## Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon Gold 6246</td>
<td></td>
</tr>
<tr>
<td>Max MHz.: 4200</td>
<td></td>
</tr>
<tr>
<td>Nominal: 3300</td>
<td></td>
</tr>
<tr>
<td>Enabled: 24 cores, 2 chips, 2 threads/core</td>
<td></td>
</tr>
<tr>
<td>Orderable: 1,2 chips</td>
<td></td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td></td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td></td>
</tr>
<tr>
<td>L3: 24.75 MB I+D on chip per chip</td>
<td></td>
</tr>
<tr>
<td>Other: None</td>
<td></td>
</tr>
<tr>
<td>Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)</td>
<td></td>
</tr>
<tr>
<td>Storage: 1 x 480 GB SATA SSD</td>
<td></td>
</tr>
<tr>
<td>Other: None</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: Ubuntu 18.04.2 LTS</td>
<td></td>
</tr>
<tr>
<td>Compiler: C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux; Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux</td>
<td></td>
</tr>
<tr>
<td>Parallel: Yes</td>
<td></td>
</tr>
<tr>
<td>Firmware: Version 2.1.6 released Mar-2019</td>
<td></td>
</tr>
<tr>
<td>File System: ext4</td>
<td></td>
</tr>
<tr>
<td>System State: Run level 5 (multi-user)</td>
<td></td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td></td>
</tr>
<tr>
<td>Peak Pointers: 64-bit</td>
<td></td>
</tr>
<tr>
<td>Other: None</td>
<td></td>
</tr>
</tbody>
</table>

### SPECspeed2017_fp_base = 114

### SPECspeed2017_fp_peak = 113

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Time</th>
<th>Hardware Availability</th>
<th>Software Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>48</td>
<td>Apr-2019</td>
<td>Feb-2019</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
<td>Apr-2019</td>
<td>Feb-2019</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>48</td>
<td>Apr-2019</td>
<td>Feb-2019</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>48</td>
<td>Apr-2019</td>
<td>Feb-2019</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>48</td>
<td>Apr-2019</td>
<td>Feb-2019</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>48</td>
<td>Apr-2019</td>
<td>Feb-2019</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
<td>Apr-2019</td>
<td>Feb-2019</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>48</td>
<td>Apr-2019</td>
<td>Feb-2019</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
<td>Apr-2019</td>
<td>Feb-2019</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>48</td>
<td>Apr-2019</td>
<td>Feb-2019</td>
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<td>Apr-2019</td>
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## SPEC CPU2017 Floating Point Speed Result

**Dell Inc.**  
PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)  

**SPECspped2017_fp_base** = 114  
**SPECspped2017_fp_peak** = 113

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seconds</td>
<td>Ratio</td>
<td>Seconds</td>
</tr>
<tr>
<td>603.bwaves_s</td>
<td>48</td>
<td>127</td>
<td>463</td>
</tr>
<tr>
<td>607.cactusBSN_s</td>
<td>48</td>
<td>169</td>
<td>98.8</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>48</td>
<td>68.4</td>
<td>76.6</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>48</td>
<td>112</td>
<td>118</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>48</td>
<td>89.3</td>
<td>99.2</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>48</td>
<td>251</td>
<td>47.2</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
<td>142</td>
<td>101</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>48</td>
<td>86.2</td>
<td>203</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
<td>115</td>
<td>79.3</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>48</td>
<td>141</td>
<td>112</td>
</tr>
</tbody>
</table>

**SPECspped2017_fp_base** = 114  
**SPECspped2017_fp_peak** = 113

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:  
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5  
NA: 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  
runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>
Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)

SPECspeed2017_fp_base = 114
SPECspeed2017_fp_peak = 113

BIOS settings:
ADDDC setting disabled
Sub NUMA Cluster enabled
Virtualization Technology disabled
DCU Streamer Prefetcher enabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
C1E 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 /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on intel-sut Thu Apr 25 01:13:17 2019

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 6246 CPU @ 3.30GHz
  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 2 4 8 9 10 17 18 19 25 27
physical 1: cores 0 2 4 8 9 10 11 17 18 19 25 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
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
Dell Inc.  
PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)  

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Test Date</th>
<th>Hardware Availability</th>
<th>Software Availability</th>
</tr>
</thead>
</table>

Test Sponsor: Dell Inc.  
Tested by: Dell Inc.  

SPECspeed2017_fp_base = 114  
SPECspeed2017_fp_peak = 113

### Platform Notes (Continued)

- **Model name:** Intel(R) Xeon(R) Gold 6246 CPU @ 3.30GHz
- **Stepping:** 7
- **CPU MHz:** 4042.436
- **BogoMIPS:** 6600.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 25344K
- **NUMA node0 CPU(s):** 0,4,8,10,12,20,24,28,32,34,36,44
- **NUMA node1 CPU(s):** 1,5,9,13,17,21,25,29,33,37,41,45
- **NUMA node2 CPU(s):** 2,6,14,16,18,22,26,30,38,40,42,46
- **NUMA node3 CPU(s):** 3,7,11,15,19,23,27,31,35,39,43,47
- **Flags:** fpu vme de pse tsc msr pae mce 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 cop1 aperfmperf pni pclmulqdq dttes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt aes xSAVE f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmxior flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaveaves cmqm_llc cmqm_occup_llc cmqm_mbb_total cmqm_mbb_local dtherm ida arat pln pts pkup ospke avx512_vnni flush_l1d arch_capabilities

From numactl --hardware  

<table>
<thead>
<tr>
<th>available</th>
<th>node 0 cpus</th>
<th>node 0 size</th>
<th>node 0 free</th>
<th>node 1 cpus</th>
<th>node 1 size</th>
<th>node 1 free</th>
<th>node 2 cpus</th>
<th>node 2 size</th>
<th>node 2 free</th>
<th>node 3 cpus</th>
<th>node 3 size</th>
<th>node 3 free</th>
<th>node distances</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 nodes</td>
<td>0 4 8 10 12 20 24 28 32 34 36 44</td>
<td>46785 MB</td>
<td>45719 MB</td>
<td>1 5 9 13 17 21 25 29 33 37 41 45</td>
<td>48381 MB</td>
<td>43226 MB</td>
<td>2 6 14 16 18 22 26 30 38 40 42 46</td>
<td>48381 MB</td>
<td>47464 MB</td>
<td>3 7 11 15 19 23 27 31 35 39 43 47</td>
<td>48359 MB</td>
<td>47521 MB</td>
<td>node distances:</td>
</tr>
<tr>
<td>(0-3)</td>
<td>0: 10 21 11 21</td>
<td>1: 21 10 21 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Continued on next page)</td>
</tr>
</tbody>
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SPEC CPU2017 Floating Point Speed Result

Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)

SPECspeed2017_fp_base = 114
SPECspeed2017_fp_peak = 113

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.
Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Platform Notes (Continued)

2:  11  21  10  21
3:  21  11  21  10

From /proc/meminfo
MemTotal: 196513984 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
Ubuntu 18.04.2 LTS

From /etc/*release*/etc/*version*
debian_version: buster/sid
os-release:
NAME="Ubuntu"
VERSION="18.04.2 LTS (Bionic Beaver)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 18.04.2 LTS"
VERSION_ID="18.04"
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"

uname -a:
Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB

run-level 5 Apr 23 19:20

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 439G 25G 392G 6% /

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. 2.1.6 03/04/2019
Memory:
11x 002C069D002C 18ASF2G72F2-2G9E1 16 GB 2 rank 2933
1x 00AD00B300AD HMA82GR7CJR8N-WM 16 GB 2 rank 2933

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

Dell Inc.
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SPECspeed2017_fp_base = 114
SPECspeed2017_fp_peak = 113

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

Test Date: Mar-2019
Hardware Availability: Apr-2019
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Platform Notes (Continued)

4x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC  607.cactuBSSN_s(base, peak)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
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FC  603.bwaves_s(peak) 649.fotonik3d_s(peak)
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==============================================================================
CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)

(Continued on next page)
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

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

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

(Continued on next page)
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Base Portability Flags (Continued)

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=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64
SPEC CPU2017 Floating Point Speed Result

Dell Inc.
PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)

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SPECspeed2017_fp_peak = 113

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

Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:

603.bwaves_s: -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=4
-qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs

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=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

The flags files that were used to format this result can be browsed at
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<th>SPEC CPU2017 Floating Point Speed Result</th>
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**Dell Inc.**

PowerEdge C6420 (Intel Xeon Gold 6246, 3.30GHz)

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**SPECspeed2017_fp_peak = 113**

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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 v1.0.5 on 2019-04-24 21:13:16-0400.


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