Dell Inc.

PowerEdge R540 (Intel Xeon Silver 4108, 1.80 GHz)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
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<tr>
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<td>605.mcf_s 32</td>
<td>9.06</td>
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<td>620.omnetpp_s 32</td>
<td>4.23</td>
<td>4.31</td>
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<tr>
<td>623.xalancbmk_s 32</td>
<td>7.55</td>
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<td>625.x264_s 32</td>
<td>8.13</td>
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<td>631.deepsjeng_s 32</td>
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<td>641.leela_s 32</td>
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<tr>
<td>648.exchange2_s 32</td>
<td>10.9</td>
<td>15.9</td>
</tr>
<tr>
<td>657.xz_s 32</td>
<td>16.4</td>
<td>16.4</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Silver 4108
- **Max MHz.:** 3000
- **Nominal:** 1800
- **Enabled:** 16 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:** 11 MB I+D on chip per chip
- **Other:** None
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

**Software**

- **OS:** Suse Linux Enterprise Server 12 SP3
- **Kernel:** 4.4.138-8.g8686768-default
- **Compiler:** C/C++: Version 18.0.2.20180210 of Intel C/C++ Compiler for Linux;
  Fortran: Version 18.0.2.20180210 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Version 1.4.8 released Jul-2018 tested as May-2018
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc memory allocator v5.0.1
SPEC CPU2017 Integer Speed Result

Dell Inc.

PowerEdge R540 (Intel Xeon Silver 4108, 1.80 GHz)

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

Test Date: Aug-2018
Hardware Availability: May-2018
Software Availability: Apr-2018

Results Table

<table>
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<tr>
<th>Benchmark</th>
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</table>

SPECspeed2017_int_base = 6.86
SPECspeed2017_int_peak = 6.77

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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017_07202018/lib/ia32:/home/cpu2017_07202018/lib/intel64:
/home/cpu2017_07202018/jemalloc-5.0.1-32:/home/cpu2017_07202018/jemalloc-5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
Yes: 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
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.4, 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 enabled
- Uncore Frequency set to Dynamic
- Energy Efficiency Policy set to Performance
- Memory Patrol Scrub disabled
- Logical Processor enabled
- CPU Interconnect Bus Link Power Management disabled
- PCI ASPM L1 Link Power Management disabled
- Sysinfo program /home/cpu2017_07202018/bin/sysinfo
- Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
- running on linux-nh09 Fri Aug 24 00:46:35 2018

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) Silver 4108 CPU @ 1.80GHz
  2 "physical id"s (chips)
  32 "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 : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7
```

From lscpu:
```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4108 CPU @ 1.80GHz
Stepping: 4
```
Platform Notes (Continued)

CPU MHz: 1795.793
BogoMIPS: 3591.58
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31
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
aperfmpref eagerfpu 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
xsavex f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtherm intel_pt rsb_cts xsw spec_ctrl ssbd ibpb stibp retpoline kaiser tpr_shadow vmni
flexpriority ept vpid fsbsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx avx512f avx512dq rdseed adx smap ciflushopt clwb avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc pku ospke

/proc/cpuinfo cache data
  cache size : 11264 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
  node 0 size: 95348 MB
  node 0 free: 94855 MB
  node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
  node 1 size: 96746 MB
  node 1 free: 96301 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 196705556 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
  SUSE Linux Enterprise Server 12 SP3

From /etc/*release* /etc/*version*
  SuSE-release:
Dell Inc.

PowerEdge R540 (Intel Xeon Silver 4108, 1.80 GHz)

SPEC CPU2017 Integer Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECspeed2017_int_base = 6.86
SPECspeed2017_int_peak = 6.77

CPU2017 License: 55
Test Sponsor: Dell Inc.
Hardware Availability: May-2018
Test Date: Aug-2018
Tested by: Dell Inc.
Software Availability: Apr-2018

Platform Notes (Continued)

SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 3
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.
os-release:
  NAME="SLES"
  VERSION="12-SP3"
  VERSION_ID="12.3"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
  Linux linux-nh09 4.4.138-8.g8686768-default #1 SMP Mon Jun 25 17:25:25 UTC 2018
  (g8686768) x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Aug 24 00:46 last=5

SPEC is set to: /home/cpu2017_07202018
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda3 xfs 929G 32G 897G 4% /

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 SMIBIOS" standard.
BIOS Dell Inc. 1.4.8 05/22/2018
Memory:
  12x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666, configured at 2400
  4x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)
    657.xz_s(base)
==============================================================================

(Continued on next page)
# SPEC CPU2017 Integer Speed Result

**Dell Inc.**

PowerEdge R540 (Intel Xeon Silver 4108, 1.80 GHz)  

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<td>55</td>
<td>Aug-2018</td>
<td>Dell Inc.</td>
<td>May-2018</td>
<td>Dell Inc.</td>
<td>Apr-2018</td>
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</table>

## Compiler Version Notes (Continued)

```plaintext
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CC 600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 625.x264_s(peak)
657.xz_s(peak)

icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
641.leela_s(base)

icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CXXC 620.omnetpp_s(peak) 623.xalancbmk_s(peak) 631.deepsjeng_s(peak)
641.leela_s(peak)

icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC 648.exchange2_s(base)

ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC 648.exchange2_s(peak)

ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```
Dell Inc.

PowerEdge R540 (Intel Xeon Silver 4108, 1.80 GHz)

SPEC CPU2017 Integer Speed Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECspeed2017_int_base = 6.86
SPECspeed2017_int_peak = 6.77

C benchmarks:
icc -m64 -std=c11

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_p: -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:
-W1, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-W1, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-W1, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-L/usr/local/je5.0.1-64/lib -ljemalloc
SPEC CPU2017 Integer Speed Result

Dell Inc.

PowerEdge R540 (Intel Xeon Silver 4108, 1.80 GHz)

SPECspeed2017_int_base = 6.86
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Aug-2018
Hardware Availability: May-2018
Software Availability: Apr-2018

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks (except as noted below):
icpc -m64

623.xalancbmk: icpc -m32 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

Peak 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: -D_FILE_OFFSET_BITS=64 -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

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX2 -qopt-prefetch -ipo -O3
-qopt-mem-layout-trans=3 -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-AVX2 -qopt-prefetch -ipo -O3
-qopt-mem-layout-trans=3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

(Continued on next page)
Peak Optimization Flags (Continued)

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264_s: Same as 602.gcc_s

657.xz_s: Same as 602.gcc_s

C++ benchmarks:

620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

623.xalancbmk_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-32/lib -ljemalloc

631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: Same as 620.omnetpp_s

Fortran benchmarks:

-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

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-ic18.0-official-linux64.2017-12-21.xml

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