Dell Inc.  
PowerEdge C6420 (Intel Xeon Gold 6144, 3.50 GHz)  

<table>
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<tr>
<th>SPECspeed2017_fp_base</th>
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<td>85.4</td>
<td>86.7</td>
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CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.  

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<tr>
<td></td>
<td>Software Availability: Sep-2017</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
</table>
| CPU Name: Intel Xeon Gold 6144  
Max MHz.: 4200  
Nominal: 3500  
Enabled: 16 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: 24.75 MB I+D on chip per core  
Other: None  
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)  
Storage: 1 TB SATA SSD  
Other: None |
| 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 |
Dell Inc.
PowerEdge C6420 (Intel Xeon Gold 6144, 3.50 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>
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<tr>
<td>621.wrf_s</td>
<td>16</td>
<td>210</td>
<td>63.0</td>
<td>195</td>
<td>67.9</td>
<td>201</td>
<td>65.8</td>
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<td>67.4</td>
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<td>184</td>
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<tr>
<td>628.pop2_s</td>
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<td>61.8</td>
<td>192</td>
<td>61.9</td>
<td>192</td>
<td>61.8</td>
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<tr>
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<td>124</td>
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<td>124</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>122</td>
<td>74.6</td>
<td>122</td>
<td>74.7</td>
<td>122</td>
<td>75.0</td>
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<td>121</td>
<td>75.0</td>
<td>123</td>
<td>74.2</td>
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<td>73.9</td>
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<td>109</td>
<td>145</td>
<td>109</td>
<td>144</td>
<td>109</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 85.4
SPECspeed2017_fp_peak = 86.7

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)
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 Wed Feb 28 15:24:00 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 6144 CPU @ 3.50GHz
  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 : 8
siblings : 8
physical 0: cores 0 2 3 9 16 19 26 27
physical 1: cores 0 2 3 9 16 19 26 27

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: 1
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) Gold 6144 CPU @ 3.50GHz
Stepping: 4
CPU MHz: 3491.763
BogoMIPS: 6983.52
Virtualization: VT-x

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

**Dell Inc.**

PowerEdge C6420 (Intel Xeon Gold 6144, 3.50 GHz)

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

**Platform Notes (Continued)**

L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
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 rdtsdp
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 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx fl64 rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pni pts
dtherm intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vmni 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

/procpuinfo cache data
  cache size: 25344 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
  node 0 size: 95354 MB
  node 0 free: 89474 MB
  node 1 cpus: 1 3 5 7 9 11 13 15
  node 1 size: 96749 MB
  node 1 free: 94847 MB
  node distances:
    node 0
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 196715332 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)
Dell Inc.  
PowerEdge C6420 (Intel Xeon Gold 6144, 3.50 GHz)  

SPECspeed2017_fp_base = 85.4  
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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-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 27 12:36

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  
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)
**Dell Inc.**  
PowerEdge C6420 (Intel Xeon Gold 6144, 3.50 GHz)  

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

---

**Compiler Version Notes (Continued)**

```plaintext
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.
------------------------------------------------------------------------------
```

```plaintext
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.
------------------------------------------------------------------------------
```

```plaintext
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.
------------------------------------------------------------------------------
```

```plaintext
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.
------------------------------------------------------------------------------
```

```plaintext
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.
------------------------------------------------------------------------------
```

```plaintext
CC  621.wrf_s(peak) 628.pop2_s(peak)
------------------------------------------------------------------------------
(Continued on next page)
```
### 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:

```bash
icc
```

Fortran benchmarks:

```bash
ifort
```

Benchmarks using both Fortran and C:

```bash
ifort icc
```

Benchmarks using Fortran, C, and C++:

```bash
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 -O3 -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

Dell Inc.
PowerEdge C6420 (Intel Xeon Gold 6144, 3.50 GHz)

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**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
SPEC CPU2017 Floating Point Speed Result

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PowerEdge C6420 (Intel Xeon Gold 6144, 3.50 GHz)

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**Tested by:** Dell Inc.  
**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:**

621.wrf_s: `-prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp -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 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`

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 6144, 3.50 GHz)  

| SPECspeed2017_fp_base = 85.4 |
| SPECspeed2017_fp_peak = 86.7 |

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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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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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Report generated on 2018-10-31 17:09:10 by CPU2017 PDF formatter v6067.  
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