## SPEC® CPU2017 Floating Point Rate Result

### Dell Inc.

PowerEdge FC640 (Intel Xeon Silver 4112, 2.60 GHz)

| SPECrate2017_fp_base = | 51.2 |
| SPECrate2017_fp_peak = | Not Run |

```
Dell Inc. 
PowerEdge FC640 (Intel Xeon Silver 4112, 2.60 GHz)

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.
Test Date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017
```

### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Silver 4112</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>3000</td>
</tr>
<tr>
<td>Nominal</td>
<td>2600</td>
</tr>
<tr>
<td>Enabled</td>
<td>8 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td></td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td></td>
<td>8.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)</td>
</tr>
<tr>
<td>Storage</td>
<td>960 GB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 12 SP3 (x86_64) 4.4.70-2-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>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</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>
</tr>
</tbody>
</table>

| Copies | 503.bwaves_r | 16 |
|        | 507.cactuBSSN_r | 16 |
|        | 508.namd | 16 |
|        | 510.parest | 16 |
|        | 511.povray | 16 |
|        | 519.lbm | 16 |
|        | 521.wrf | 16 |
|        | 526.blender | 16 |
|        | 527.cam4 | 16 |
|        | 538.imagick | 16 |
|        | 544.nab | 16 |
|        | 549.fotonik3d | 16 |
|        | 554.roms | 16 |

```
<table>
<thead>
<tr>
<th>SPECrate2017_fp_base (51.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>503.bwaves_r</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
</tr>
<tr>
<td>508.namd</td>
</tr>
<tr>
<td>510.parest</td>
</tr>
<tr>
<td>511.povray</td>
</tr>
<tr>
<td>519.lbm</td>
</tr>
<tr>
<td>521.wrf</td>
</tr>
<tr>
<td>526.blender</td>
</tr>
<tr>
<td>527.cam4</td>
</tr>
<tr>
<td>538.imagick</td>
</tr>
<tr>
<td>544.nab</td>
</tr>
<tr>
<td>549.fotonik3d</td>
</tr>
<tr>
<td>554.roms</td>
</tr>
</tbody>
</table>
```
Dell Inc.

PowerEdge FC640 (Intel Xeon Silver 4112, 2.60 GHz)

SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECrate2017_fp_base = 51.2
SPECrate2017_fp_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>16</td>
<td>715</td>
<td>224</td>
<td>717</td>
<td>224</td>
<td>715</td>
<td>224</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>16</td>
<td>517</td>
<td>39.1</td>
<td>514</td>
<td>39.4</td>
<td>517</td>
<td>39.2</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>16</td>
<td>452</td>
<td>33.6</td>
<td>446</td>
<td>34.1</td>
<td>454</td>
<td>33.5</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>16</td>
<td>1066</td>
<td>39.3</td>
<td>1064</td>
<td>39.4</td>
<td>1076</td>
<td>38.9</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>16</td>
<td>682</td>
<td>54.7</td>
<td>681</td>
<td>54.8</td>
<td>682</td>
<td>54.8</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>16</td>
<td>448</td>
<td>37.6</td>
<td>447</td>
<td>37.7</td>
<td>445</td>
<td>37.9</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>16</td>
<td>686</td>
<td>52.3</td>
<td>715</td>
<td>50.1</td>
<td>706</td>
<td>50.7</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>16</td>
<td>530</td>
<td>46.0</td>
<td>533</td>
<td>45.7</td>
<td>531</td>
<td>45.9</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>16</td>
<td>750</td>
<td>37.3</td>
<td>746</td>
<td>37.5</td>
<td>751</td>
<td>37.3</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>16</td>
<td>591</td>
<td>67.3</td>
<td>591</td>
<td>67.3</td>
<td>591</td>
<td>67.3</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>16</td>
<td>460</td>
<td>58.5</td>
<td>458</td>
<td>58.8</td>
<td>459</td>
<td>58.7</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>16</td>
<td>1074</td>
<td>58.0</td>
<td>1076</td>
<td>58.0</td>
<td>1073</td>
<td>58.1</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>16</td>
<td>736</td>
<td>34.5</td>
<td>734</td>
<td>34.6</td>
<td>735</td>
<td>34.6</td>
</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 sync 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)
Dell Inc.

PowerEdge FC640 (Intel Xeon Silver 4112, 2.60 GHz)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>51.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**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-bek4 Sat Oct 28 05:09:37 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) Silver 4112 CPU @ 2.60GHz
  2 "physical id"s (chips)
  16 "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 : 4
siblings : 8
```

(Continued on next page)
Dell Inc.

PowerEdge FC640 (Intel Xeon Silver 4112, 2.60 GHz)

SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge FC640 (Intel Xeon Silver 4112, 2.60 GHz)

SPECrate2017_fp_base = 51.2
SPECrate2017_fp_peak = Not Run

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

Test Date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Platform Notes (Continued)

physical 0: cores 1 2 4 5
physical 1: cores 1 2 4 5

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4112 CPU @ 2.60GHz
Stepping: 4
CPU MHz: 2600.122
BogoMIPS: 5200.24
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 8448K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15
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 xptr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsogcdeadlnetime aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb pln pts dtherm intel_pt
otr_shard vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
ermvivpcid rtm cmp mxv axv512f avx512d qdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occu1_llc pku ospke

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
node 0 size: 95341 MB
node 0 free: 94849 MB
node 1 cpus: 1 3 5 7 9 11 13 15

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

Dell Inc.

PowerEdge FC640 (Intel Xeon Silver 4112, 2.60 GHz)

SPECrate2017_fp_base = 51.2
SPECrate2017_fp_peak = Not Run

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

Test Date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Platform Notes (Continued)

node 1 size: 96736 MB
node 1 free: 96260 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 196687956 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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-bek4 4.4.70-2-default #1 SMP Wed Jun 7 15:12:06 UTC 2017 (4502c76) x86_64 x86_64 GNU/Linux

run-level 3 Oct 14 03:24

SPEC is set to: /root/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda7 btrfs 855G 25G 831G 3% /

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 08/10/2017
Memory:
12x 002C00B3002C 18ASF2G72PD2-2G6D1 16 GB 2 rank 2666, configured at 2400
4x Not Specified Not Specified

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

**Dell Inc.**

PowerEdge FC640 (Intel Xeon Silver 4112, 2.60 GHz)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>51.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

### Platform Notes (Continued)

(End of data from sysinfo program)

### Compiler Version Notes

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

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

**Dell Inc.**

**PowerEdge FC640 (Intel Xeon Silver 4112, 2.60 GHz)**

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>51.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Oct-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability</td>
<td>Sep-2017</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Sep-2017</td>
</tr>
</tbody>
</table>

### Compiler Version Notes (Continued)

<table>
<thead>
<tr>
<th>CC 521.wrf_r(base) 527.cam4_r(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifort (IFORT) 18.0.0 20170811</td>
</tr>
<tr>
<td>Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>icc (ICC) 18.0.0 20170811</td>
</tr>
<tr>
<td>Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
</tr>
</tbody>
</table>

### 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
- 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-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`

**C++ benchmarks:**
- `-xCORE-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`

**Fortran benchmarks:**
- `-xCORE-AVX2`  
- `-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-AVX2`  
- `-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-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`

**Benchmarks using Fortran, C, and C++:**
- `-xCORE-AVX2`  
- `-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`

**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`
Dell Inc.

PowerEdge FC640 (Intel Xeon Silver 4112, 2.60 GHz)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>51.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by</td>
<td>Dell Inc.</td>
</tr>
</tbody>
</table>

Test Date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

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:

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2017-10-28 06:09:37-0400.
Originally published on 2018-02-27.