Software Availability:** Jun-2020

**Platform Notes (Continued)**

From `/proc/cpuinfo`

- model name: Intel(R) Xeon(R) Silver 4214R CPU @ 2.40GHz
  - 2 "physical id"s (chips)
  - 48 "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: 24
    - 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): 48
- On-line CPU(s) list: 0-47
- Thread(s) per core: 2
- Core(s) per socket: 12
- Socket(s): 2
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Silver 4214R CPU @ 2.40GHz
- Stepping: 7
- CPU MHz: 1171.853
- 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): 0,4,8,12,16,20,24,28,32,36,40,44
- NUMA node1 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,45
- NUMA node2 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46
- NUMA node3 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,47
- Flags: fpu vme de pse tsc msr pae mce cmov
- pat pse36 clflush dts acpi mmx fxsr mmxset mmse sse2 ss ht tm pbe syscall nx pdpe1gb dts
- svm lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
- cpuidape perfmonf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
- xsave cap xsaveprec smep cmp_legacy xsavecap popcnt-descropt pmc Cheney Deadline_timer aes
- xsavecap f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
- invpcid_single intel_pwpin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
- flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ems invpcid rtm

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

PowerEdge R740xd (Intel Xeon Silver 4214R, 2.40 GHz)

| SPECspeed®2017_int_base = 9.40 |
| SPECspeed®2017_int_peak = 9.59 |

**Platform Notes (Continued)**

cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl ssxveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbml_total
cqm_mbml_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d
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: 4 nodes (0-3)
node 0 cpus: 0 4 8 12 16 20 24 28 32 36 40 44
node 0 size: 192048 MB
node 0 free: 191249 MB
node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45
node 1 size: 193533 MB
node 1 free: 192759 MB
node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46
node 2 size: 193533 MB
node 2 free: 184048 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47
node 3 size: 193532 MB
node 3 free: 193282 MB
node distances:
node 0 1 2 3
0:  10 21 11 21
1:  21 10 21 11
2:  11 21 10 21
3:  21 11 21 10

From /proc/meminfo
MemTotal:    791191964 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)
<table>
<thead>
<tr>
<th>SPEC CPU®2017 Integer Speed Result</th>
</tr>
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</table>

**Dell Inc.**  
PowerEdge R740xd (Intel Xeon Silver 4214R, 2.40 GHz)  

<table>
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<td>Dell Inc.</td>
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**SPECspeed®2017_int_base = 9.40**  
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<th>Test Date</th>
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<th>Software Availability</th>
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</table>

**Platform Notes (Continued)**

```plaintext
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:

- 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 sanitation
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Jun 30 12:46

SPEC is set to: /dev/shm/cpu2017-ic19.1u1
  Filesystem   Type   Size  Used  Avail Use% Mounted on
  tmpfs        tmpfs  378G  4.2G  374G   2% /dev/shm

From /sys/devices/virtual/dmi/id
  BIOS:    Dell Inc. 2.7.1 02/14/2020
  Vendor:  Dell Inc.
  Product: PowerEdge MX740c
  Product Family: PowerEdge
  Serial:  1234567

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:
  21x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
  1x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
  2x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933

(End of data from sysinfo program)
```

**Compiler Version Notes**

```
C  | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
```

(Continued on next page)
## Compiler Version Notes (Continued)

<table>
<thead>
<tr>
<th></th>
<th>625.x264_s(base, peak) 657.xz_s(base, peak)</th>
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<tbody>
<tr>
<td>Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304</td>
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<th>648.exchange2_s(base, peak)</th>
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<tr>
<td>Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306</td>
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(Continued on next page)
Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4214R, 2.40 GHz)

SPECspeed®2017_int_base = 9.40
SPECspeed®2017_int_peak = 9.59

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 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -ftlo -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 -ftlo -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

(Continued on next page)
Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4214R, 2.40 GHz)

SPEC®2017 Integer Speed Result

SPECspeed®2017_int_base = 9.40
SPECspeed®2017_int_peak = 9.59

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

GHz)

Test Sponsor: Dell Inc.
Tested by: Dell Inc.

CPU2017 License: 55

Test Date: Jun-2020
Hardware Availability: Jul-2020
Software Availability: Jun-2020

Base Optimization Flags (Continued)

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

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Peak Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64 -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64
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

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

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
- xCORE-AVX512 -ipo -O3 -no-prec-div

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

Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4214R, 2.40 GHz)

SPECspeed®2017_int_base = 9.40
SPECspeed®2017_int_peak = 9.59

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

Test Date: Jun-2020
Hardware Availability: Jul-2020
Software Availability: Jun-2020

Peak Optimization Flags (Continued)

600.perlbench_s (continued):
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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

605.mcf_s: basepeak = yes

625.x264_s: -m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-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

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
SPEC CPU®2017 Integer Speed Result

Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4214R, 2.40 GHz)

| SPECspeed®2017_int_base = 9.40 |
| SPECspeed®2017_int_peak = 9.59 |

Dataset:

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

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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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