### Dell Inc.

**PowerEdge C6420 (Intel Xeon Gold 6148, 2.40 GHz)**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>40</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>40</td>
<td>155</td>
<td></td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>40</td>
<td>85.5</td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>40</td>
<td>85.8</td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>40</td>
<td>86.0</td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>40</td>
<td>59.9</td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>40</td>
<td>110</td>
<td></td>
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<tr>
<td>644.nab_s</td>
<td>40</td>
<td>217</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>40</td>
<td>79.2</td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>40</td>
<td>119</td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6148
- **Max MHz:** 3700
- **Nominal:** 2400
- **Enabled:** 40 cores, 2 chips
- **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:** 27.5 MB I+D on chip per chip
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)
- **Storage:** 1 TB SATA SSD
- **Other:** None

**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
# SPEC CPU2017 Floating Point Speed Result

**Dell Inc.**  
PowerEdge C6420 (Intel Xeon Gold 6148, 2.40 GHz)  

**SPECspeed2017_fp_base = 111**  
**SPECspeed2017_fp_peak = 112**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Threads</td>
<td>Seconds</td>
</tr>
<tr>
<td>603.bwaves_s</td>
<td>40</td>
<td>128</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>40</td>
<td>108</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>40</td>
<td>127</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>40</td>
<td>155</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>40</td>
<td>103</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>40</td>
<td>198</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>40</td>
<td>132</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>40</td>
<td>80.4</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>40</td>
<td>115</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>40</td>
<td>133</td>
</tr>
</tbody>
</table>

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
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)
SPEC CPU2017 Floating Point Speed Result

Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6148, 2.40 GHz)

SPECspeed2017_fp_base = 111
SPECspeed2017_fp_peak = 112

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Feb-2018

Tested by: Dell Inc.
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 disabled
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-jfqv Tue Feb 20 17:41:45 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 6148 CPU @ 2.40GHz
  2 "physical id"s (chips)
  40 "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: 20
siblings: 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 1
Core(s) per socket: 20
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz
Stepping: 4
CPU MHz: 2393.373
BogoMIPS: 4788.74
Virtualization: VT-x

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

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Dell Inc.
PowerEdge C6420 (Intel Xeon Gold 6148, 2.40 GHz)       SPECspeed2017_fp_base = 111
                                                          SPECspeed2017_fp_peak = 112

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

Platform Notes (Continued)

L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38
NUMA node1 CPU(s): 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39
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 pcpid 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 dtc dtherm intel_pt rsb_cxtsw spec_ctrl retpoline kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnowvp clflushopt clwb avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavevc xgetbv1 cqm_llc cqm_occup_llc pku ospke

From /proc/cpuinfo cache data
  cache size : 28160 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
  node 0 size: 95353 MB
  node 0 free: 89787 MB
  node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39
  node 1 size: 96748 MB
  node 1 free: 94472 MB
  node distances:
  node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
  MemTotal: 196712160 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:

(Continued on next page)
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**Dell Inc.**  
PowerEdge C6420 (Intel Xeon Gold 6148, 2.40 GHz)  

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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

---

**Platform Notes (Continued)**

```plaintext
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"
```

```plaintext
uname -a:  
Linux linux-jfqv 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 20 12:40
```

```
SPEC is set to: /root/cpu2017  
```

**Filesystem**  
<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>xfs</td>
<td>928G</td>
<td>31G</td>
<td>897G</td>
<td>4%</td>
<td>/</td>
</tr>
</tbody>
</table>

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
  - 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)
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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

### Compiler Version Notes (Continued)

#### 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 607.cactuBSSN_s(peak)

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.

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

#### FC 603.bwaves_s(peak) 649.fotonik3d_s(peak) 654.roms_s(peak)

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

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

#### CC 621.wrf_s(base) 627.cam4_s(base, peak) 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.

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

#### CC 621.wrf_s(peak) 628.pop2_s(peak)

(Continued on next page)
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<td>Sep-2017</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Sep-2017</td>
</tr>
</tbody>
</table>

**Compiler Version Notes (Continued)**

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

### Compiler Version Notes (Continued)

---

### 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-AVX512 -ipo -03 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

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

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SPECspeed2017_fp_base = 111
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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-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

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
Dell Inc.
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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-AVX512
-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-AVX512 -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-AVX512 -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-AVX512
-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-AVX512 -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-AVX512 -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 Gold 6148, 2.40 GHz)  

SPEC CPU2017 Floating Point Speed Result

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Dell Inc.  
PowerEdge C6420 (Intel Xeon Gold 6148, 2.40 GHz)

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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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