Dell Inc.

PowerEdge R840 (Intel Xeon Gold 6140, 2.30 GHz)

SPECrate2017_int_base = 185
SPECrate2017_int_peak = 196

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

Hardware

CPU Name: Intel Xeon Gold 6140
Max MHz.: 3700
Nominal: 2300
Enabled: 36 cores, 2 chips, 2 threads/core
Orderable: 2,4 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 24.75 MB I+D on chip per chip
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 1 TB SATA 7200 RPM
Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP3
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++
Compiler for Linux:
Fortran: Version 18.0.0.128 of Intel Fortran
Compiler for Linux:
Firmware: Version 1.0.0 released Mar-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc memory allocator library, version 5.0.1
SPEC CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Dell Inc.
PowerEdge R840 (Intel Xeon Gold 6140, 2.30 GHz)

SPECrater2017_int_base = 185
SPECrater2017_int_peak = 196

Results Table

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<td>548.exchange2_r</td>
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</tr>
</tbody>
</table>

SPECrater2017_int_base = 185
SPECrater2017_int_peak = 196

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"

General Notes

Environment variables set by runcpu before the start of the run:

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.
jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets; jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5; jemalloc: sources available via jemalloc.net
Transparent Huge Pages enabled by default
Prior to runcpu invocation

(Continued on next page)
### General Notes (Continued)

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>
```

### 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 disabled
- Logical Processor enabled
- CPU Interconnect Bus Link Power Management disabled
- PCI ASPM L1 Link Power Management disabled
- Sysinfo program /root/cpu2017/bin/sysinfo
- Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
- running on linux-jfwh Fri Mar 30 10:58:32 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) Gold 6140 CPU @ 2.30GHz
  2  "physical id"s (chips)
  72  "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
```

From lscpu:
```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 2
```

(Continued on next page)
**SPEC CPU2017 Integer Rate Result**

**Dell Inc.**

PowerEdge R840 (Intel Xeon Gold 6140, 2.30 GHz)

<table>
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</table>

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Mar-2018
Hardware Availability: May-2018
Software Availability: Sep-2017

**Platform Notes (Continued)**

- **Core(s) per socket:** 18
- **Socket(s):** 2
- **NUMA node(s):** 2
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz
- **Stepping:** 4
- **CPU MHz:** 2294.634
- **BogoMIPS:** 4589.26
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 25344K
- **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, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70
- **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, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71
- **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 aperfmperf eagerfpu pni pclmulqdq dtss64 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 abm 3dnowprefetch ida arat epb invpcid_single pln pts dtherm intel_pt rsb_ctxs spec_ctrl retpoline kaiser trp_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ertms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1 cmq_llc cmq_occup_llc pk uospke

```
/proc/cpuinfo cache data
  cache size : 25344 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 48 50 52 54 56 58 60 62 64 66 68 70
- **node 0 size:** 192114 MB
- **node 0 free:** 191650 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 49 51 53 55 57 59 61 63 65 67 69 71
- **node 1 size:** 193514 MB
- **node 1 free:** 193114 MB
- **node distances:**
Dell Inc.

PowerEdge R840 (Intel Xeon Gold 6140, 2.30 GHz)

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Tested by: Dell Inc.

Test Date: Mar-2018
Hardware Availability: May-2018
Software Availability: Sep-2017

Platform Notes (Continued)

node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 394883872 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:
  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-jfwh 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 30 10:58
SPEC is set to: /root/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 415G 24G 392G 6% /

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.

BIOS Dell Inc. 1.0.0 03/20/2018
Memory:
12x 002C00B3002C 18ASF2G72PD2-2G6D1 16 GB 2 rank 2666
2x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
6x 00AD063200AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666

(Continued on next page)
## Dell Inc. PowerEdge R840 (Intel Xeon Gold 6140, 2.30 GHz)

<table>
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Test Date:** Mar-2018  
**Hardware Availability:** May-2018  
**Tested by:** Dell Inc.  
**Software Availability:** Sep-2017  

### Platform Notes (Continued)

4x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666  
24x Not Specified Not Specified  

(End of data from sysinfo program)

### Compiler Version Notes

```plaintext
==============================================================================
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)  
    525.x264_r(base, peak) 557.xz_r(base, peak)  
---------------------------------------------------------------
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  

==============================================================================
CC  500.perlbench_r(peak) 502.gcc_r(peak)  
---------------------------------------------------------------
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  

==============================================================================
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)  
    541.leela_r(base)  
---------------------------------------------------------------
icpc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  

==============================================================================
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)  
    541.leela_r(peak)  
---------------------------------------------------------------
icpc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  

==============================================================================
FC 548.exchange2_r(base, peak)  
---------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
```

---
SPEC CPU2017 Integer Rate Result

Dell Inc.
PowerEdge R840 (Intel Xeon Gold 6140, 2.30 GHz)

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Test Date: Mar-2018
Hardware Availability: May-2018
Software Availability: Sep-2017

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

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

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 -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc
## SPEC CPU2017 Integer Rate Result

### Dell Inc.

**PowerEdge R840 (Intel Xeon Gold 6140, 2.30 GHz)**

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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Mar-2018  
**Hardware Availability:** May-2018  
**Software Availability:** Sep-2017

### Base Other Flags

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

- **C++ benchmarks:**
  -m64

- **Fortran benchmarks:**
  -m64

### Peak Compiler Invocation

- **C benchmarks:**
  icc

- **C++ benchmarks:**
  icpc

- **Fortran benchmarks:**
  ifort

### Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64  
502.gcc_r: -D_FILE_OFFSET_BITS=64  
505.mcf_r: -DSPEC_LP64  
520.omnetpp_r: -DSPEC_LP64  
523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX  
525.x264_r: -DSPEC_LP64  
531.deepsjeng_r: -DSPEC_LP64  
541.leela_r: -DSPEC_LP64  
548.exchange2_r: -DSPEC_LP64  
557.xz_r: -DSPEC_LP64

### Peak Optimization Flags

- **C benchmarks:**
  500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
  -xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3  
  -fno-strict-overflow -L/usr/local/je5.0.1-64/lib

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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Tested by: Dell Inc.
Software Availability: Sep-2017

Test Date: Mar-2018

Peak Optimization Flags (Continued)

500.perlbench_r (continued):
-1jemalloc

502.gcc_r: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-W1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -1jemalloc

505.mcf_r: -W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib
-1jemalloc

525.x264_r: -W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -fno-alias
-L/usr/local/je5.0.1-64/lib -1jemalloc

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: -W1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-64/lib -1jemalloc

523.xalancbmk_r: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-W1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -1jemalloc

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

Fortran benchmarks:

-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -1jemalloc

Peak Other Flags

C benchmarks (except as noted below):
-m64 -std=c11

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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Software Availability: Sep-2017

Peak Other Flags (Continued)

502.gcc_r: -m32 -std=c11

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

523.xalancbmk_r: -m32

Fortran benchmarks:
- m64

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 CPU2017 v1.0.2 on 2018-03-29 22:58:31-0400.
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