# SPEC® CPU2017 Floating Point Speed Result

**Dell Inc.**

PowerEdge C6420 (Intel Xeon Silver 4110, 2.10 GHz)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tr>
<td>603.bwaves_s 32</td>
<td>75.8</td>
<td>86.7</td>
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<tr>
<td>607.cactuBSSN_s 32</td>
<td>78.5</td>
<td>86.9</td>
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<tr>
<td>619.lbm_s 32</td>
<td>29.6</td>
<td>58.4</td>
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<tr>
<td>621.wrf_s 32</td>
<td>29.4</td>
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<tr>
<td>627.cam4_s 32</td>
<td>42.2</td>
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<td>628.pop2_s 32</td>
<td>42.3</td>
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<td>638.imagick_s 32</td>
<td>43.3</td>
<td>58.1</td>
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<tr>
<td>644.nab_s 32</td>
<td>40.3</td>
<td>60.3</td>
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<tr>
<td>649.fotonik3d_s 32</td>
<td>40.3</td>
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</tr>
<tr>
<td>654.roms_s 32</td>
<td>53.0</td>
<td>65.1</td>
</tr>
</tbody>
</table>

**Software**

- OS: SUSE Linux Enterprise Server 12 SP3 (x86_64) 4.4.114-94.11-default
- 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 1.3.7 released Feb-2018
- File System: xfs
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: 64-bit
- Other: None

**Hardware**

- CPU Name: Intel Xeon Silver 4110
- Max MHz.: 3000
- Nominal: 2100
- 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 TB SATA SSD
- Other: None
**Dell Inc.**

**PowerEdge C6420 (Intel Xeon Silver 4110, 2.10 GHz)**

---

**Results Table**

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<tr>
<th>Benchmark</th>
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<td>241</td>
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</table>

**SPECspeed2017_fp_base = 61.9**

**SPECspeed2017_fp_peak = 63.2**

---

**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

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

---

**Platform Notes**

BIOS settings:

Sub NUMA Cluster disabled

Virtualization Technology disabled

(Continued on next page)
Dell Inc.
PowerEdge C6420 (Intel Xeon Silver 4110, 2.10 GHz)

SPECspeed2017_fp_base = 61.9
SPECspeed2017_fp_peak = 63.2

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

Platform Notes (Continued)

System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
C1EE 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-5j67 Tue Feb 27 02:55:03 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 4110 CPU @ 2.10GHz
    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 4110 CPU @ 2.10GHz
  Stepping: 4
  CPU MHz: 2095.173
  BogoMIPS: 4190.34
  Virtualization: VT-x

(Continued on next page)
Dell Inc.
PowerEdge C6420 (Intel Xeon Silver 4110, 2.10 GHz)

SPEC CPU2017 Floating Point Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Dell Inc.  SPECspeed2017_fp_base = 61.9
PowerEdge C6420 (Intel Xeon Silver 4110, 2.10 GHz)  SPECspeed2017_fp_peak = 63.2

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

Test Date: Feb-2018
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Platform Notes (Continued)

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 nop1 xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid dca ssse4_1 ssse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epbt invpcid_single pln pts
dtherm intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vnumi 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 cqmm_l1c cqmm_occu_p_l1c pkt osxsave

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: 95353 MB
   node 0 free: 90094 MB
   node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
   node 1 size: 96748 MB
   node 1 free: 94204 MB
   node distances:
      node 0 1
      0: 10 21
      1: 21 10

From /proc/meminfo
   MemTotal: 196713216 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:

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CPU2017 License: 55
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Test Date: Feb-2018
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Platform Notes (Continued)

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-5j67 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 Feb 26 19:49

SPEC is set to: /root/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 928G 31G 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 SMBIOS" standard.

BIOS Dell Inc. 1.3.7 02/09/2018
Memory:
12x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400
4x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
==============================================================================

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

==============================================================================

CC  619.lbm_s(peak)
==============================================================================

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

==============================================================================

(Continued on next page)
## Compiler Version Notes (Continued)

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<th>cactuBSSN_s(base)</th>
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PowerEdge C6420 (Intel Xeon Silver 4110, 2.10 GHz)

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**CPU2017 License:** 55

**Test Date:** Feb-2018

**Test Sponsor:** Dell Inc.

**Details:**

### Compiler Version Notes (Continued)

- 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

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

*(Continued on next page)*
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CPU2017 License: 55
Test Sponsor: Dell Inc.
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Test Date: Feb-2018
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Base Optimization Flags (Continued)

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX2 -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-AVX2 -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-AVX2 -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

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

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

Peak 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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## CPU2017 License

55

## Test Sponsor

Dell Inc.

## Tested by

Dell Inc.

## Test Date

Feb-2018

## Hardware Availability

Sep-2017

## Software Availability

Sep-2017

---

### Peak Portability Flags

Same as Base Portability Flags

---

### Peak Optimization Flags

#### C benchmarks:

619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP

638.imagick_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP

644.nab_s: Same as 638.imagick_s

#### Fortran benchmarks:

- -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
- -DSPEC_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3
- -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp
- -nostandard-realloc-lhs -align array32byte

#### Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

628.pop2_s: Same as 621.wrf_s

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

- -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-prefetch
- -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
- -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs
- -align array32byte
Dell Inc.  
PowerEdge C6420 (Intel Xeon Silver 4110, 2.10 GHz)  

| CPU2017 License: 55 | Test Date: Feb-2018 |
| Test Sponsor: Dell Inc. | Hardware Availability: Sep-2017 |
| Tested by: Dell Inc. | Software Availability: Sep-2017 |

**SPEC CPU2017 Floating Point Speed Result**

**SPECspeed2017 fp_base = 61.9**

**SPECspeed2017 fp_peak = 63.2**

Peak Other Flags

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

Fortran benchmarks:
- `-m64`

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.

Tested with SPEC CPU2017 v1.0.2 on 2018-02-27 03:55:02:0500.
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