**CPU2017 Floating Point Speed Result**

**Dell Inc.**

**PowerEdge FC640 (Intel Xeon Gold 6146, 3.20 GHz)**

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

**SPECspeed2017_fp_base = 102**  
**SPECspeed2017_fp_peak = Not Run**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base (102)</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td></td>
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<tr>
<td>48</td>
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<tr>
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<tr>
<td>48</td>
<td></td>
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<tr>
<td>48</td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6146  
- **Max MHz.:** 4200  
- **Nominal:** 3200  
- **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:** 24.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)  
- **Storage:** 960 Gb SATA SSD  
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 12 SP3 (x86_64)  
- **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  
- **Parallel:** Yes  
- **Firmware:** Version 1.0.0 released Aug-2017  
- **File System:** btrfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None
Dell Inc.

PowerEdge FC640 (Intel Xeon Gold 6146, 3.20 GHz)

CPU2017 License: 55
Test Sponsor: Dell Inc.
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tr>
<td>603.bwaves_s</td>
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<td>137</td>
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<td>137</td>
<td>122</td>
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<td>627.cam4_s</td>
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<td>85.1</td>
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<td>103</td>
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<td>628.pop2_s</td>
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<td>201</td>
<td>59.0</td>
<td>203</td>
<td>58.6</td>
<td>204</td>
<td>58.1</td>
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<td>638.imagick_s</td>
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<td>164</td>
<td>88.1</td>
<td>164</td>
<td>88.2</td>
<td>164</td>
<td>88.1</td>
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<td>644.nab_s</td>
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<td>190</td>
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<td>91.9</td>
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<td>649.fotonik3d_s</td>
<td>48</td>
<td>116</td>
<td>78.5</td>
<td>117</td>
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<td>654.roms_s</td>
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<td>141</td>
<td>112</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 102
SPECspeed2017_fp_peak = Not Run

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,compact"
OMP_STACKSIZE = "192M"

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
No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
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 (Continued on next page)
**SPEC CPU2017 Floating Point Speed Result**

*Dell Inc.*

PowerEdge FC640 (Intel Xeon Gold 6146, 3.20 GHz)

| SPECsweep2017_fp_base | 102 |
| SPECsweep2017_fp_peak  | Not Run |

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

---

**General Notes (Continued)**

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 96c45e4568ad54c135fd618bce091c0f  
  Running on linux-bek4 Thu Nov 16 06:50:53 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) Gold 6146 CPU @ 3.20GHz
  - 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 3 4 5 6 7 16 18 19 20 21 22
    - physical 1: cores 0 1 2 3 9 10 16 18 19 24 26 27

  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

(Continued on next page)
Dell Inc. PowerEdge FC640 (Intel Xeon Gold 6146, 3.20 GHz)  

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

SPECspeed2017_fp_base = 102  SPECspeed2017_fp_peak = Not Run

**Platform Notes (Continued)**

Core(s) per socket: 12  
Socket(s): 2  
NUMA node(s): 2  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Gold 6146 CPU @ 3.20GHz  
Stepping: 4  
CPU MHz: 3200.144  
BogoMIPS: 6400.28  
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  
NUMA node0 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  
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 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 epb pni pts dtherm intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  
erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_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 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
node 0 size: 95341 MB
node 0 free: 92006 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
node 1 size: 96736 MB
node 1 free: 95245 MB
node distances:
node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo

(Continued on next page)
**SPEC CPU2017 Floating Point Speed Result**

<table>
<thead>
<tr>
<th>Dell Inc.</th>
<th>SPECspeed2017_fp_base = 102</th>
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<tbody>
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<td>PowerEdge FC640 (Intel Xeon Gold 6146, 3.20 GHz)</td>
<td>SPECspeed2017_fp_peak = Not Run</td>
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</tbody>
</table>

<table>
<thead>
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<th>Test Date: Nov-2017</th>
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<tbody>
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<td>Hardware Availability: Sep-2017</td>
</tr>
<tr>
<td>Tested by: Dell Inc.</td>
<td>Software Availability: Sep-2017</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

```
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 x86_64 GNU/Linux

run-level 3 Nov 16 04:25

SPEC is set to: /root/cpu2017
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda7 btrfs 855G 28G 828G 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 SMBIOS" standard.

  BIOS Dell Inc. 1.0.0 08/10/2017
  Memory:
    12x 002C00B3002C 18ASF2G72PD2-2G6D1 16 GB 2 rank 2666
    4x Not Specified Not Specified

(End of data from sysinfo program)
```

**Compiler Version Notes**

```
==============================================================================
<table>
<thead>
<tr>
<th>CC 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Continued on next page)</td>
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```
Dell Inc.

PowerEdge FC640 (Intel Xeon Gold 6146, 3.20 GHz)

CPU2017 License: 55
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SPEC CPU2017 Floating Point Speed Result

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SPECspeed2017_fp_base = 102
SPECspeed2017_fp_peak = Not Run

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

Compiler Version Notes (Continued)

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

--------------------------
FC 607.cactuBSSN_s(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 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
-------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

-------------------------------
CC 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
-------------------------------
ifort (IFORT) 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.

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort
## SPEC CPU2017 Floating Point Speed Result

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**PowerEdge FC640 (Intel Xeon Gold 6146, 3.20 GHz)**

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<th>Tested by</th>
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<th>SPECspeed2017_fp_peak</th>
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<tr>
<td>55</td>
<td>Dell Inc.</td>
<td>Dell Inc.</td>
<td>102</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**Test Date:** Nov-2017  
**Hardware Availability:** Sep-2017  
**Software Availability:** Sep-2017  

### Base Portability Flags

- 603.bwaves_s: `-DSPEC_LP64`  
- 607.cactuBSSN_s: `-DSPEC_LP64`  
- 619.lbm_s: `-DSPEC_LP64`  
- 621.wrf_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`  
- 627.cam4_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG`  
- 628.pop2_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian -assume byterecl`  
- 638.imagick_s: `-DSPEC_LP64`  
- 644.nab_s: `-DSPEC_LP64`  
- 649.fotonik3d_s: `-DSPEC_LP64`  
- 654.roms_s: `-DSPEC_LP64`  

### Base Optimization Flags

**C benchmarks:**

- `xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`

**Fortran benchmarks:**

- `-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp`  
- `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 -qopenmp -DSPEC_OPENMP`  
- `nostandard-realloc-lhs -align array32byte`

**Benchmarks using Fortran, C, and C++:**

- `xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`  
- `nostandard-realloc-lhs -align array32byte`

### Base Other Flags

**C benchmarks:**

- `-m64 -std=c11`

**Fortran benchmarks:**

- `-m64`

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

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PowerEdge FC640 (Intel Xeon Gold 6146, 3.20 GHz)

SPECspeed2017_fp_peak = Not Run
SPECspeed2017_fp_base = 102

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Base Other Flags (Continued)

Benchmarks using both Fortran 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.

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