## SPEC® CPU2017 Floating Point Rate Result

**Dell Inc.**

PowerEdge FC640 (Intel Xeon Platinum 8160, 2.10 GHz)

<table>
<thead>
<tr>
<th>Software Availability: Sep-2017</th>
<th>Test Date: Dec-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License: 55</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Test Sponsor: Dell Inc.</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by: Dell Inc.</td>
<td>Dell Inc.</td>
</tr>
</tbody>
</table>

### SPECrate2017_fp_base = 200

### SPECrate2017_fp_peak = Not Run

<table>
<thead>
<tr>
<th>Software</th>
<th>CPU Name: Intel Xeon Platinum 8160</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS:</td>
<td>SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.16-56-default</td>
</tr>
<tr>
<td>Compiler:</td>
<td>Version 18.0.0.128 of Intel C/C++</td>
</tr>
<tr>
<td>Compiler for Linux:</td>
<td></td>
</tr>
<tr>
<td>Fortran:</td>
<td>Version 18.0.0.128 of Intel Fortran</td>
</tr>
<tr>
<td>Compiler for Linux:</td>
<td></td>
</tr>
<tr>
<td>Parallel:</td>
<td>No</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 1.0.0 released Aug-2017</td>
</tr>
<tr>
<td>File System:</td>
<td>btrfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage:</td>
<td>960 GB SATA SSD</td>
</tr>
<tr>
<td>Other:</td>
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### Benchmarks

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Rate (SPEC)</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>96</td>
<td>183</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>96</td>
<td>183</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>96</td>
<td>178</td>
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<tr>
<td>510.parest_r</td>
<td>96</td>
<td>262</td>
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<tr>
<td>511.povray_r</td>
<td>96</td>
<td>110</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>96</td>
<td>203</td>
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<tr>
<td>521.wrf_r</td>
<td>96</td>
<td>241</td>
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<td>522.blender_r</td>
<td>96</td>
<td>139</td>
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<tr>
<td>527.cam4_r</td>
<td>96</td>
<td>320</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>96</td>
<td>371</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
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</tr>
</tbody>
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**Note:** The SPECrate2017_fp_base and SPECrate2017_fp_peak results are reported based on the available specifications and benchmarks.
SPEC CPU2017 Floating Point Rate Result

Dell Inc.
PowerEdge FC640 (Intel Xeon Platinum 8160, 2.10 GHz)

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
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<tr>
<td>508.namd_r</td>
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</tr>
</tbody>
</table>

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
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.:
numactl --interleave=all runcpu <etc>
No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

Dell Inc.
PowerEdge FC640 (Intel Xeon Platinum 8160, 2.10 GHz)

SPECrate2017_fp_base = 200
SPECrate2017_fp_peak = Not Run

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

General Notes (Continued)

No: 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.
No: 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

Platform Notes

BIOS settings:
Virtualization Technology disabled
System Profile set to Custom
CPU Power Management set to Maximum Performance
Memory Frequency set to Maximum Performance
Turbo Boost enabled
C States disabled
Memory Patrol Scrub disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /root/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-u8yg Wed Dec 13 03:18:25 2017

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) Platinum 8160 CPU @ 2.10GHz
            2 "physical id"s (chips)
            96 "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 : 24
siblings : 48

(Continued on next page)
### Dell Inc.
PowerEdge FC640 (Intel Xeon Platinum 8160, 2.10 GHz)

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#### CPU2017 License:
55

#### Test Sponsor:
Dell Inc.

#### Tested by:
Dell Inc.

#### Test Date:
Dec-2017

#### Hardware Availability:
Sep-2017

#### Software Availability:
Sep-2017

---

**Platform Notes (Continued)**

```
physical 0: cores 0 1 2 3 4 5 8 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 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
```

From `lscpu`:
```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 2
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) Platinum 8160 CPU @ 2.10GHz
Stepping: 4
CPU MHz: 2100.098
BogoMIPS: 4200.19
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 33792K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72,74,76,78,80,82,84,86,88,90,92,94
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59,61,63,65,67,69,71,73,75,77,79,81,83,85,87,89,91,93,95
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 aperfmperf 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 xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epbi epb pni pclmulqdq dtes64_64bit smmx smep msr_drm ioport stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 iplei invpcid rtm cqm mpx avx512f avx512dav1 rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vnni xsaves opt xsaveopt xsavec xgetbv1 cvm_llc cvm_occupa llc
```

/proc/cpuinfo cache data
```
cache size : 33792 KB
```

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a physical chip.
```
available: 2 nodes (0-1)
```

(Continued on next page)
Dell Inc.
PowerEdge FC640 (Intel Xeon Platinum 8160, 2.10 GHz)

SPECrate2017_fp_base = 200
SPECrate2017_fp_peak = Not Run

CPU2017 License: 55
Test Sponsor: Dell Inc.
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Hardware Availability: Sep-2017
Software Availability: Sep-2017

Platform Notes (Continued)

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 72 74 76 78 80 82 84 86 88 90 92 94
node 0 size: 95341 MB
node 0 free: 94767 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 73 75 77 79 81 83 85 87 89 91 93 95
node 1 size: 96736 MB
node 1 free: 96185 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 196687636 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# 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-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME=cpe:/o:suse:sles:12:sp2"

uname -a:
Linux linux-u8yg 4.4.16-56-default #1 SMP Mon Aug 8 14:24:26 UTC 2016 (5b281a8) x86_64
x86_64 x86_64 GNU/Linux

run-level 3 Dec 13 03:15

SPEC is set to: /root/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda1 btrfs 921G 34G 887G 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

(Continued on next page)
Platform Notes (Continued)

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
BIOS Dell Inc. 1.0.0 08/10/2017
Memory:
  12x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
  4x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
 CC  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
 icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CXXC 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CC  511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  507.cactuBSSN_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
(Continued on next page)
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</tbody>
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**SPECrate2017_fp_base = 200**
**SPECrate2017_fp_peak = Not Run**

---

**Compiler Version Notes (Continued)**

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

---

CC  521.wrf_r(base) 527.cam4_r(base)

**Base Compiler Invocation**

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

---

**Base Portability Flags**

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian

(Continued on next page)
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---

**Base Portability Flags (Continued)**

526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

---

**Base Optimization Flags**

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -nostandard-realloc-lhs  
-align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -nostandard-realloc-lhs  
-align array32byte

Benchmarks using both C and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -nostandard-realloc-lhs  
-align array32byte

---

**Base Other Flags**

C benchmarks:
-m64 -std=c11

(Continued on next page)
Dell Inc.
PowerEdge FC640 (Intel Xeon Platinum 8160, 2.10 GHz)

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SPECrate2017_fp_base = 200
SPECrate2017_fp_peak = Not Run

Base Other Flags (Continued)

C++ benchmarks:
- m64

Fortran benchmarks:
- m64

Benchmarks using both Fortran and C:
- m64 -std=c11

Benchmarks using both C and C++:
- m64 -std=c11

Benchmarks using Fortran, C, and C++:
- m64 -std=c11

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 2017-12-13 04:18:25-0500.
Originally published on 2018-02-27.